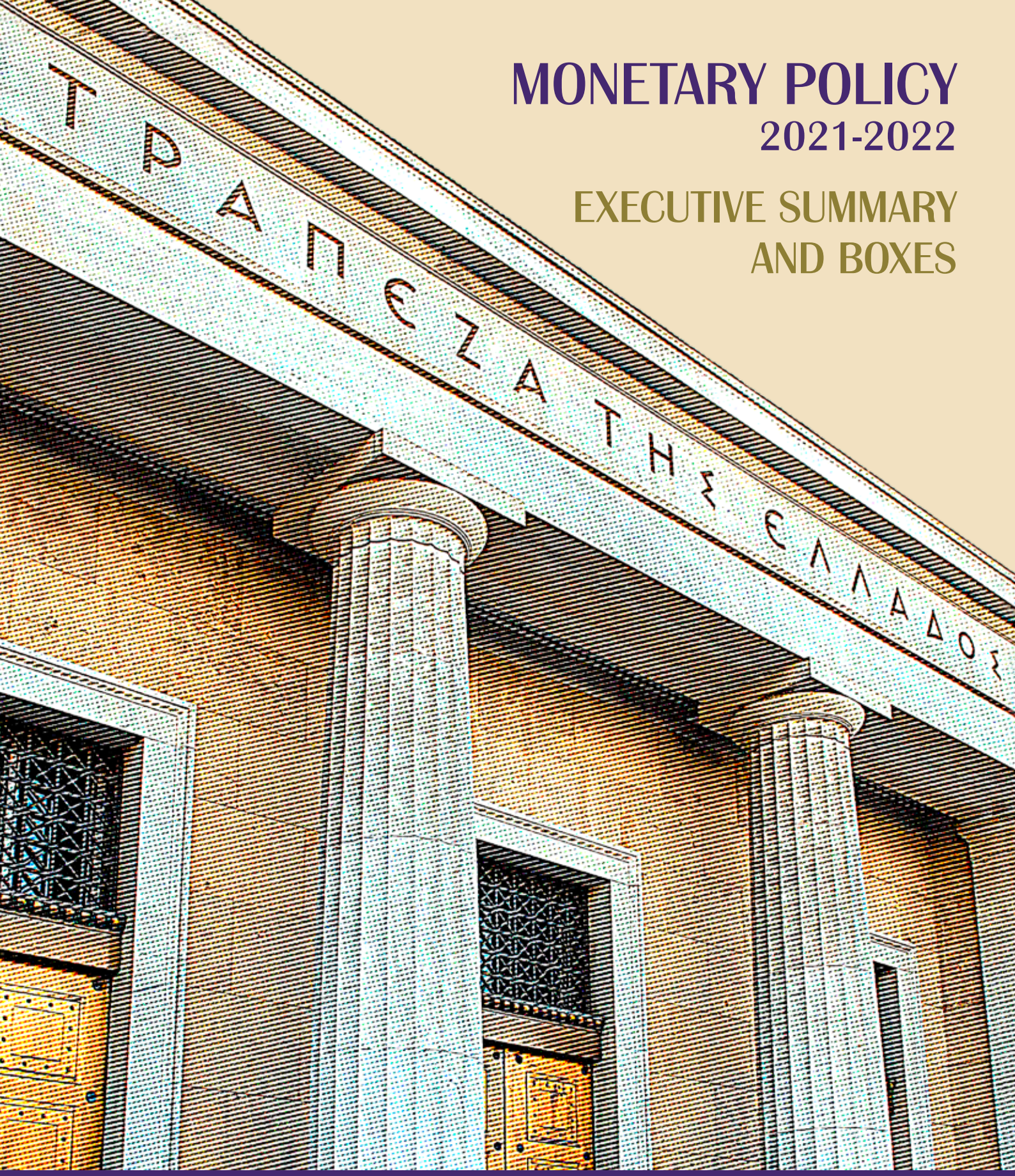
MONETARY POLICY
2021-2022

EXECUTIVE SUMMARY AND BOXES



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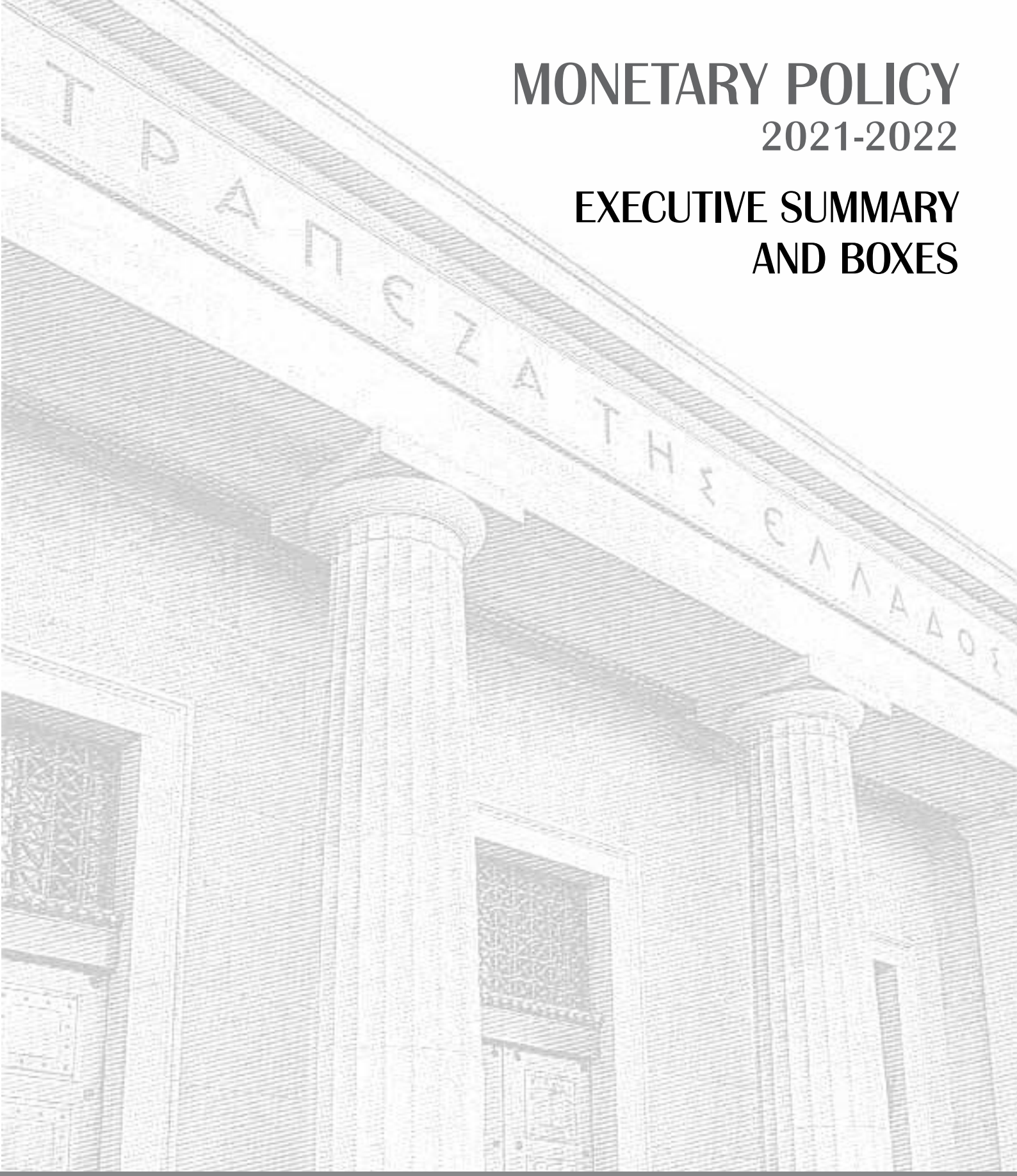

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

DETERIORATION IN THE INTERNATIONAL ECONOMIC ENVIRONMENT IS CAUSING UNCERTAINTY IN THE GREEK ECONOMY

1 INTRODUCTION

Russia's invasion of Ukraine has undermined global security and stability and abruptly changed the international economic environment and outlook. Before the war in Ukraine, the global economy was dynamically recovering from the impact of the pandemic and the resulting disruptions of global supply chains. Today, it is faced with a double shock: on the one hand, a further rise in inflation, driven by energy, food and metal commodity prices, and, on the other, the risk of a major slowdown in economic activity or even recession amid heightened uncertainty and high geopolitical and financial risks.

The surge in inflation globally prompts central banks, including the European Central Bank (ECB), to gradually normalise monetary policy. Although the current rise in inflation stems mainly from a negative aggregate supply shock, which central banks cannot easily offset, they are nevertheless responding by raising their interest rates in order to contain inflation expectations and second-round effects. The size of interest rate increases will depend on the path of inflation, the evolution of the output gap and the existence of second-round effects via wages.

In any event, markets are pricing in an acceleration and broadening of interest rate increases as they expect a growing number of central banks to raise their key rates in the course of 2022. Interest rate increases, combined with the surge in inflation and the slowdown in economic activity, have led to stronger risk aversion among investors. Since early 2022, global financial conditions have deteriorated significantly, reflected in a substantial rise in government and corporate bond yields, a fall in stock prices and an increase in volatility, mainly on account of investor concerns about the path of the global economy.

In this unfavourable environment, the dynamic recovery of the Greek economy continued in the first quarter of 2022, but the war in Ukraine, the surge in inflation and the normalisation of monetary policy are expected to dampen growth thereafter. At the same time, the rise in average inflation above euro area levels is likely to worsen the competitiveness of the Greek economy, with negative repercussions on the current account balance. In this context, vigilance is needed to prevent a price-wage spiral. Domestic fiscal policy responded to the adverse conditions by introducing targeted and temporary income support measures for vulnerable social groups worst hit by soaring energy prices. This was done using the available fiscal space without compromising the primary deficit reduction target. In the medium term, ensuring fiscal sustainability is key to achieving sustainable growth rates, preserving the credibility of fiscal policy and upgrading the credit rating of the Greek sovereign to investment grade.

In order to counter the rise in energy prices and mitigate the impact on the economy, short- and medium-term interventions are needed. In the short run, direct income support measures (though targeted and limited in time) are required, as well as joint interventions at the European level in the wholesale energy market in order to rein in price hikes; such measures should have a positive impact on households' real disposable income and reduce companies' energy costs. At the same time, supplier diversification efforts need to be stepped up. In the medium term, the activation and deployment of the new REPowerEU tool proposed by the European Commission will help accelerate the process of weaning off fossil fuels.

Worsening financial conditions led to a comparatively higher increase in Greek bond yields than in other euro area bond yields. This is due to the fact that Greek bonds are more vulnerable, as their credit rating is below investment grade, but is also attributable to the shallowness of the secondary bond market. It should be noted that the Bank of Greece had, already in June 2021 in its Monetary Policy Report 2020-2021, highlighted the risks of a faster-than-expected increase in inflation and the potential negative impact on Greek bonds from a tightening of monetary policy, as Greece has not yet attained investment grade.

The continuation of reforms and the implementation of the investment projects envisaged in the National Recovery and Resilience Plan are factors that will improve the economic outlook. At the same time, flexibility in PEPP portfolio reinvestments, as well as the policy interventions to be launched by the ECB to prevent fragmentation of the euro area financial system, should reduce tensions in bond markets.

2 DEVELOPMENTS – PROSPECTS

Strong growth in the first quarter of 2022 – Significant rise in inflation and worsening economic sentiment

Economic activity expanded at very high rates in 2021 and the first quarter of 2022, offsetting the 2020 pandemic-induced losses. In particular, real GDP grew by 8.3% in 2021, supported by higher private consumption, stronger public consumption, increased private investment, as well as a rapid recovery in exports of goods and services. In the first quarter of 2022, the high growth rate (+7.0% year-on-year) is mainly attributable to private consumption, exports of services, but also to business investment expenditure.

Based on the evolution of the turnover of Greek enterprises and the available short-term indicators of economic activity, regarding e.g. retail sales, building permits and sales of passenger cars, the recovery continues to be broadly based across sectors of economic activity.

Nevertheless, the deterioration of the economic environment and the exacerbation of inflationary pressures, also due to Russia's invasion of Ukraine, have inevitably created new conditions. As a result, business expectations and consumer confidence declined significantly in April, before strengthening again in May, but remained below their January-February levels. The Purchasing Managers' Index (PMI) also declined in May, reaching a 14-month low, while remaining at levels suggesting growth.

The main and most visible effect of the energy crisis is an increase in the general level of prices, which reduces the real disposable income of households, in particular the lowest-income groups of society, and intensifies uncertainty about the economic outlook. Inflation, as measured by the Harmonised Index of Consumer Prices (HICP), having fallen to -1.3% in 2020 and partly rebounded to 0.6% in 2021, trended strongly upwards in the first five months of 2022. An upward path, albeit much weaker, was also followed by core inflation (i.e. excluding unprocessed food and energy). It should be noted that the upward trend in harmonised inflation started in mid-2021, as increases in the energy component were accompanied by increases in food prices. Over time, a combination of continued increases in energy prices and the return of the two main components of core inflation (services and non-energy industrial goods) to positive territory, together with food price increases, contributed to positive annual rates, which had not been seen for more than a decade. It should be noted that the energy component of inflation has continuously been on the rise since March 2021, increasing by 50.8% on average in the first five months of 2022 year-on-year. This impressive rise in energy inflation was originally driven by international oil prices, but in recent months increases have been mainly driven by electricity and gas prices. Headline HICP inflation stood at 10.5% in May and appears to have become more persistent, as higher energy and food prices are now affecting the components of core inflation, i.e. services and non-energy industrial goods.

The Greek real estate market is under the influence of opposing forces, with positive expectations currently prevailing over the effects of the unfavourable international situation. Housing market prices continued to record upward trends both during 2021 and in the first quarter of 2022. In the first months of 2022, in addition to valuations, other housing market indicators remained positive, such as the residential building activity index, the housing expectations index and net foreign direct investment. However, the total cost of construction of new residential buildings rose in the first quarter of 2022 by 7.0% year-on-year, while the construction confidence indicator deteriorated. There was significant investment activity in the commercial real estate sector in the second half of 2021 and in the first months of 2022, including both purchases and reconstructions or new developments. According to the Bank of Greece's new commercial real estate market survey, expectations for the first half of 2022 were positive in January for prime offices and stable for prime retail properties. Stronger optimism was recorded for business warehouses and hotels.

The labour market showed considerable resilience during the health crisis thanks to fiscal employment-protection measures, while in 2021, with the recovery of the economy, employment grew by 1.4% and unemployment continued its downward path. Improving trends in the labour market continue in 2022, with employment increasing by 11.6% year-on-year in the first quarter, driven by strong growth and largely by positive base effects. The rate of unemployment declined to 13.8% in the first quarter of 2022 (from 17.1% in the first quarter of 2021). The decline of unemployment benefited both men and women. However, unemployment remains significantly above the European average. Labour market prospects remain positive, with tourism being the main driver of employment growth.

The international competitiveness of the Greek economy improved overall in 2021. In particular, the real effective exchange rate based on relevant consumer price indices continued to improve for the third consecutive year in 2021, declining by 1.3%. However, this trend is likely to slow down or even reverse in 2022, due to a stronger rise in inflation in Greece compared to several of its trading partners. The structural competitiveness of the Greek economy, although still comparatively low at European and international level, improved in 2021 in some areas as, inter alia, business costs in terms of taxation and employer contributions have decreased and the efficiency of the public sector has increased.

The current account balance improved slightly in 2021, registering a deficit of 5.9% of GDP (compared with 6.6% in 2020). This improvement was mainly driven by the continued upward trend of exports of goods, the recovery in travel receipts and the increase in net sea transport receipts, while the rapid increase in imports of goods (a result of the recovery in economic activity) made a negative contribution.

In January-April 2022, the current account deficit rose by EUR 3.3 billion year-on-year. The goods deficit also widened, as the rise in exports of goods slowed down while the rise in imports of goods accelerated. The widening deficit of the balance of goods was only slightly offset by an increase in the services surplus, as the contribution of the travel balance to the current account balance was small in the first months of the year. However, the return of travel receipts to 2019 (i.e. pre-pandemic) levels and the rise in net sea transport receipts continued. At the same time, the surplus of the primary income account declined, while the secondary income account turned to surplus.

Financial sector: rising bond yields, falling equity prices and increasing volatility – Greece's credit rating upgrade is a positive development

Since the beginning of the fourth quarter of 2021, Greek government bond yields have been on an upward trend, in line with international developments, and have increased significantly from their 2021 historical lows and more strongly than the government bond yields of other euro area Member States for similar maturities. This can be explained by the greater sensitivity of

low-rated securities, including Greek government bonds, to changes in international monetary and financial conditions. Moreover, concerns about world economic activity, compounded by the war in Ukraine, increase investors' risk aversion.

Yields on bonds issued by Greek non-financial corporations also moved upwards, already from the end of the third quarter of 2021, broadly in line with the upward trend in corporate bond yields in international markets.

Uncertainty surrounding the outlook for global economic activity has negatively affected the investment climate in equity markets and has led to a significant increase in volatility. Against this background, stock prices on the Athens Exchange moved downwards in 2022, in line with negative returns in the United States and the euro area.

However, the first months of 2022 saw also positive developments. These include the upgrade of the credit rating of the Greek sovereign by DBRS and Standard and Poor's to just one notch short of investment grade. This development contributes to the upgrading of other bond issuers based in Greece, including significant Greek credit institutions, whose credit ratings were also upgraded in the same period. A further one-notch upgrade by these rating agencies will be a very favourable development, as it will place Greek bonds in investment grade territory, with significant benefits in terms of the borrowing costs of the Greek State, banks and private enterprises, while also helping to attract foreign investment.

The annual growth rate of bank credit to non-financial corporations (NFCs) decelerated in the first four months of 2022 and their deposits declined from the very high levels of earlier months, without affecting the high liquidity of the economy. The announced shift of the ECB's monetary policy to a less accommodative stance to curb inflationary pressures (with a first interest rate increase due to take place in July) is expected to lead to rises in domestic bank interest rates.

Fiscal developments: Improving fiscal aggregates in 2021 – New measures to support vulnerable social groups

According to the first EDP notification of fiscal data for 2018-2021 by the Hellenic Statistical Authority (ELSTAT), the general government primary deficit for 2021 dropped to 5.0% of GDP (from 7.2% in 2020 and against a forecast of 6.2% of GDP), while the debt-to-GDP ratio fell to 193.3% in 2021 (from 206.3% in 2020 and against a forecast 197.1% of GDP). The significant decline of both the primary deficit and the government debt as a percentage of GDP is mainly due to a faster recovery in economic activity. As a result, fiscal policy in 2021 turned out to be less expansionary than initially forecast.

The rise in inflation, which started in 2021 and intensified in 2022, led to additional fiscal measures in 2022 aimed at supporting businesses and households' disposable income. In particular, the amount of emergency support measures for vulnerable social groups was increased to EUR 4.3 billion in 2022, from EUR 1 billion in 2021. For the most part, these measures (EUR 3.6 billion, compared with EUR 0.63 billion in 2021) are expected to be financed by the Just Transition Fund without burdening the government budget.

In this regard, it should be noted that in January-April 2022 the government budget balance improved significantly year-on-year, as its deficit dropped to 1.7%, from 4.8% of GDP in the corresponding period of 2021. Compared to the first four months of 2021, tax revenue rose significantly in the first four months of 2022, with the rise stemming mainly from individual income tax, indirect taxes and the first payments of outstanding non-restructured debt accumulated during the pandemic. At the same time, a year-on-year decline in the government budget primary expenditure registered in the first four months of 2022 mainly reflects a decrease in expenditure on social transfers and under the Public Investment Programme, as the pandemic-related support measures have been significantly reduced and this reduction is only partially offset by energy subsidies.

Forecasts: higher uncertainty, weaker growth and rising inflation

Given the rise in uncertainty, the Bank of Greece has developed a baseline and an adverse scenario on the future path of the economy. According to the most recent baseline projections of the Bank of Greece, the growth rate of the Greek economy in 2022 is expected to be 3.2%, revised downwards from 3.8% in the Annual Report of April 2022. The revision reflects a further rise in uncertainty in the economy, due to the ongoing war in Ukraine, and increases in costs and prices in general.

Economic growth could turn out higher than the baseline projection of 3.2% if the strong performance of the first quarter continues in the next quarters of this year. However, the risks are tilted to the downside and relate to a further escalation of geopolitical instability, a worsening international economic climate, a disruption in energy supply and a consequent further increase in energy prices.

In 2023, growth is expected to pick up to 4.1%, while for 2024 it is projected to be relatively high, at 3.6%, provided that the geopolitical crisis abates by the end of 2022 and energy prices decline.

In the adverse scenario, the growth rate of the Greek economy is projected at 1.8% in 2022, 0.3% in 2023 and 4.9% in 2024. These estimates are based on assumptions of adverse developments related to the war in Ukraine. In particular, this scenario assumes that the war will continue up to end-2023, gas and oil imports from Russia will be completely discontinued and it will be impossible to immediately substitute for these energy sources by resorting to other suppliers.

In the baseline scenario, consumption expenditure is projected to keep rising in 2022, but at a much weaker pace than in the previous year, due to lower real disposable income and higher uncertainty. In the following years, consumption expenditure growth will strengthen somewhat, supported by a projected rise in employment, as well as a decline in the high savings accumulated in the past couple of years mainly due to the postponement of spending during the pandemic.

Investment is expected to grow at high rates throughout the projection horizon 2022-2024, supported by high liquidity in the banking sector and by the utilisation of available European funds.

Exports of goods have shown resilience during the pandemic and are projected to grow at a satisfactory pace in 2022-2024. Exports of services are expected to rise. Travel receipts in 2022 should rebound to about 80% of their 2019 level, remaining on an upward trend also in 2023-2024. Finally, sea transport receipts should keep rising, benefiting from a strong freight market. At the same time, however, imports are also expected to increase in line with strengthening domestic – in particular investment – demand.

The number of employees is projected to increase in 2022-2024. High rates of economic growth, the measures put in place to support employment and incomes, and the continuation of reforms will help to further reduce unemployment.

Headline HICP inflation is projected to reach 7.6% in 2022, mainly driven by energy and food prices, before weakening in 2023 and further in 2024. Core inflation will also be high in 2022 and, although declining in 2023 and 2024, will remain elevated and above the headline measure as the strong inflationary pressures of 2022 feed into underlying inflation.

Turning to budgetary aggregates, the 2022 Stability Programme projects a smaller reduction in the primary deficit, estimated at 2.0% of GDP (compared with 1.4% of GDP in the 2022 Budget Report), but a faster decline of the debt-to-GDP ratio to 180.2% (compared with 187.3%) mainly due to an upward revision of the inflation forecast and, thus, also of nominal GDP. As a result,

the fiscal policy stance in 2022 is expected to turn contractionary. According to revised projections by the Bank of Greece, in 2022 the general government primary balance (calculated using the enhanced surveillance methodology) is expected to be in deficit of about 2.0% of GDP, while the public debt should stand at 177.0%.

In the medium term, the 2022 Stability Programme projects a return in the following years to primary surpluses of 1.1% of GDP in 2023, 2.1% of GDP in 2024 and 2.3% of GDP in 2025, leading to a further gradual decline of the debt-to-GDP ratio to 146.5% in 2025. Projections for the coming years incorporate the assumption that the two main budgetary interventions of the 2021-2022 period, namely the 3% reduction in social security contributions and the waiver of the solidarity surcharge in the private sector, will become permanent.

Due to emergency fiscal measures in 2020-2022 (totalling EUR 40 billion) and additional borrowing under European instruments (NGEU, SURE), both public debt and the gross financing needs of the government have increased. In particular, the financing needs for the coming decade remain marginally at the reference level of 15% of GDP, on condition however that cash buffers remain high. This implies increased downside macroeconomic risks, eliminating the scope for easing primary surplus targets.

In any event, according to the updated estimates of the Bank of Greece, risks to the sustainability of public debt remain limited in the medium term, provided that the fiscal measures taken in the context of the pandemic and the energy crisis are temporary in nature and that the European resources (NGEU) are used effectively. In the longer term, there is increased uncertainty, as the gradual refinancing of the accumulated official sector debt on market terms increases the exposure of the Greek government to interest rate risk.

The economic outlook is subject to uncertainties and risks

Downside risks to the growth outlook of the Greek economy relate to: (a) a further escalation of the war in Ukraine, which would lead to a further increase in uncertainty and stronger and more persistent inflationary pressures; (b) a new wave of the pandemic; or (c) a low absorption rate of EU funds under the Recovery and Resilience Facility. A further tightening of global financial conditions and increased risk aversion on the part of international investors pose risks to the financing of the real economy, as well as to the Greek government's uninterrupted and affordable access to international capital markets. However, the actions being planned by the ECB to prevent financial fragmentation in the euro area are expected to reduce such risks. In addition, significant risks to the inflation outlook are associated with a possible further increase in international energy prices coupled with a depreciation of the euro vis-à-vis the US dollar, as well as the possibility that inflationary pressures may become more permanent, leading to increases in nominal wages and thereby triggering a wage-price spiral. In the event of a fast and drastic tightening of monetary policy to rein in higher-than-expected inflation and/or a further deterioration in confidence and an economic downturn in Greece's main trading partners, stagflationary phenomena could be observed in the Greek economy.

Additional risks to the Greek economy, which are not reflected in the above scenarios, also stem from geopolitical tensions in the Eastern Mediterranean, and in particular from Turkey's increasingly aggressive rhetoric.

3 WORLD ECONOMY

Decline in confidence, slowdown in recovery and global trade, rising inflation

Russia's invasion of Ukraine at the end of February 2022 and the ongoing war have so far had tragic consequences, with human casualties, large refugee flows, but also serious economic impacts both for the belligerent countries and for the European and the global economy. Inter-

national economic activity had just recovered from the largest post-war recession caused by the pandemic and the pandemic-related restrictions.

Global GDP grew by 6.1% in 2021, following an unprecedented post-war drop of 3.1% in 2020. In January, the recovery of the global economy was projected to continue at a slower pace, yet above the long-term average. Since the beginning of the war, however, the outlook for the global economy has changed dramatically, with a stronger GDP slowdown and higher inflation, against a background of heightened uncertainty and high geopolitical and financial risks.

Global GDP growth is now projected to decline to 3.6% in 2022 and 2023 (IMF, April 2022), with the effects of the war in Ukraine spreading to both advanced and emerging economies through international commodity prices, international trade and financial markets, but also through second-round effects on global demand. However, the impact of the war is projected to be more pronounced in emerging and developing economies over the medium term, as they generally have less scope for conducting counter-cyclical policies.

In the first quarter of 2022, the war between Russia and Ukraine halted the dynamic growth of international trade, amid increased disruptions in global supply chains, a surge of energy, metals and food prices at historically high levels and a decline in global economic activity. Moreover, the reintroduction of lockdowns in China as part of its zero-COVID policy has exacerbated supply-side constraints. According to IMF estimates, revised downwards due to the impacts of the war in Ukraine, the volume of international trade in goods and services is expected to increase by 5% in 2022, compared with a strong recovery of 10.1% in 2021. In 2022, a decline in global demand for goods is expected due to inflationary pressures and the phasing out of the pandemic-related fiscal support measures; however, demand for services is expected to strengthen. The medium-term outlook for world trade is expected to be in line with global economic growth of close to 3.5%.

Inflation has continued to rise globally and, since the outbreak of the war, in advanced economies has reached its highest levels in 40 years. Inflation is now expected to remain high worldwide for a longer period, fuelled by the impacts of the war, directly as a result of higher global commodity prices and, indirectly, of the gradual pass-through of inflationary pressures to the prices of industrial goods and services. Despite the anticipated easing of bottlenecks in global supply chains, inflation will also be affected upwards by the shrinking output gap and declining economic slack. Inflation in advanced economies as a whole is expected to reach 5.7% in 2022, up from 3.1% in 2021, according to the IMF's April estimate, i.e. almost 2 percentage points higher than the January forecast. Inflation is projected to decline to 2.5% in 2023, if the assumed 13% fall in international crude oil prices is confirmed.

In the first quarter of 2022, euro area GDP grew by 0.6% quarter-on-quarter. According to the Eurosystem staff baseline projections (June 2022), GDP is expected to grow by 2.8% in 2022, down from 5.4% in 2021. This estimate reflects, on the one hand, the positive carry-over from the dynamic economic recovery in 2021 and, on the other, the negative impact of the energy crisis, rising uncertainty, supply chain bottlenecks, but also the indirect exposure of the euro area economy to the evolution of the pandemic in other countries, notably China. In 2023, economic activity is projected to grow by 2.1%, driven by geopolitical developments, the withdrawal of temporary income support measures and the normalisation of monetary policy, while it will be supported by the easing of supply chain bottlenecks and the expected decline in energy prices.

In the first quarter of 2022, soaring energy and global commodity prices due to Russia's invasion of Ukraine, as well as supply shortages, fuelled the surge of cost inflation in the euro area, which had been rising sharply already since mid-2021. Inflation in the euro area stood at 8.1% in May 2022, up from 5.1% in January 2022 and 1.6% in April 2021. Inflation rates vary considerably across Member States, ranging from 5.8% in Malta and France to 20.1% in Estonia. In addition, the depreciation of the euro raises import prices and strengthens inflationary pressures.

According to the Eurosystem staff projections (June 2022), HICP inflation will reach historically high levels, at 6.8% in 2022, from 2.6% in 2021, before falling to 3.5% in 2023, remaining above the target (2%). The shrinking output gap and the energy crisis are expected to affect non-energy industrial goods prices as well as nominal wages, and therefore inflation excluding energy and food is expected to reach 3.3% in 2022, from 1.5% in 2021, compounding risks for a wage-price spiral and for more persistent inflationary pressures over the medium term.

The war in Ukraine exacerbates the dilemmas facing economic policy, which has to strike the right balance between supporting the recovery and anchoring inflation expectations, but also between government support for the most vulnerable social groups and the necessary post-pandemic restoration of fiscal equilibrium.

Current projections for the global and European economies are surrounded by increased uncertainty. Risks to economic growth and inflation are associated with a number of negative potential developments, such as a longer duration or an escalation of the war in Ukraine, imposition of further sanctions on and by Russia, spreading geopolitical tensions, increasing export bans, weaker global trade and economic slowdown in China due to its zero-COVID policy. The speed of monetary policy normalisation remains a key issue, with the expected short-term cost of interest rate increases being significantly lower than the long-term impact of a possible de-anchoring of inflation expectations. At the same time, governments' efforts towards energy transition, phasing out fossil fuel dependency and reaching the carbon-neutral footprint target face new difficulties and higher costs due to the new reality of having to rapidly wean off Russian energy. However, the frontloaded reduction of fossil fuel dependency and a faster green transition will enhance the resilience of economies to fluctuations in energy prices. Especially for the countries of the European Union, a faster implementation of investment projects with the help of NGEU funds will support the medium-term economic outlook.

4 THE SINGLE MONETARY POLICY

Measures to further normalise monetary policy – Forward guidance on interest rate increases – Design of a new instrument to address market fragmentation

On 9 June, the Governing Council of the ECB considered that in May inflation again rose significantly, mainly because of surging energy and food prices, including due to the impact of the war in Ukraine. Indeed, inflation pressures have broadened and intensified, with prices for many goods and services increasing strongly. In addition, the Governing Council of the ECB noted that the Russian invasion of Ukraine continued to weigh on the economy in Europe. It is disrupting international trade, leading to shortages of raw materials and intermediate goods and contributing to high energy and commodity prices. These factors will continue to weigh on confidence and dampen growth, especially in the near term. However, the conditions are in place for the euro area economy to continue to grow on account of savings built up during the pandemic, part of which is now being spent, and continued, albeit declining, fiscal support.

On the basis of the updated assessment, the Governing Council decided to take further steps in normalising its monetary policy. In particular, it announced that:

- It will end net purchases under the asset purchase programme (APP) as of 1 July 2022. The Governing Council intends to continue reinvesting, in full, the principal payments from maturing securities purchased under the APP for an extended period of time past the date when it starts raising the key ECB interest rates and, in any case, for as long as necessary to maintain ample liquidity conditions and an appropriate monetary policy stance.

- It will reinvest the principal payments from maturing securities purchased under the PEPP 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. In the event of renewed market fragmentation related to the pandemic, PEPP reinvestments can be adjusted flexibly across time, asset classes and jurisdictions at any time. This could include purchasing bonds issued by the Hellenic Republic over and above rollovers of redemptions in order to ensure a smooth transmission of monetary policy to the Greek economy while it is still recovering from the fallout from the pandemic. Net purchases under the PEPP could also be resumed, if necessary, to counter negative shocks related to the pandemic.

- It intends to raise the key ECB interest rates by 25 basis points at its July monetary policy meeting.

The Governing Council also expects to raise the key ECB interest rates again in September. The calibration of this rate increase will depend on the updated medium-term inflation outlook. If the inflation outlook persists or deteriorates, a larger increment will be appropriate at the September meeting.

Beyond September, based on its current assessment, the Governing Council anticipates that a gradual but sustained path of further increases in interest rates will be appropriate. In line with the Governing Council's commitment to its 2% medium-term inflation target, the pace at which the Governing Council adjusts its monetary policy will depend on the incoming data and how it assesses inflation will develop in the medium term.

The Governing Council will continue to monitor bank funding conditions and ensure that the maturing of operations under the third series of targeted longer-term refinancing operations (TLTRO III) does not hamper the smooth transmission of its monetary policy. It will also regularly assess how targeted lending operations are contributing to its monetary policy stance. As announced previously, the special conditions applicable under TLTRO III ended on 23 June 2022.

The Governing Council stands ready to adjust all of its instruments, incorporating flexibility if warranted, to ensure that inflation stabilises at its 2% target over the medium term. The pandemic has shown that, under stressed conditions, flexibility in the design and conduct of asset purchases has helped to counter the impaired transmission of monetary policy and made the Governing Council's efforts to achieve its goal more effective. Within the ECB's mandate, under stressed conditions, flexibility will remain an element of monetary policy whenever threats to monetary policy transmission jeopardise the attainment of price stability.

In this context, following an ad hoc meeting on 15 June 2022 the ECB Governing Council decided that it will apply flexibility in reinvesting redemptions coming due in the PEPP portfolio, with a view to preserving the functioning of the monetary policy transmission mechanism, a precondition for the ECB to be able to deliver on its price stability mandate. In addition, the Governing Council mandated the relevant Eurosystem Committees together with the ECB services to accelerate the completion of the design of a new anti-fragmentation instrument for consideration by the Governing Council.

5 FINANCIAL SECTOR

Declining deposits and decelerating growth of bank credit to NFCs in the first four months of 2022 – The normalisation of monetary policy will put upward pressure on lending rates; however, the terms and conditions and availability of bank credit are supported by public resources

Greek banks benefited from favourable liquidity conditions in the first four months of 2022, thanks to the increase in retail deposits in previous years and the continued accommodative stance of the Eurosystem's single monetary policy. As a result, in the first four months of 2022,

interest rates on deposits offered to NFCs and households were in marginally positive territory for time deposits and fell to zero for overnight deposits. As regards the cost of bank lending, the average interest rate on loans to NFCs stabilised in the first four months of 2022 at a historical low (3.0%), underpinned by the single monetary policy and domestic and international credit support programmes. The average lending rate for households increased slightly (4.9%), as a result of increases in the interest rates on consumer loans, while the rate on housing loans remained broadly stable (2.8%).

Deposits from the domestic private sector declined in the first four months of 2022, as a result of lower NFC liquidity buffers, and their annual growth rate decelerated. Between January and April 2022, they decreased cumulatively by EUR 2.1 billion, in contrast with the significant increases observed in the corresponding periods of 2021 and 2020. In particular, NFC deposits declined significantly, by EUR 3.5 billion, while household deposits increased by EUR 691 million. In addition to the inevitable decline in business deposits due to the reopening of the economy in 2022, these deposits were also negatively affected by the sharp rise in energy prices and the slowdown in credit growth. The decline in the purchasing power of households due to rising energy and food prices was partly offset by compensatory fiscal measures. The annual growth rate of household deposits has started to decelerate in particular since the last quarter of 2021 as a result of households' pent-up spending, but also due to the withdrawal of pandemic support measures and the impact of the aforementioned significant price increases.

The annual growth rate of bank credit to NFCs remained almost stable on average in 2021 compared with the previous year, while in the first four months of 2022 it declined. Bank credit to households continued to contract, albeit at a slower pace. In the first four months of 2022, the average monthly net flow of credit to NFCs stood at EUR 278 million, compared with an average of EUR 206 million in 2021. Lending continued to benefit from the operation of the Pan-European Guarantee Fund of the European Investment Bank (EIB) Group, as well as other guarantee and co-financing programmes implemented by development agencies. GDP growth and higher house prices also supported the demand for bank loans, while a positive impact on the supply of bank credit also came from the still ample liquidity provided by the Eurosystem, the availability of bank deposits, and the progress made by banks in cleaning up their balance sheets of most non-performing loans.

The normalisation of monetary policy through an increase in interest rates by the ECB is expected to put upward pressure on nominal lending rates. This, to the extent that it will lead to an increase in real borrowing costs, will result in dampening domestic credit growth and slowing down economic activity. On the other hand, the terms and conditions and the availability of bank credit to businesses are expected to continue to be supported by public resources through co-funding and guarantee programmes, in particular the low-interest loans expected under the Recovery and Resilience Facility, contributing to supporting investment, GDP growth, credit growth and bank deposits.

Profitability, decline in capital adequacy, reduction of non-performing loans

In the first quarter of 2022, Greek banking groups posted profits as a result of non-recurring income, a decrease in operating expenses and, most importantly, lower credit risk provisioning.

As regards capital adequacy, both the Common Equity Tier 1 (CET1) and the Total Capital Ratio (TCR) on a consolidated basis fell slightly in March 2022 to 12.2% and 15%, respectively (from 12.6% and 15.2% respectively in December 2021). At the EU level, according to data from the European Banking Authority (EBA), the weighted average CET1 ratio stood at 15.7% in December 2021, while the TCR ratio stood at 19.6%.

By the end of March 2022, the quality of the loan portfolio on a solo basis had improved, with non-performing loans (NPLs) reaching EUR 17.7 billion, down by EUR 0.7 billion from end-

December 2021 and by around EUR 91 billion from their March 2016 peak. The ratio of NPLs to total loans declined further in the first quarter of 2022 (March 2022: 12.1%, December 2021: 12.8%), but remained high compared with the EU average of 2.0% at the end of December 2021, according to EBA data. Based on the NPL resolution and management actions under way, a one-digit NPL ratio for the banking sector as a whole is expected to be reached by the end of 2022.

6 CHALLENGES

The main challenge facing the Greek economy is to continue the dynamic recovery, which started in 2021, in an unfavourable international environment.

The coronavirus pandemic, the energy crisis, the surge in inflation and heightened uncertainty are exacerbating some of the problems already facing the Greek economy as a legacy of the ten-year debt crisis, which can have a negative impact on both the short-term and the long-term prospects of the economy.

For example, the necessary fiscal measures to support businesses and vulnerable groups of the population are slowing down the reduction of budget deficits, despite a faster-than-expected decline in the debt-to-GDP ratio. The high import dependence of the Greek economy leads to a deterioration of the current account balance. Increased uncertainty about the economic outlook leads to a postponement of investment and consumer decisions, and the expected rise in interest rates could hamper the implementation of investment projects, thereby delaying the closing of the investment gap. In an unfavourable macroeconomic environment of high inflation and weaker demand, the decline in unemployment could be halted and a new generation of non-performing loans could emerge, adversely affecting the financial aggregates of Greek banks.

The slowdown in deficit reduction risks undermining market confidence in the commitment of fiscal policy to temporary rather than permanent fiscal relaxation and thus to a return to primary surpluses. This could interrupt the downward path of the government debt-to-GDP ratio and, coupled with the adverse international environment, delay the upgrade of the credit rating of the Greek sovereign to investment grade. This, as is already evident, could put significant upward pressure on the borrowing costs of the Greek government. Instrumental to averting this risk will be the actions planned by the ECB to prevent financial fragmentation in the euro area, as well as the implementation of the investments and reforms envisaged in the National Recovery and Resilience Plan, as mentioned below.

The possibility of a partial or total disruption of Europe's energy supply from Russia requires immediate action to ensure energy security through new investment in gas storage facilities, supplier diversification and extraction of hydrocarbons. In this challenging environment, the ongoing climate change calls for stepping up investment to prepare the economy's transition to cleaner energy.

In addition to the problems related to the negative international economic environment, the structural weaknesses of the Greek economy persist, leading to low structural competitiveness. For example, despite significant progress made in some areas in an effort to tackle the pandemic, the administration of justice remains slow, the efficiency of the public sector is still low and Greece lags behind its European partners in the digital transformation of the economy. At the same time, the high dependence of the Greek economy on imports of goods and energy, the increased share of energy in Greek firms' costs already before the energy crisis, the low average size of domestic businesses and oligopolistic phenomena in several sectors exacerbate the problems of rising international energy and raw material prices and push inflation above

the euro area average. Moreover, despite the efforts made in recent years, tax evasion remains very high, hampering the reduction of government debt. The projected demographic deterioration due to population ageing continues to limit the long-term growth prospects of the economy and to increase risks to the pension system.

7 PRECONDITIONS FOR A SUSTAINABLE RECOVERY

To address the challenges and uncertainties associated with a worsened global economic environment and higher inflation and to ensure that Greece's credit rating is upgraded to investment grade, economic policy should, in addition to the necessary support to the more vulnerable social groups, depending on the fiscal space available, also focus on the implementation of the investments and reforms envisaged in the National Recovery and Resilience Plan and on gradually restoring fiscal equilibrium.

In particular, in order to safeguard fiscal credibility, permanent fiscal relaxation measures should be avoided, and any additional income support measures should: (a) target vulnerable groups of the population; (b) be of a temporary nature; and (c) not jeopardise the ambitious environmental targets set, insofar as they are financed by the Just Transition Fund, whose resources are intended to finance the green transition plan of the Greek economy. Short-term and targeted measures in the form of means-tested one-off allowances can enhance disposable income and consumption more effectively than horizontal tax cuts, as such measures mostly support low-income households, which have a higher marginal propensity to consume. The size of measures depends on the available fiscal space.

At the same time, the cash buffer should be maintained at a high level in order to limit debt refinancing risk. Based on the favourable debt repayment profile, it is assessed that medium-term debt sustainability is not at risk. In the medium term, however, both the debt-to-GDP ratio and gross financing needs are expected to increase significantly compared with the pre-pandemic estimates. This implies increased downside risks, eliminating the scope for relaxation of primary surplus targets. In the longer term, moreover, as already mentioned, heightened uncertainty is expected, as the gradual refinancing of the accumulated official sector debt on market terms increases the exposure of the Greek government to interest rate risk.

Therefore, in the medium term, fiscal policy should again focus on gradually reducing the primary deficit and returning to primary surpluses from 2023 onwards, as well as on restoring fiscal equilibrium by withdrawing emergency support measures. The restoration of fiscal equilibrium will also be underpinned indirectly by the adoption of a more growth-friendly fiscal policy. Such a policy may include strengthening public infrastructure investment, increasing productive public expenditure, reducing the tax burden and current public expenditure, as well as effectively addressing tax evasion by targeting audits at high-risk activities, but also providing tax incentives to purchasers of services and goods in order to ensure that these transactions are registered in the formal sector of the economy. In all these areas, the efficient and timely use of European funds is crucial.

The utilisation of resources from the EU's long-term budget 2021-2027 and the European recovery instrument NextGenerationEU (NGEU) will be key to addressing investment uncertainty in the new environment of high inflation and geopolitical instability. In the coming years, both public and private investment with European funding is expected to make a decisive contribution to economic growth and to strengthen the long-term productive capacity of the economy.

The activation and utilisation of the new REPowerEU instrument proposed by the European Commission will be crucial for speeding up the EU's energy transition in the medium term and weaning Member States off fossil fuel imports from Russia by promoting renewable energy

sources. This tool will help mitigate the impact of high energy prices and create a more efficient, resilient and integrated European energy supply system based on clean energy sources, while at the same time promoting the cross-border investments necessary to strengthen interconnection and secure the energy supply of the EU as a whole.

It is also necessary to restart the privatisation programme – after two years of pandemic-related delays – and to continue the reforms linked to the NGEU. This will allow the economy to continue its path towards a production model that is more open, flexible and resilient to disruptions, with a focus on digital transformation, green transition and the strengthening of employment and social cohesion.

Containing inflationary pressures, in particular input costs such as wages and energy, is essential in order to maintain the competitiveness gains achieved over the past decade. Reforms aimed at further deregulating goods and services markets and actions that can protect households' income from the surge in energy prices could also help in this direction.

Significant interventions are also needed in the labour market. Despite its decline over time, the unemployment rate remains high and could increase due to the impact of the adverse international environment on domestic and foreign demand. It should be noted that the persistently high unemployment of recent years has exacerbated the problem of labour supply and demand mismatches, as a significant part of the workforce has lost some of its skills. Also, factors such as population ageing, workers' early retirement and the brain drain in the years of the crisis have led to shortages of low- and high-skilled workers. It is therefore necessary to upgrade technical training and streamline the continuing retraining of the workforce so that it acquires the qualifications and skills required for entering and remaining in the labour market. There is also a need for more effective implementation of policies to increase women's participation in the labour force, by further measures to support working mothers (e.g. working hours, leave, availability of childcare facilities, pre-school and elementary school hours, etc.). Employment growth and labour market participation require strengthening demand in sectors and occupations with high added value, attracting foreign direct investment and increasing the openness of the Greek economy. The implementation of actions under the National Recovery and Resilience Plan will help job creation and preservation.

Maintaining the growth momentum requires smooth financing of businesses by the banking system. Co-funding and guarantee programmes supported by public resources, in particular low-interest loans under the Recovery and Resilience Facility, are expected to continue to play a vital role in improving the terms and conditions and availability of bank credit to businesses. However, the continued flow of bank credit and the achievement of the private fund mobilisation targets under the National Recovery and Resilience Plan crucially hinge on a resilient banking system. To this end, it is necessary to address the remaining challenges facing the banking system, namely a further reduction of non-performing loans, an improvement of core profitability and qualitative and quantitative enhancement of banks' capital base, in particular given the inflationary pressures and uncertainties for economic activity created by current geopolitical developments, as well as the impact of climate change.

The dynamic recovery of the Greek economy that started in 2021 continued in the first quarter of 2022. However, the Russian invasion of Ukraine has worsened the global economic environment, increased uncertainty and risk aversion among international investors and exacerbated the energy crisis, leading to higher inflation. Against this background, the ECB announced a gradual increase in its key interest rates to contain inflation expectations and the government took emergency income support measures for vulnerable social groups to address the economic impact of the energy crisis. The unfavourable macroeconomic environment created by rising uncertainty, mounting inflation and higher borrowing costs is expected to dampen economic growth in Greece in the coming quarters.

Despite the challenges facing the Greek economy in an environment dominated by downside risks to growth, such as the intense inflationary pressures, the partial or total disruption of Europe's energy supply from Russia, the suspension of investment projects due to mounting uncertainty and rising interest rates, there is also some good news: the exit from enhanced surveillance next August; the ECB's planned actions to prevent fragmentation of euro area money and capital markets; the recent upgrade of the credit rating of Greek bonds by two international rating agencies; the strong performance of travel receipts; and the announcement of large investments in Greece by major foreign companies are notable developments that strengthen the medium-term outlook of the economy.

In any event, maintaining the growth momentum in the period ahead is the main challenge facing economic policy. In this respect, the European recovery instrument NextGenerationEU (NGEU) is particularly important for accelerating reforms and increasing public and private investment in digital transformation, green transition and employment growth. A healthy and strong domestic banking system, in partnership with the international financial organisations involved, is called upon to play a central role in achieving the objectives of the National Recovery and Resilience Plan. At the same time, it is crucial to stem inflationary pressures in order to protect the competitiveness of the economy and the real disposable income of consumers. Over the medium term, fiscal policy should focus on achieving primary surpluses. In addition to strengthening the medium-term outlook, these elements of economic policy will also help Greek bonds to obtain investment grade status, thereby enhancing the resilience of the economy to future external shocks.

Box 1

ENERGY PRICES IN THE EU: DETERMINANTS AND IMPACT ON INFLATION

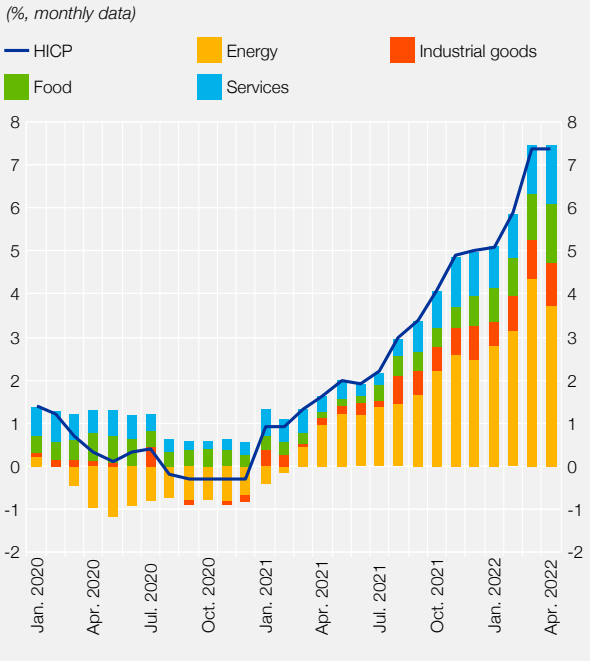
International energy prices and, hence, wholesale oil and gas prices in the EU, which had already been rising sharply since the second half of 2021, climbed to historically high levels in the first quarter of 2022 due to the war in Ukraine and remained elevated during the next months.[1] This box aims to explore recent trends in energy prices in the EU, the factors driving different developments across Member States and the associated direct impact on consumer price inflation. It also examines the role of the green transition and sustainable investment, i.e. investment that meets environmental, social and governance criteria (ESG criteria), in the outlook for energy prices in the coming years and presents the main policy challenges.

Recent developments in energy prices

A sharp recovery in energy demand following the pandemic, coupled with supply constraints, largely explain the rise in energy prices in 2021, which was then fuelled by the effects of the war on international commodity prices and high uncertainty about energy security, especially in Europe. Between mid-2021 and the historical highs seen in March 2022, the price of Brent crude oil increased by around 75% and the European gas benchmark price (Dutch Title Transfer Facility − TTF) by 500%, while the EU average wholesale electricity price had already increased by 400% year-on-year in the fourth quarter of 2021.[2] In April and May 2022, high volatility continued to prevail in the markets, while futures contracts implied persistently high energy prices.

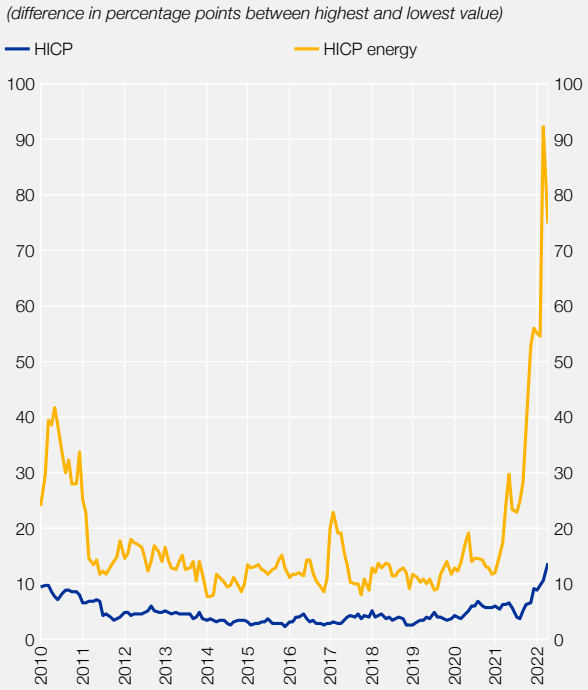
Retail energy prices generally rose less than international prices, but the increase varied across EU Member States. In March 2022, annual energy inflation, as reflected in changes in the energy component of the Har-

Chart A Euro area headline inflation and its components (January 2020-April 2022)



Source: Eurostat.

Chart B Consumer price inflation differences among EU Member States (January 2010-April 2022)



Source: Eurostat.
Note: Malta is not included due to data unavailability.

1 This box takes into account available data on energy prices and consumer price inflation up to mid-May 2022.
2 European Commission, *Quarterly Report on European electricity markets*, Q4 2021.

monised Index of Consumer Prices (HICP energy), rose to 40.2% in the EU and 44.3% in the euro area; the increase varied across countries, from 7.3% in Hungary to 99.6% in the Netherlands (Greece: 51.2%, i.e. the 7th highest in the EU).[3] Price increases in the electricity, gas and solid fuels component in many Member States have been unprecedented. For electricity in particular, the largest increases were recorded in the Netherlands (181.9%), Spain (107.8%), Italy (82.3%) and Greece (79.3%), and in many cases were more than double the EU average (34.6%). Gas prices rose by 48.5% on average in the EU, with significant variations across Member States. Steep hikes were recorded, among other countries, in the Netherlands (161.4%), Belgium (143.6%), Bulgaria (117.4%) and Luxembourg (87.4%), while in Hungary, Sweden and Croatia price increases were below 10%.

The rise in energy prices is the main driver of headline consumer price inflation in the euro area (see Chart A). Moreover, the increase in energy inflation dispersion across EU Member States, already observed since 2021, led to a widening differential in headline inflation rates (see Chart B).

Factors explaining energy price differentials among countries

Different energy price developments among EU Member States are attributable to a number of factors, associated *inter alia* with domestic habits and preferences of households and businesses in terms of the energy mix they consume, the overall share in headline inflation and the composition (i.e. the share of electricity, gas and other fuels) of the HICP energy component, as well as with market conditions and more permanent or one-off policy measures (e.g. taxes, subsidies, rebates, indexation clauses) that determine wholesale and retail prices of energy goods in each country.

The energy composition and, in effect, the impact of different energy sources on inflation vary across Member States. Overall, energy accounts for around 11% of the consumption basket in the euro area and the EU, with the lowest weight registered in Malta (6.7%) and the highest in Latvia (16.2%). Greece stands close to the EU average (11.5%). In the EU, motor fuels have the largest share in the HICP energy component (45%), followed by electricity (28%) and gas (18%). This is the case in most countries with few exceptions. Electricity has a larger share in energy prices (over 35%) in Sweden, Croatia, Malta, Greece, Belgium and Finland, while natural gas (over 24%) in the Netherlands, Germany, Slovakia and Italy.

According to European Commission estimates,[4] there is a lag of up to one year before an increase in international oil and gas prices passes on to consumer energy prices. In particular, 40% of the change in the international price of Brent crude oil is passed on to consumer liquid fuel prices in the euro area within 12 months, while most of the pass-through materialises within the first month. In the case of oil products, the estimated speed and degree of transmission of the international energy price shock does not vary significantly across Member States and therefore the observed price differentials potentially reflect differences in other price components, e.g. taxes. As regards natural gas, the estimated impact as well as the speed of transmission of an international price increase on retail prices is lower. Barely 13% of this increase is passed on to gas consumer prices in the euro area within one year, of which only 1/5 within the first month. However, given the greater heterogeneity in gas markets across EU Member States, these effects vary across countries. In conclusion, the above estimates suggest that successive hikes in international oil and gas prices as from the second half of 2021 are expected to continue to have an upward effect on consumer energy prices in 2022 and early 2023.

Differences in retail prices of oil products in the EU mostly reflect tax variations among Member States, which accounted for around 60% on average of oil product retail prices in the EU before the pandemic.[5] By contrast,

3 Energy prices in Malta are administered, and as from July 2020 their changes are not recorded.

4 European Commission, *European Economic Forecast*, Winter 2022, Box 1.2 "An update on energy price developments: pass-through from wholesale to retail", pp. 13-15, February 2022. It should be noted that the empirical model adopted in this study examines the pass-through of oil and gas prices to consumer energy prices over a 12-month period and therefore no conclusions can be drawn as to the likely degree of pass-through over a longer time horizon.

5 European Commission (2020), *Study on energy prices, costs and their impact on industry and households*, DG Energy.

different retail gas and electricity prices among EU Member States also reflect variations in the institutional framework and the degree of market regulation, as well as idiosyncratic factors, leading to market fragmentation.

Natural gas retail prices at a national level are determined by supply costs, transportation and distribution costs and energy taxes. These components vary among EU Member States in terms of both their levels and their share in the final retail energy price. In February 2022, the share of gas supply costs, including raw material prices, ranged from 33% in Sweden to 82% in Poland.[6] Moreover, the lowest share of distribution and storage costs was observed in the Netherlands (7%) and the highest in Sweden (36%). Lastly, the share of taxes ranged from 1% in Belgium and 2% in Greece and Spain to 22% in the Netherlands, while in several EU countries the retail price of natural gas does not include energy taxes.

Furthermore, the range of wholesale gas prices among EU Member States increased significantly in the second half of 2021, partly as a result of the deviation between the TTF benchmark price, which remains at historically high levels, and cross-border gas delivery prices in a number of Member States,[7] which incorporate changes in international energy prices with a lag.[8] Portugal and Italy are among the countries with the lowest wholesale gas prices, the highest being registered in France, Poland, Austria and the Netherlands. In some countries, conjunctural factors at end-2021 affected wholesale prices. For instance, in Spain these prices increased as a gas supply contract with Morocco expired and due to supply constraints on other pipelines (e.g. Medgaz). At the same time, the direct link between gas supply contracts and international oil prices (e.g. in Italy) is expected to widen wholesale price differentials among countries in the second half of 2022, as the war in Ukraine keeps gas prices at high levels.

The wholesale electricity market is even more fragmented in the EU. The diverse energy mix for electricity generation (e.g. nuclear power, renewables, gas and lignite), the prices of carbon emission allowances under the EU Emissions Trading Scheme (ETS), the electricity market clearing price (usually marginal pricing based on the highest ask price by the seller), the number of network interconnections and producer and supplier competition at a national level are some of the factors that explain the differences in electricity prices among Member States, hampering comparative analysis.

Different institutional frameworks for the energy market and government interventions in retail energy pricing also explain to some extent the observed variations in the HICP energy component among Member States. According to the Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2020,[9] around half the European countries intervene in retail electricity and gas markets in order to contain hikes in retail energy prices, by adopting regulatory measures on pricing or by applying price caps and social tariffs. In Slovakia, Poland and Hungary, among other countries, gas market interventions apply to all consumers (households), while household coverage is extensive also in Italy (around 40%). Accordingly, in the electricity market, price-setting measures cover all households in Cyprus, Malta and Slovakia, compared with 68% of consumers in France and 38% in Spain. However, the degree of energy market regulation is not always fully proportional to retail energy price changes, as government interventions in the energy market are observed both in countries registering relatively small price changes (i.e. Hungary, Portugal and Slovakia) and in countries recording stronger increases (i.e. Spain and Belgium). In other words, government interventions alone do not explain energy price differentials among Member States.

In addition to the regulatory interventions mentioned above, the significant rise in wholesale energy prices already since the second half of 2021, which intensified following Russia's invasion of Ukraine, prompted many Member

6 European Commission (2022), *Quarterly report on European gas markets Q4 2021*, Issue 4, Vol.14.
7 The prices and volumes of pipeline gas deliveries are usually determined by bilateral long-term gas supply contracts between domestic providers and gas suppliers.
8 See footnote 6 above.
9 ACER, *Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2020* – Energy Retail Markets and Consumer Protection, November 2021.

States to adopt – already since September 2021 – emergency policy measures in order to protect consumers from the direct impact of price increases. Although these – mainly budgetary – interventions vary across Member States, almost all countries (except for Bulgaria and Hungary) provide social transfers to vulnerable households to offset part of the energy costs.[10] Moreover, most countries reduced direct levies and indirect taxes (VAT), while a smaller number of countries adopted other measures, such as regulating retail and/or wholesale energy prices, supporting businesses and subsidising part of the electricity bills. Thus, the varying degree and type of interventions among Member States in order to tackle the energy crisis has a direct impact on retail energy prices.[11]

Upward pressures on energy prices over the medium term

Beyond the current juncture of rising energy prices in the EU, the green transition and ESG policies could exert persistent inflationary pressures on energy prices in the coming years. The growing focus on sustainable finance in the EU and the United States is expected to further reduce investment in fossil fuels, thus keeping conventional energy prices high.

For instance, as a result of shrinking finance for fossil fuel extraction and exploitation, oil and gas production halved in the EU between 2015 and 2020 (while production remained stable in the Middle East and increased in China).[12] Furthermore, the IMF estimates that capital expenditure in the oil and gas sector by listed companies worldwide has fallen by around 20% over the past 3-4 years.[13] While in the aftermath of the war in Ukraine the need for energy sufficiency and for curbing the very high energy inflation has again generated global pressures to increase supply of fossil fuels, the EU is committed to its objectives of tackling climate change and accelerating the green transition. In view of the EU's target to achieve net zero emissions by 2050, a further reduction in oil and gas production capacity is expected, as well as increased demand and competition for commodities needed to produce alternative forms of energy (e.g. certain metals), leading to a rise in international energy prices in the medium term.

Conclusions and policy proposals

Energy prices have reached historically high levels and show significant volatility, fuelled by strong global demand after the pandemic and supply constraints due to the war in Ukraine. As a result of high energy prices for consumers and businesses and the subsequent rise in consumer price inflation, euro area and EU economic growth estimates for 2022 were revised downwards and risks to medium-term growth increased. At the same time, different levels of headline inflation across EU Member States, which largely reflect widening energy price inflation differentials, amplify macroeconomic imbalances and reduce the resilience of the economy to future shocks.

In this context, policy measures to secure the necessary oil and gas supplies and reserves, as well as optimisation of the functioning and interconnectivity of gas and electricity markets, should contribute to containing increases in retail energy prices in Europe and shielding markets from potential major energy price shocks in the future. Cooperation at the European level, such as joint gas purchases through the EU Energy Purchase Platform, should deliver lower prices for Member States and supply adequacy, reducing price differentials and supporting real income convergence. Oil and gas supplier diversification strategies could enhance the EU's energy security and strategic autonomy.

In the short term, it is necessary to keep in place emergency support measures for households and businesses, especially in Member States where fiscal space is available, in order to tackle the energy crisis and reduce the impact on economic growth. Redistributing part of the additional tax revenue of power companies to vulnerable

10 Sgaravatti, G., S. Tagliapietra and G. Zachmann (2022), "National policies to shield consumers from rising energy prices", Bruegel.

11 A typical example of different interventions is the approval by the European Commission in May 2022 of Spain's and Portugal's request to regulate electricity prices and thus to disconnect them from gas prices. These countries present on the one hand a high share of RES use and, on the other hand, insufficient interconnections to other EU energy networks, thus constituting energy "islands".

12 Gros, D. (2022), "Is Putin's war driving up commodity prices?", Project Syndicate, 6 April.

13 IMF, *World Economic Outlook*, April 2022, Special Feature "Market Developments and the Pace of Fossil Fuel Divestment".

households should, at the current juncture, enhance consumer confidence and support private consumption. However, national institutional measures, such as regulation of energy market retail prices, should be monitored at the EU level so as to prevent a further widening of the observed price differentials among EU Member States, as well as any increases in energy consumption due to market overregulation and distortion of incentives. On the energy demand side, rationalisation of usage and more efficient energy consumption at the national level are needed in order to save resources.

In the medium term, providing additional budgetary funds and incentives to support private investment in green projects, which may not be profitable at present, should accelerate the green transition and the deployment of renewable energy sources. Moreover, the reallocation of financial resources from high-carbon to low-carbon investment could cover part of the increased financing needs for sustainable investment. The rate of development and consumption of renewable energy sources should be at least commensurate with fossil fuel divestment in order to reduce the risk of high and volatile energy prices. Developing renewable energy sources should reduce the dependency of electricity generation on natural gas, helping to disconnect the prices of the two energy goods. A stable institutional framework on climate change and green energy transition with clearly defined objectives would help countries promote the necessary adjustments on both the supply and the demand side.

Box 2

INFLATION PERSISTENCE: AN ANALYSIS BASED ON CONSUMER PRICE INDEX MICRODATA

Inflation is the outcome of the aggregation of millions of individual price changes. In fact, monthly inflation can be calculated on the basis of the percentage of prices that change in a given month multiplied by the size of the average percentage price change.[1] In this box, we examine the evolution of inflation in recent years in the light of developments in the frequency and size of price changes.

For the purposes of our analysis, we utilise the micro price data set developed by the Hellenic Statistical Authority (ELSTAT), which is used to compile the Greek Consumer Price Index (CPI). We have price data on 742 products (goods and services) collected from different outlets,[2] which translate into 46,729 unique product identifiers (8 million prices in total).[3] The raw data are monthly from January 2002 to March 2020, spanning across almost two decades and covering on average 75% of the Greek CPI.

Monthly inflation can be calculated as the product of the share of prices that change in a given month (frequency of price changes) multiplied by the average size of this change: $\pi_t = f_t * dp_t$, where π_t is the monthly inflation, f_t the frequency of price changes and dp_t the size of the average percentage price change.[4] Furthermore, since price changes can be broken down into price increases and decreases, the above equation can be written as follows: $\pi_t = f_t^+ dp_t^+ - f_t^- |dp_t^-|$.[5] Since we have monthly price quotes at product level, we can calculate both the average frequency of price changes and the average percentage price change (increase/decrease). Annual inflation can then be approximated on the basis of monthly inflation.[6]

1 The analysis in this box is based on the findings of the ongoing research work "Endogenous frequencies and large shocks: price setting in Greece during the crisis", H. Dixon, T. Kosma and P. Petroulas.
2 For each product, prices are collected every month from various outlets in each region. For example, a price quote in our data set refers to "long grain Carolina rice" sold in a shopping outlet in Attica in January 2017.
3 The micro database does not include energy, fresh fruit and vegetables, certain services and administered prices. Therefore, the results of this box relate to core CPI inflation.
4 This analysis is based on non-weighted data.
5 "+" and "-" in the superscripts of the equation refer to price increases and decreases respectively.
6 The annual inflation calculated from microdata is very close to the "official" core CPI inflation (excluding energy and fresh fruit and vegetables).

Frequency and size of price changes

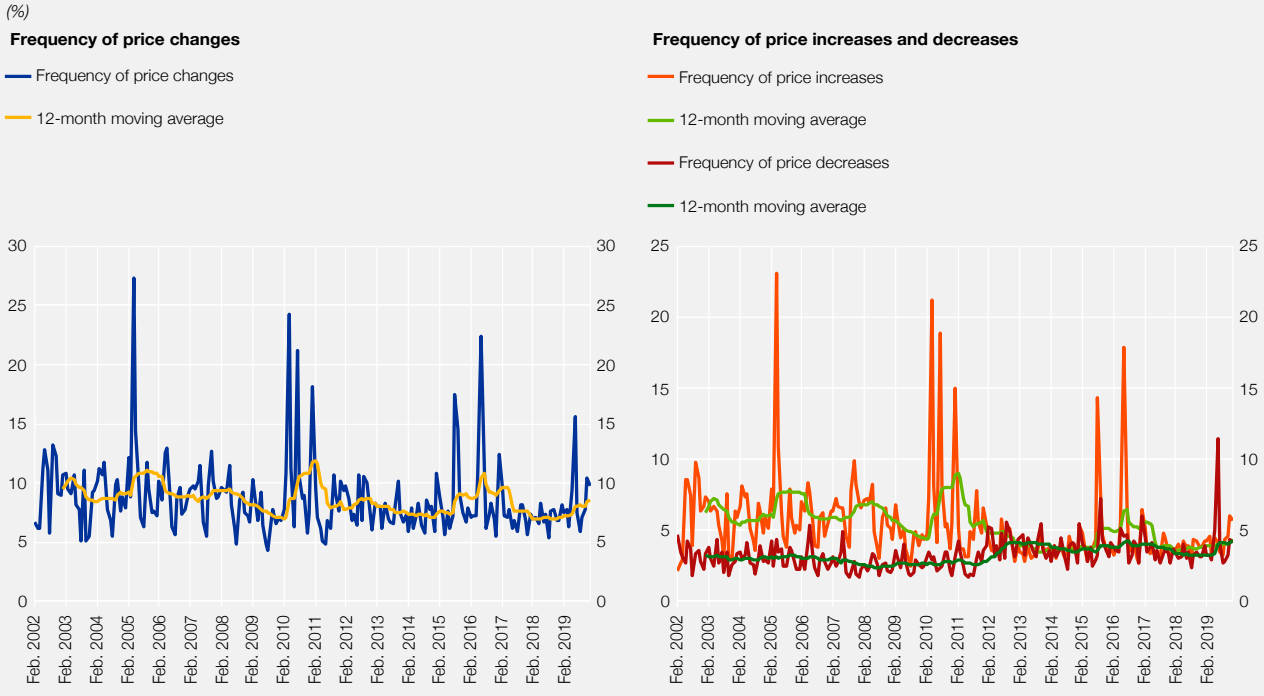
At first glance, the left-hand panel of Chart A[7] shows that the frequency of price changes has remained fairly stable over time.[8] However, if we split the total frequency of price changes into increases and decreases, we see (Chart A, right-hand panel) that, after the sovereign debt crisis and during the low inflation period, there is a significant decline in the frequency of price increases and, conversely, a gradual increase in the frequency of price decreases, with the two percentages converging during the low inflation period.[9]

Chart B, which presents the share of price increases and decreases in total price changes, also shows that the share of increases declined significantly after 2011. Thus, the low inflation period is characterised by a significant decline in the share of price increases and a considerable rise in the share of price decreases.

As mentioned earlier, inflation is defined not only on the basis of the relative shares of price changes, but also by the size of price changes (increases and decreases). Chart C shows that, during the low inflation period, the average size of both increases and decreases rose significantly and by similar amounts.

One question that emerges, given the significant changes that were observed in the evolution of the frequency and size of price changes over the last decade, is whether these developments are affected by the macroeconomic environment. It should be noted that our analysis covers a period of significant shocks, which hit Greece strongly. In particular, GDP declined by around 26% over the period 2010-2013. To this end, we estimate four different regressions where the dependent variables are: the frequency of price increases, the frequency of price decreases and the size of price increases and decreases respectively. In each of these four equations, the following explanatory variables are used: the annual inflation rate, the annual rate of change in the volume of retail

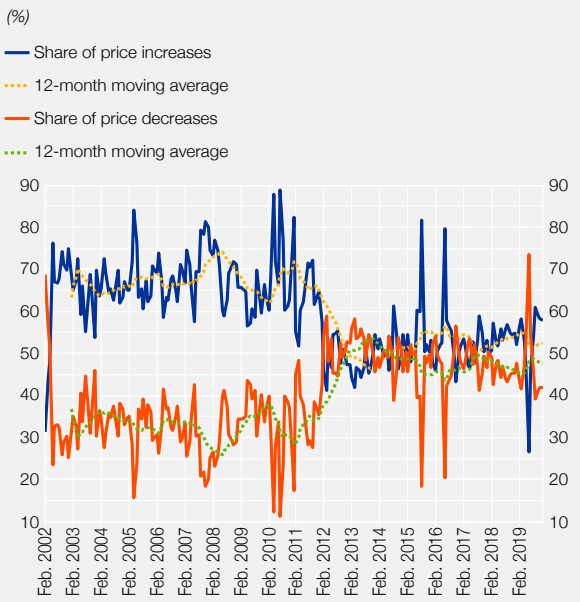
Chart A Frequency of price changes



Source: ELSTAT, Bank of Greece calculations.

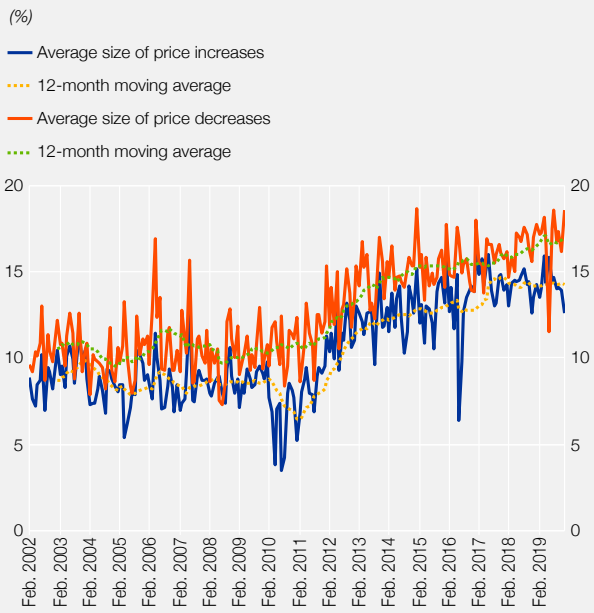
7 Sales discounts are not included in the analysis.
8 The outliers in the frequency of price changes are associated with the implementation of changes in VAT rates in a large share of products in our sample.
9 During 2002-2010, the average inflation rate was 3.4%, compared with 0.4% in 2011-2019.

Chart B Share of price increases and decreases



Source: ELSTAT, Bank of Greece calculations.

Chart C Size of price increases and decreases



Source: ELSTAT, Bank of Greece calculations.

sales, the unemployment rate and a lagged dependent variable.[10] All variables are in monthly frequency. The results show that the annual inflation of the previous month has a statistically significant positive impact on the frequency of price increases and a statistically significant negative impact on the frequency of price decreases. Therefore, when annual inflation increases, the frequency of price increases rises and the frequency of price decreases declines. The impact of inflation seems to be larger in the case of price increases, with the elasticity being 0.342 in the case of price increases and -0.167 in the case of price decreases. Inflation does not seem to have a statistically significant impact on the size of price increases and decreases. In conclusion, if annual inflation was high in the previous month, a slightly higher percentage of firms will increase prices this month and a slightly lower percentage will decrease them. This will automatically increase the current month's inflation, which will increase annual inflation somewhat more, and the same will occur the following month, and so on.

Simulation results

Based on the relationship between the frequency of price changes and annual inflation, as established in our regression analysis, we can examine the response of core inflation to an external shock, such as an increase in energy prices. To this end, we perform a simple simulation analysis, assuming a temporary shock that increases the size of the average price change by 8.2 percentage points. The choice of the size of the shock is based on the following assumptions. Using input-output tables, we find that energy accounts for around 8.2% of the intermediate consumption of the Greek economy. We assume a 100% increase in the price of energy, with full pass-through.[11] We perform the following simulation exercises: a "mechanical" approach, where the frequencies of price increases and decreases are assumed constant, and an "endogenous" approach, where the frequencies of price increases and decreases respond endogenously, since – as we have seen previously – annual inflation has a statistically significant impact on the frequencies of price increases and decreases. We assume three alternative scenarios, where the shock lasts 6, 12 and 24 months, respectively, i.e. energy prices return to their initial levels after 6, 12 and 24 months. Charts D, E and F present the simulation results. It appears that both the

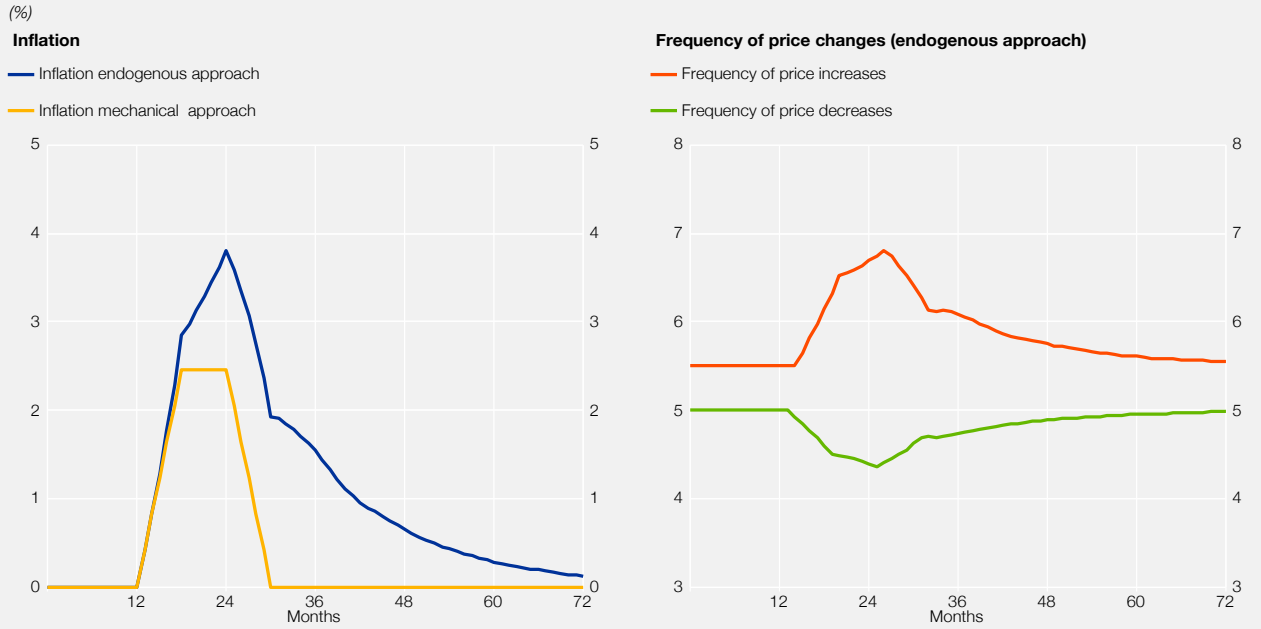
10 We also use monthly dummies to account for seasonality, as well as dummy variables for the months during which VAT rate changes have occurred. We use the instrumental variables estimation in our analysis, where the annual inflation rate, the annual rate of change in the volume of retail sales and the unemployment rate are instrumented.

11 Synthetic indices for energy prices (ECB Working Group of Forecasting) show that energy prices increased in March 2021 by 100% year-on-year and that the average increase up to April 2022 was around 130%.

magnitude and persistence of inflation are higher in the case of the endogenous approach. In addition, the magnitude and persistence of inflation increase with the duration of the shock.

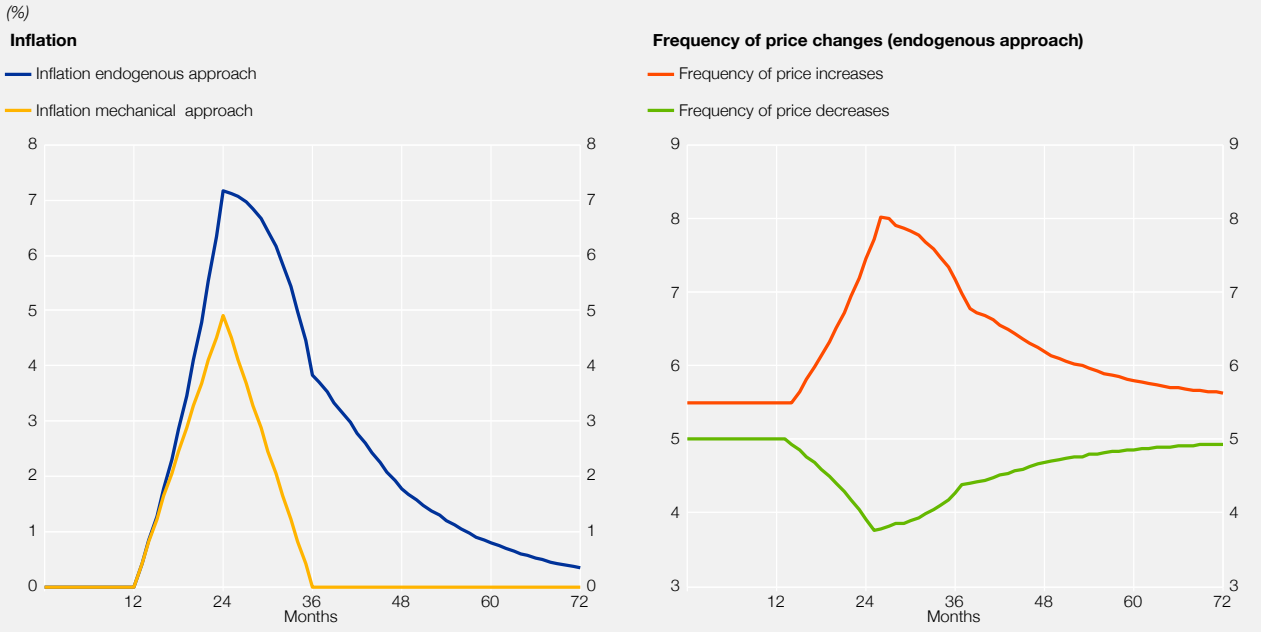
Both the higher magnitude and the higher persistence are due to the endogenous response of the frequencies of price increases and decreases (see the right-hand panels in Charts D, E and F). Therefore, our analysis shows that, in an environment where firms' pricing decisions depend on inflation, a price shock can lead to a stronger response and persistence of inflation.

Chart D Simulation results - shock duration: 6 months



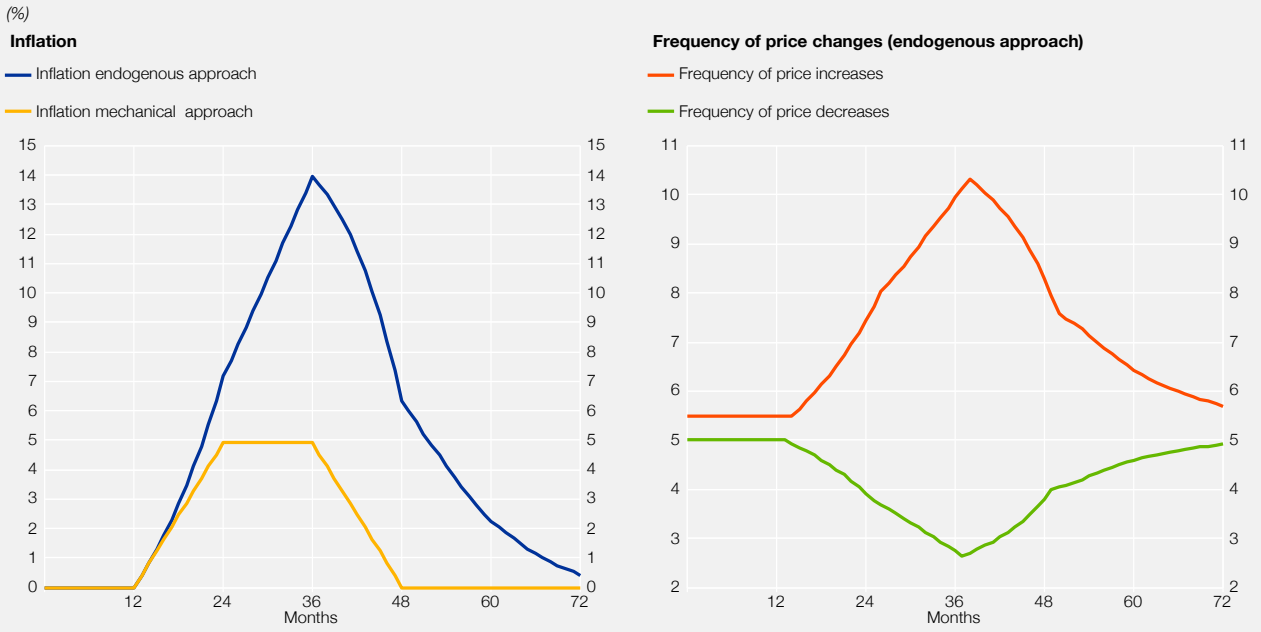
Source: ELSTAT, Bank of Greece estimates.

Chart E Simulation results - shock duration: 12 months



Source: ELSTAT, Bank of Greece estimates.

Chart F Simulation results - shock duration: 24 months



Source: ELSTAT, Bank of Greece estimates.

Box 3

IMPACT OF HIGH INFLATION ON PUBLIC FINANCES

The global economic recovery from the COVID-19 pandemic was accompanied by an energy crisis and a resurgence of inflationary pressures that impacts household disposable income and business profits. In an environment already burdened by rising inflation, Russia's invasion of Ukraine has caused multiple crises – energy crisis, food crisis, inflation crisis and refugee crisis – the management of which entails a significant fiscal cost, especially for European economies, leading to an upending of fiscal planning. The war in Ukraine and the imposition of sanctions on Russia brought about renewed price increases especially for energy, food and industrial commodities, intensifying inflationary pressures and heightening risks stemming from continued supply chain and international trade disruptions. Whether or not global and European economic growth will lose momentum will depend on how fast the war ends, but also on the duration and intensity of inflationary pressures, as well as on the response of monetary and fiscal policies. The box analyses the impact of higher inflation on Greece's public finances, referring to the special economic circumstances arising from the war in Ukraine. To this end, first, it discusses the main dilemmas Greek fiscal policy faces. And, second, it empirically investigates the impact of a *ceteris paribus* inflationary shock on Greek fiscal variables, namely total tax revenues, primary spending and the primary budget balance.

Pandemic, war and inflation

Before the war in Ukraine, as the EU countries were emerging from the pandemic all together, the deviation from sound fiscal positions was not a primary concern, as inflation remained muted. Inflationary pressures were regarded temporary as they resulted from supply-demand mismatches caused by pandemic-related supply shortages and global trade disruptions.[1] Once global supply chains and production units returned to

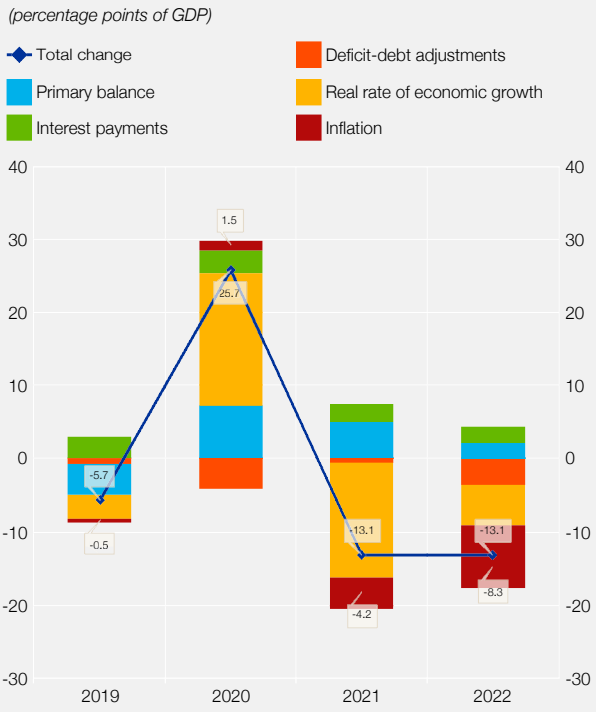
1 See Ha, J., M.A. Kose and F. Ohnsorge (2021), "Inflation during the pandemic: What happened? What is next?", CEPR Discussion Paper no 16328. It should be mentioned that the Bank of Greece warned as early as in June 2021 of the risk of a global inflation surge, adding that some structural factors (such as climate change and de-globalisation) could also lead to higher inflation in the long run. See Bank of Greece (2021), *Monetary Policy 2020-2021: Executive Summary and Boxes*.

the normal pre-pandemic state, aggregate supply would adjust to the temporarily increased aggregate demand and thus inflation would return to its medium-term target. Meanwhile, with nominal interest rates stuck at zero and the growth rate expected to exceed the interest rate, the conditions were favourable for financing government spending (which soared in response to the COVID-19 pandemic) by creating debt without an increase in taxes later.[2,3] In other words, it was expected that a combination of robust growth and temporary and controlled inflation would bring down the public debt-to-GDP ratio, even in cases where the fiscal balance remained in deficit. However, as the war escalates and a general situation of global geopolitical instability prevails, price inflation is strengthening and becoming more persistent. Thus, it is seen now as the most serious threat to stable and sustainable global economic growth. Inflationary surge represents an implicit tax burden on households' budgets, especially those most vulnerable. It also threatens financial stability and de-anchors long-term inflation expectations, thus making it hard to control inflation in order to contain adverse effects to growth.

Inflation and fiscal policy dilemmas

The pandemic took a heavy toll on public finances, leaving a legacy of large deficits and high government debt. However, nowadays, in the context of a generalised high uncertainty and an inflation explosion, fiscal policy is confronted with two additional challenges: the first is to manage the impact of persistently high inflation on household and business budgets so as to enable the continuation of post-pandemic recovery. The second is to simultaneously achieve a faster restoration of sound fiscal positions, by demonstrating flexibility and adaptability.[4]

Chart A Contributions to the percentage change in the public debt-to-GDP ratio



Source: Processing of ELSTAT data and forecasts of the 2022 Stability Programme.

In the short run, an inflationary surprise, defined as a positive difference between actual (ex post) and forecast (ex ante) inflation, exerts a positive impact on public debt dynamics. The reason is that usually tax revenue is expressed as a percentage of nominal GPD, and, therefore, an unexpected yet moderate inflation can have a benign short-run effect on the primary balance-to-GDP ratio. Moreover, where such inflationary surprise is due to shocks on the demand side, the pursuit of a counter-cyclical fiscal policy to stabilise the business cycle and prevent the economy from overheating results in a reining-in of government spending. On the other hand, in the event of cost inflation, governments usually increase spending (grants and benefits) in an attempt to mitigate the recessionary effects of inflation on real incomes. By doing this, the positive short-run effect of the inflationary surprise on the primary balance is partly offset. Such spending, however, must be appropriately targeted to prevent cost inflation from turning into a price/wage spiral with persistent negative effects. Consistent with the above, in the case of Greece, the debt-to-GDP ratio is projected to improve in 2022, with much of the improvement coming from inflation, also because of the specific characteristics of Greek public debt (see Chart A).

2 See Blanchard, O. (2019), "Public debt and low interest rates", *American Economic Review*, 109, 1197-1229.
3 See Hall, G.J. and T.J. Sargent (2021), "Debt and Taxes in Eight US Wars and Two Insurrections", in A. Bisin and G. Federico (eds), *The Handbook of Historical Economics*, ch. 27, 825-880, Academic Press; and Hall, G.J. and T.J. Sargent (2022), "Three World Wars: Fiscal-Monetary Consequences".
4 IMF (2022), "Fiscal policy from pandemic to war", *Fiscal Monitor*, ch. 1, 1-23, April.

However, medium- to long-term debt and fiscal sustainability depends on price stability, since persistently high inflation has a negative impact on real household and business income, leading to lower consumer and investment spending and therefore lower GDP growth. Furthermore, persistently high inflation puts pressure on fiscal policy to increase public spending in order to boost domestic demand, posing a threat of a price/wage spiral. Monetary policy also comes under strong pressure to control inflation by raising nominal borrowing rates, which would lead to higher debt dynamics in the medium term.

As regards debt dynamics, the evolution of the debt-to-GDP ratio is determined by three crucial variables: the primary balance; the real borrowing rate; and the expected or potential growth rate of real GDP. All these variables have one thing in common: their path is determined by, among other things, inflation. High and persistent inflation ultimately has a negative effect on the fiscal balance, by dampening real GDP growth and increasing the level of the nominal interest rate and the volatility of the real interest rate. Actually, if the slowdown in real GDP growth is accompanied by a large increase in nominal borrowing costs, this could negatively affect the debt service-to-GDP ratio, which reflects debt sustainability and country risk. However, experience has shown that real interest rates also tend to become negative in periods of higher inflation, and remain so for quite some time. Moreover, combined with a fixed ("locked") nominal borrowing rate, as is the case for a large part of Greek public debt, this negative real interest rate can have a positive effect on debt sustainability.

Fiscal policy is nowadays called upon to reconcile two conflicting objectives: on the one hand, it must restore fiscal equilibrium that was disrupted during the years of the pandemic to maintain debt sustainability; and on the other hand, it must try to counter the negative effects of cost inflation by boosting aggregate domestic demand. In particular, when there is a need for larger and more protracted financial interventions while monetary policy tightens, fiscal policymakers may find themselves confronted with the following dilemma: should they increase taxes to prevent a further build-up of debt or should they increase debt, risking stoking future inflation through a price/wage spiral – a move which would make the necessary fiscal adjustment even more painful? If they choose the former, they burden current taxpayers; if they choose the latter, they penalise future taxpayers.[5]

Empirical investigation

The effects of high inflation on public finances are quantified using a Bayesian vector autoregressive (BVAR) model for the Greek economy.[6] A *ceteris paribus* temporary increase in harmonised inflation by an amount equal to its average historical standard deviation since the start of the investigation period (0.8 percentage point) results in a statistically significant decline in real GDP growth. This effect lasts for up to 15 quarters after the shock and therefore is relatively persistent.[7] The estimated impact of higher inflation on the primary budget balance is positive in the short run and negative in the medium run (median estimate), but overall remains not statistically significant (see Chart B). This estimated (median estimate) effect is further split into an increase in tax revenue due to – *ceteris paribus* – a short-term increase in nominal tax bases, which is, however, more than offset, in the medium term, by the estimated increase in primary expenditures caused by, among other things, the operation of automatic stabilisers. Same as before, the impact on tax revenues and primary expenditures is not statistically significant.

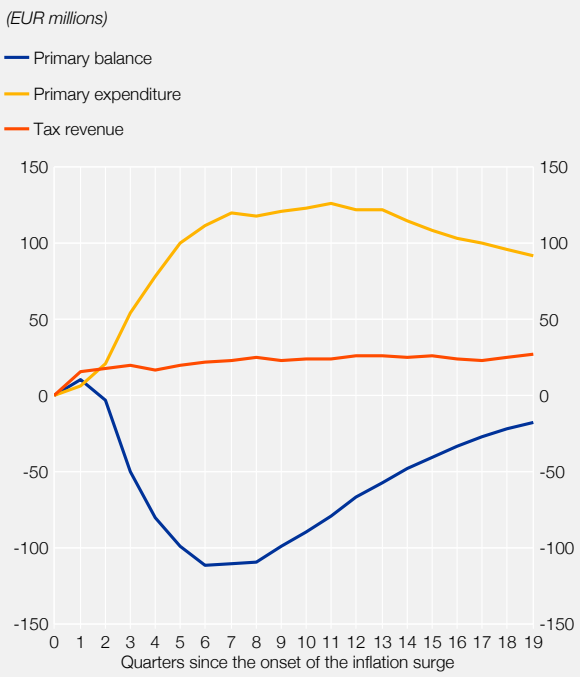
The impact of higher inflation is expected to be amplified by the effects of the war in Ukraine also via additional channels, such as (a) higher energy prices; (b) the deterioration of economic sentiment and the rise in economic

5 See Blanchard, O. and J. Pisani-Ferry (2022), "Fiscal support and monetary vigilance: economic policy implications of the Russia-Ukraine war for the European Union", Bruegel, *Policy Contribution*, 06/2022; Blanchard, O. (2022), "Deciding when debt becomes unsafe", IMF, *Finance and Development*, March; and Leeper, E.M., C.B. Leith and D. Liu (2019), "Optimal time consistent monetary, fiscal and debt maturity policy", NBER Working Paper no 25658, March.

6 The BVAR model includes three variables: the annual change in the level of harmonised inflation; the seasonally adjusted rate of change in real GDP; and the primary budget balance. The ECB's marginal lending facility is used as an exogenous variable. The estimation period runs from 1999 Q1 to 2021 Q3.

7 See Attinasi, M.G., V. Borgy, O. Bouabdallah, C. Checherita, M. Freier, G. Palaiodimos, D. Prammer, P. Tommasino and J. Zimmer (2016), "The effect of low inflation on public finances", in S. Momigliano (ed.), *Beyond the austerity dispute: New priorities for fiscal policy*, ch. 10, Banca d'Italia.

Chart B Impact of a positive (one standard deviation) HICP shock on the primary balance, primary expenditure and tax revenue



Source: Bank of Greece calculations.
Note: Impulse response functions.

uncertainty; and (c) a tightening of current financial conditions.[8] The inclusion of these additional variables in the model increases dynamic interactions. As a result, inflation now has not only direct effects, but also indirect effects via a deterioration in economic sentiment. That, in turn, could affect financial conditions. As per the model's projections, two of the three factors outlined above will, to a different extent, have a negative impact on GDP (see Chart C).[9] Regarding direct effects on the primary balance, the results of the model confirm that the impact of higher inflation remains statistically insignificant. Turning to the indirect effects, the model's estimates suggest that a negative, albeit marginal, effect on the primary balance via the impact on the economic sentiment indicator (ESI) occurs around three quarters after the inflationary shock and continues for up to another six quarters (see Chart D). Extrapolating these effects for the estimated path of inflation in 2022 (2022: 5.6% according to the 2022 Stability Programme), it is projected that the burden on the primary deficit resulting from the war in Ukraine and the inflation and energy shock could well be negligible, amounting to no more than approximately 0.1% of the estimated GDP for that year.[10]

Regarding the public debt dynamics, the increase in inflation is expected to contribute to a faster debt reduction, also because of its projected marginal impact on the primary balance. However, if it is accompanied by an abrupt tightening of monetary conditions and, consequently, an increase in borrowing costs, it could reduce the positive impact of the interest rate-growth differential on debt dynamics. In the case of Greece, such deterioration would be only limited because of the favourable profile and the key characteristics of the public debt (i.e. long average maturity, only a small percentage is refinanced by the markets each year, a large part of the total is tied to a fixed and low interest rate). The impact on the 2022 total primary balance could be larger if new fiscal measures, in addition to those already scheduled, are implemented (such as tax cuts, horizontal income support schemes and other subsidies for households and businesses) and if the inflationary shock persists for longer, affecting a number of indirect channels, such as the economic sentiment indicator.

Conclusions

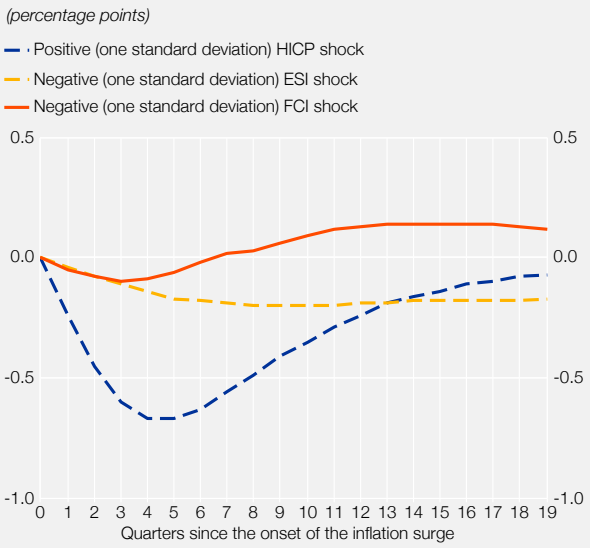
In conclusion, in the current conditions of the war in Ukraine, the impact of a *ceteris paribus* inflationary shock on the level of the nominal primary balance in Greece is expected to be only marginally negative. The factors that would amplify this impact include, apart from the level of inflation and the duration of the shock *per se*,

8 There are also other additional channels, such as energy rationing, disruptions in global production and trade, as well as other second-round effects (e.g. the slowdown in euro area activity), which are not taken into account here.

9 We expand the BVAR model by including two additional variables: the European Commission's Economic Sentiment Indicator (ESI) and the Financial Conditions Indicator (FCI). As exogenous variables, we use the interest rate on the ECB's marginal lending facility; oil prices (in USD/barrel); natural gas prices (in USD/MMBtu); and the Euro Area economic Policy Uncertainty (EPU) index. The main sources for the quarterly data are the European Commission, the World Bank, the ECB and the Bank of Greece. The estimation period runs from 2003 Q1 to 2021 Q3.

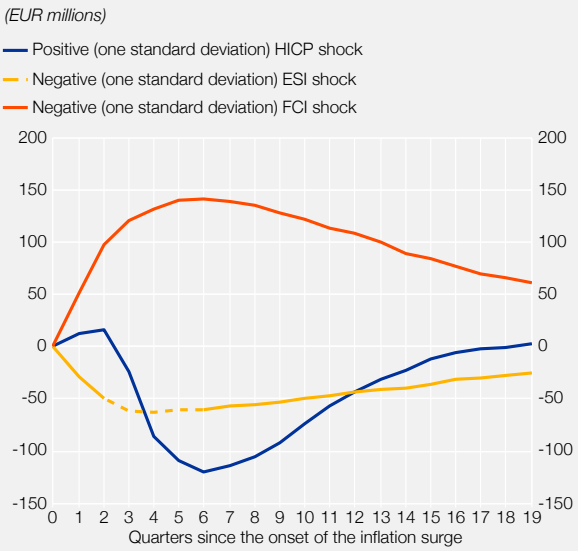
10 This outcome shows that, in the current high inflation conditions, the expected impact for 2022 is 6-7 times greater than that estimated by the BVAR model for one standard deviation (the historical standard deviation of the HICP is 0.8). This impact approximates the difference of the average rate of harmonised inflation for the period 2009-2019 from that expected for 2022 in the 2022 Stability Programme, divided by the standard deviation.

Chart C Impact of HICP, ESI and FCI shocks on GDP



Source: Bank of Greece calculations.
Note: Impulse response functions. In dashed line: statistically significant impacts at the 68% level.

Chart D Impact of HICP, ESI and FCI shocks on the primary balance



Source: Bank of Greece calculations.
Note: Impulse response functions. In dashed line: statistically significant impacts at the 68% level.

second-round negative effects on GDP growth via the deterioration of economic sentiment. A tightening of monetary policy aimed at taming high inflation would weaken the pace of reduction in the debt-to-GDP ratio. However, due to the favourable profile of the Greek public debt, the ratio will likely decline and return to its 2019 level in 2022.

Box 4

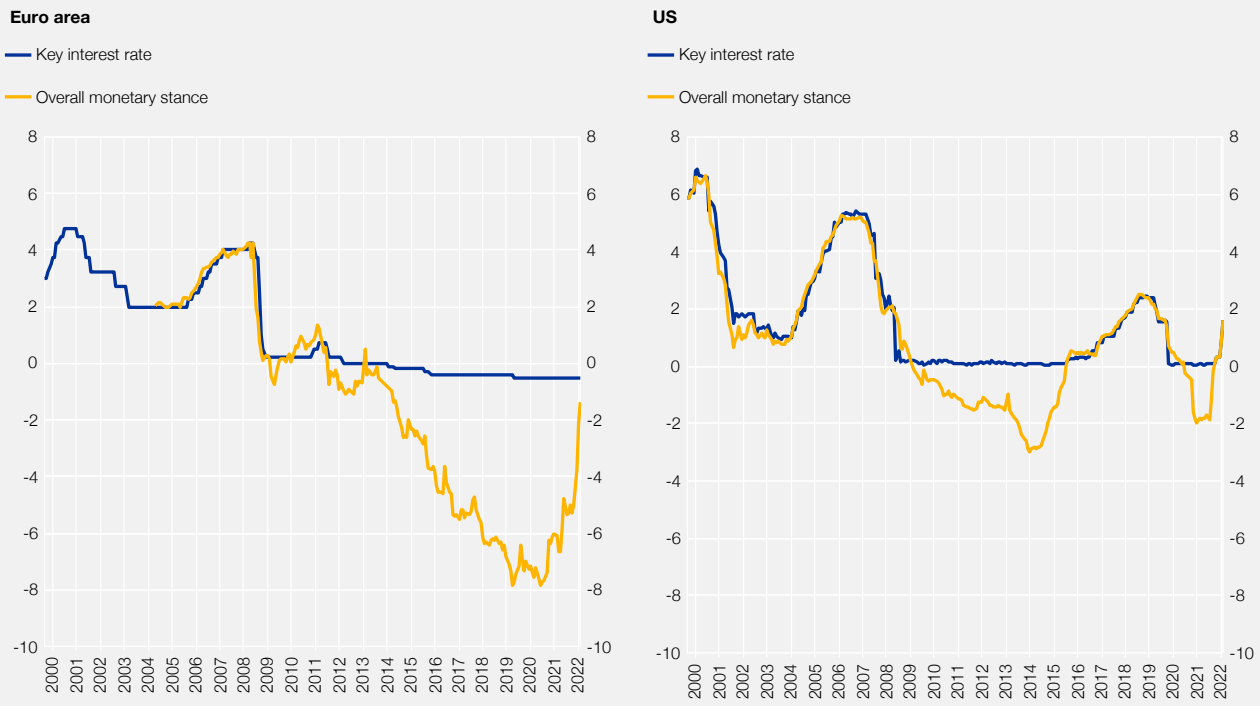
MARKET-IMPLIED EXPECTATIONS FOR INFLATION AND INTEREST RATES

Global monetary conditions, as determined by the setting of interest rates and the flows of refinancing by major central banks, are a key determinant of financial conditions, thus affecting the cyclical component of economic activity. Currently, the monetary policy stance of major central banks globally is gradually tightening, having started from highly accommodative levels.

With regard to the euro area (see Chart A), the ECB decisions to reduce the deposit facility rate to negative levels and to conduct asset purchases as well as to provide forward guidance, through ECB officials' statements, have resulted in very accommodative monetary conditions in the euro area. Monetary conditions are accommodative also in the United States, in the light of current inflation levels, although the effect of non-standard monetary policy measures has become neutral already since November 2021, i.e. shortly before the US Federal Reserve started raising the federal funds rate. At the same time, already since December 2021, following the ECB's decision to end net asset purchases through the Pandemic Emergency Purchase Programme (PEPP), the contribution of non-standard monetary policy measures to monetary accommodation in the euro area has started to decline, resulting in a gradual convergence of overall monetary conditions towards the level set by key interest rates.

Thus, it appears that the rise in inflation, in the aftermath of the pandemic, leads to a re-normalisation of monetary conditions across the globe, albeit from highly accommodative levels. Against this background, several central banks worldwide have started raising key interest rates.

Chart A Overall monetary conditions in the euro area and the US



Sources: For the euro area, ECB (Statistical Data Warehouse). For the US, Federal Reserve Bank of Atlanta.
Note: The blue line indicates the level of the key interest rate and the yellow line indicates the overall monetary policy stance of the central bank in the euro area (left-hand panel) and in the US (right-hand panel). The measure used to calculate the overall monetary stance is the shadow interest rate on both standard (most importantly, interest rate setting) and non-standard (asset purchases, forward guidance, etc.) monetary policy actions and announcements. For its construction methodology, see Wu, J.C. and J. Zhang (2019), "A shadow rate New Keynesian model", *Journal of Economic Dynamics and Control*,107, 103728. A shadow interest rate lower than, equal to or higher than the key interest rate implies that the conduct of non-standard monetary policy has accommodative/expansionary features, a neutral effect or a more restrictive effect compared with the level of interest rates, respectively.

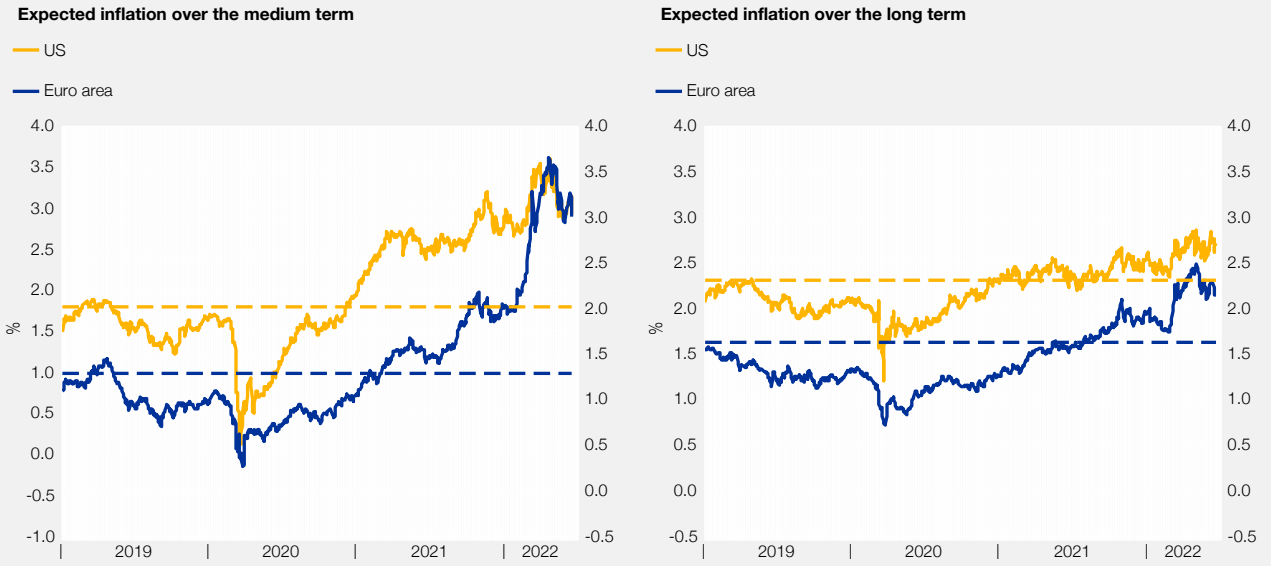
Inflation expectations and key interest rates

Inflation expectations are an important factor in the monetary policy framework and the setting of interest rates. In particular, inflation expectations – and, most importantly, their deviation from the central bank's medium-term inflation target – as well as the deviation of the GDP growth rate from its long-term trend are crucial parameters for setting policy rates.[1] The reason is that, as studies of the 1970s inflation episode have shown, rising inflation expectations may lead to an aggravation of inflationary pressures and, thus, to higher inflation persistence.[2] Central banks, therefore, set interest rates on the basis of a reaction function that takes into account expected inflation. For example, central banks take into account market-implied inflation expectations both in their econometric models for forecasting inflation and in their decisions for setting interest rates.[3]

As shown in Chart B (left-hand panel), market-implied medium-term inflation expectations have followed a steady upward trend since the second quarter of 2020, both in the United States and in the euro area. In particular, the breakeven inflation rate for a five-year horizon has been above 2% already since early 2021 in the United States, while in the euro area this development became visible by February 2022, i.e. in close connection with the international energy price shock associated with the war in Ukraine.

1 See Clarida, R., J. Gali and M. Gertler (2000), "Monetary policy rules and macroeconomic stability: evidence and some theory", *Quarterly Journal of Economics*, 115(1), 147-180.
2 See Leduc, S., K. Sill, and T. Stark (2007), "Self-fulfilling expectations and the inflation of the 1970s: Evidence from the Livingston Survey", *Journal of Monetary Economics*, 54(2), 433-459.
3 Indicatively, see "Inflation expectations and their role in Eurosystem forecasting", Eurosystem Workstream on inflation forecasting, ECB Occasional Paper no. 264, September 2021.

Chart B Market-based inflation expectations in the euro area and the US



Sources: Refinitiv and Bank of Greece.
Note: The expected inflation rate over the medium term (left-hand panel) is derived from the breakeven inflation rates on five-year benchmark bonds in the euro area (blue line) and the US (yellow line). Correspondingly, the expected inflation rate over the long term (right-hand panel) is the geometric weighted average difference between the 10-year and 5-year breakeven inflation rates (5-year, 5-year forward inflation expectation rate). The dashed lines in both charts indicate the long-term average of each series, which is depicted in the corresponding color.

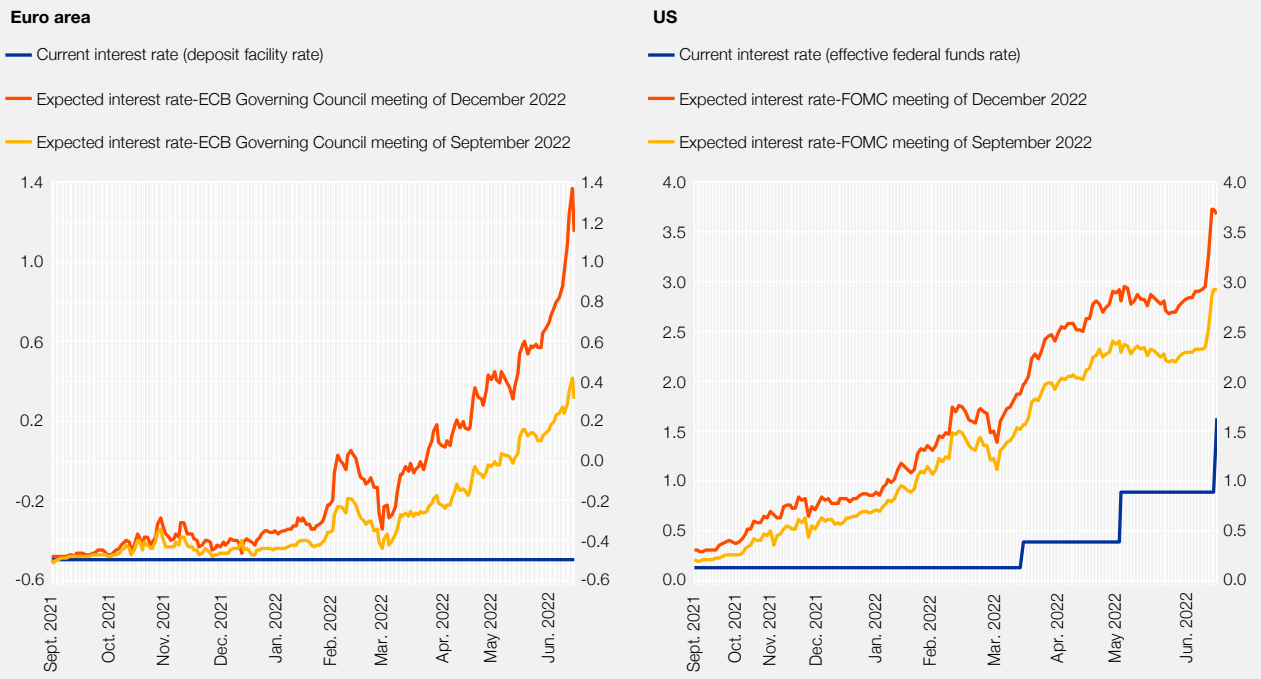
On the other hand, longer-term inflation expectations (Chart B, right-hand panel), i.e. the 5-year, 5-year forward inflation expectations rate, have not increased as strongly as medium-term indicators. Investors, therefore, seem to be linking their long-term inflation expectations to the ECB's and the Fed's inflation target of around 2% over the medium to long term. In fact, in both the United States and the euro area, the upward trend in long-term inflation expectations appears to have weakened and expectations are anchored in line with central banks' forward guidance on a gradual change in their monetary policy. In particular, in the United States long-term expectations have stabilised since October 2021, while in the euro area a significant decline in long-term expectations has become evident since the second half of April 2022.[4] This observation is particularly important, as it suggests that market participants are confident that central banks will tame inflation in both the United States and the euro area and keep it in line with their inflation target. At the same time, however, there seems to be a link between long-term inflation expectations and expectations that central banks will respond by increasing interest rates.

In particular, as derived from Fed funds futures contracts (see Chart C, right-hand panel), as early as September 2021, markets initially expected a 25 bps rate hike in the first half of 2022. However, as inflation appeared to be more persistent than initially thought, expectations of a federal funds rate hike increased and, by December 2021, markets expected that the Fed would start hiking earlier, i.e. in March 2022, as was the case. Overall, from September 2021 to date, market expectations of increases in the federal funds rate strengthened substantially. Thus, while the federal funds target rate was initially expected to be around 1.875% (i.e. ranging from 1.75% to 2%) by the end of 2022, at mid-June 2022 it was expected, with an implied probability of 100%, that the federal funds rate by the end of 2022 would be at least around 3.625% (ranging from 3.5% to 3.75%).

On the other hand, market expectations for an increase in key ECB interest rates in 2022 that had started to emerge towards the end of November 2021 proved to be temporary, as they declined after the Governing Council meeting of December 2021. However, the outbreak of the war in Ukraine and its impact on the persistent rise of

4 It should also be noted that with the outbreak of the war in Ukraine, long-term inflation expectations over a long-term horizon increased sharply. Subsequently, following the FOMC's hike in its March meeting and statements by ECB officials in April, expectations declined significantly.

Chart C Current and expected key interest rates in the euro area and the US



Source: Refinitiv.
Note: Expected interest rates are based on money market derivative contracts (overnight index swap-OIS rates for the euro area and futures contracts for the US). The prices of these contracts, from which expected interest rates are derived, are set on a daily basis and refer to different meetings of the ECB Governing Council and the FOMC. The horizontal axis reflects the timing of expectations for the interest rate level.

the prices of energy and other commodities led, in the first ten days of March 2022, to a resurgence of expectations of an increase in interest rates in the third quarter of 2022, i.e. at the first ECB Governing Council meeting after the end of Eurosystem net asset purchases. Overall, interest rate derivative markets expect the key interest rate in the euro area to rise to at least 1.25% by the end of 2022, from -0.5% currently.

Consequences of an increase in interest rates

It should be noted that, as mentioned at the beginning of this box, the overall conduct of monetary policy, i.e. interest rate setting and non-standard monetary policy measures, has led to highly accommodative monetary conditions internationally. As a result, a gradual shift in monetary policy does not automatically imply a tightening or, even more so, a restrictive monetary policy environment. It should be stressed that, in order to calculate the impact of the current interest rate level on economic activity, the level of the real interest rate has to be compared with the natural interest rate (r*).[5] The effects of monetary policy on economic activity become contractionary only when the real current interest rate (i.e. the difference between the nominal interest rate and the inflation rate over a given period) exceeds the natural interest rate.

In the United States, for example, the natural interest rate is estimated to stand around 0.3%.[6] Also, the expected inflation rate by end-2022 ranges from 3.7% to 5.4%, depending on the source.[7] Therefore, even if market expectations are confirmed and the Fed funds rate approaches the anticipated level, the real interest rate will remain

5 See, inter alia, Williams, J.C. (2016), "Monetary policy in a low r-star world", *FRBSF Economic Letter*, 2016-23, and Ajelo, A., I. Cairó, V. Cúrdia and A. Queralto (2021), "The Asymmetric Costs of Misperceiving R-star", *FRBSF Economic Letter*, 2021-1.
6 See Federal Reserve Bank of Richmond, "Lubik-Matthes Natural Rate of Interest" (retrieved on 15.5.2022).
7 The latest Survey of Professional Forecasters (May 2022) suggests an expected annual change in the US CPI of 3.7% in 2022, while the University of Michigan consumer survey suggests an annual rate of change in prices of 5.4%.

negative and well below the equilibrium rate. This applies all the more to the euro area, where interest rate increases are expected to be smaller than in the United States, while inflation expectations for 2022 have strengthened.[8] As a result, interest rate increases are not expected to have a particularly contractionary effect domestically.[9]

Of course, it should be borne in mind that faster interest rate hikes by the Federal Reserve lead to a more attractive environment of interest rate returns in the United States than in the euro area. So, according to international finance theory, differences in real interest rate yields are expected to result in capital outflows from the lower yielding area (in this case, the euro area) and inflows into the higher yielding area (in this case, the dollar area). Indeed, this imbalance has led to an appreciation of the dollar of around 8.5% against the euro in the course of 2022, thereby partially mitigating the tightening of euro-area monetary conditions.

Conclusions

Studies of past inflationary episodes have shown that a delay in raising interest rates can lead to inflationary expectations, which can, in turn, contribute to higher inflation rates and inflation persistence. Hence, major central banks across the globe have already started to raise their key interest rates in order to curb inflation. Against this background, interest rate derivative markets expect by the end of 2022 a significant further increase in interest rates in the United States and a smaller increase in interest rates in the euro area, which, nevertheless, should lead key interest rates to a positive nominal level. Of course, as the level of the shadow interest rate in both the euro area and the United States is very accommodative, the immediate effects of an eventual interest rate increase are quite far from being considered contractionary for economic activity. This is all the more so because a positive level of real interest rates is not to be expected, even if market expectations for rate hikes are confirmed.

8 The ECB Survey of Professional Forecasters for the second quarter of 2022 suggests a 6% expected rate of annual change in the HICP.

9 See also C. Lagarde, "Monetary policy normalisation in the euro area", The ECB Blog, 23.5.2022, (retrieved on 24.5.2022).

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