ECONOMIC BULLETIN

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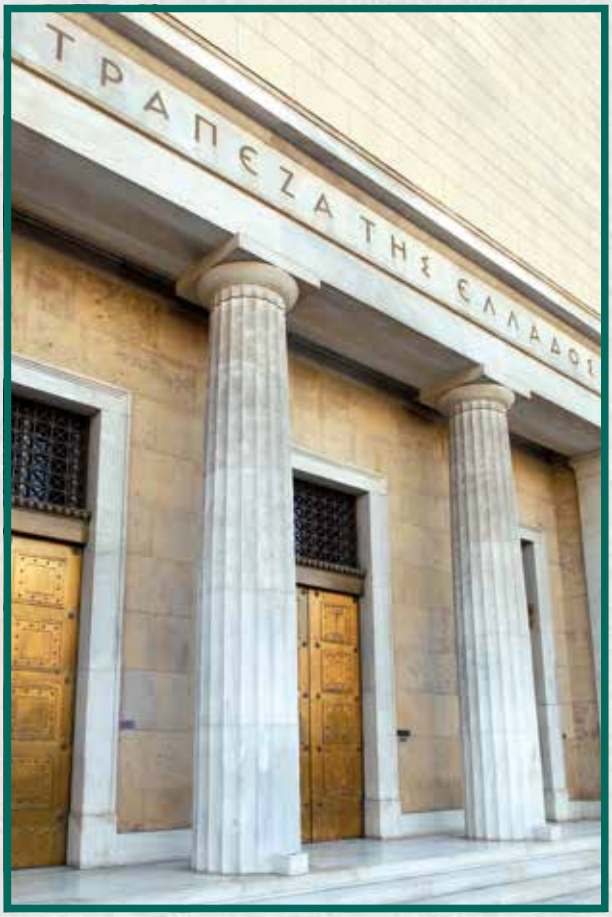

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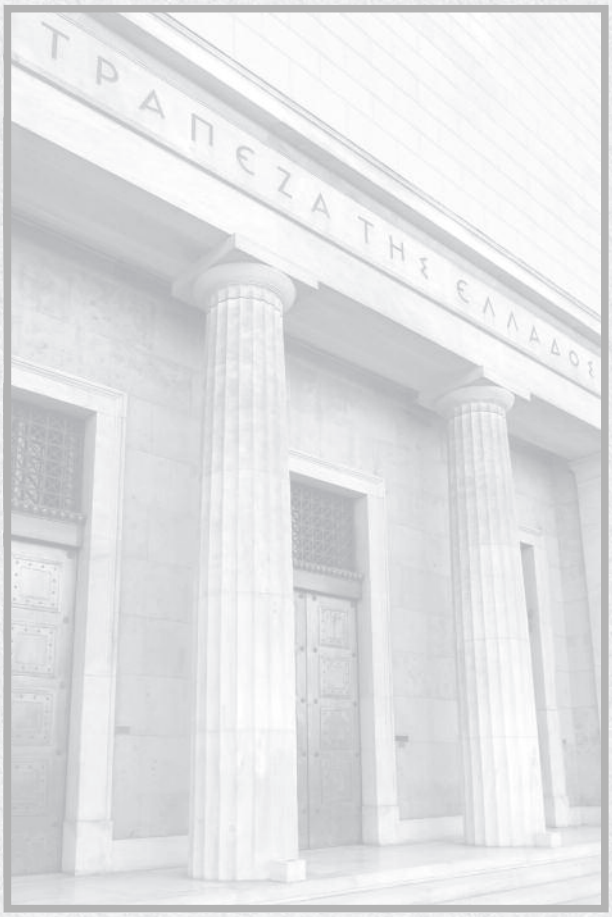

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MACROECONOMIC EFFECTS OF SHOCKS TO IMPORT AND SERVICES SECTOR PRICES

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ABSTRACT

This paper investigates the macroeconomic implications of inflationary shocks that originate from the import and services sectors. The set-up is a medium-scale Dynamic Stochastic General Equilibrium (DSGE) model calibrated for the Greek economy. The results suggest that a temporary increase in import price inflation adversely affects economic activity and drives up domestic inflation. The largest output losses occur in the medium term, since in the short term the adverse effects are dampened by the presence of price rigidities and an import substitution effect that induces expenditure to switch towards domestically produced goods. Additionally, the findings suggest that a temporary increase in the price of the services sector exerts strong inflationary pressures and negatively affects economic activity. Finally, the results show that inflation persistence matters for the effects on the macroeconomy. The more persistent inflation is in imports and the services sector, the larger the output losses.

Keywords: import prices; services sector prices; consumer prices; inflation; Greece

JEL classification: E31; E27; F41; O52

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ΜΑΚΡΟΟΙΚΟΝΟΜΙΚΕΣ ΕΠΙΔΡΑΣΕΙΣ ΑΠΟ ΔΙΑΤΑΡΑΧΕΣ ΣΤΙΣ ΤΙΜΕΣ ΤΩΝ ΕΙΣΑΓΩΓΩΝ ΚΑΙ ΤΟΥ ΤΟΜΕΑ ΤΩΝ ΥΠΗΡΕΣΙΩΝ

Δημήτρης Παπαγεωργίου
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ΠΕΡΙΛΗΨΗ

Το παρόν άρθρο διερευνά τις μακροοικονομικές επιδράσεις που προκύπτουν από αυξήσεις στις τιμές των εισαγωγών και του τομέα των υπηρεσιών. Η εκτίμηση των επιδράσεων γίνεται με τη χρήση ενός Δυναμικού Στοχαστικού Υποδείγματος Γενικής Ισορροπίας (Dynamic Stochastic General Equilibrium model), το οποίο διαμετρείται για την ελληνική οικονομία.

Τα αποτελέσματα υποδεικνύουν ότι μια προσωρινή αύξηση του πληθωρισμού των τιμών των εισαγωγών επηρεάζει αρνητικά την οικονομική δραστηριότητα και αυξάνει τον εγχώριο πληθωρισμό. Όσον αφορά το βαθμό μετακύλισης στις εγχώριες τιμές, εκτιμάται ότι μια αύξηση του πληθωρισμού του δείκτη τιμών εισαγωγών κατά 1 ποσοστιαία μονάδα (ποσ. μον.) οδηγεί σε αύξηση του πληθωρισμού του Δείκτη Τιμών Καταναλωτή και του αποπληθωριστή του ΑΕΠ κατά 0,147 και 0,1 ποσ. μον. αντίστοιχα. Οι μεγαλύτερες απώλειες του ΑΕΠ παρατηρούνται μεσοπρόθεσμα, καθώς βραχυπρόθεσμα οι δυσμενείς επιπτώσεις μετριάζονται από (α) την ακαμψία των εγχώριων τιμών και (β) τη μερική υποκατάσταση των εισαγωγών από εγχωρίως παραγόμενα αγαθά. Επιπλέον, τα ευρήματα υποδεικνύουν ότι ο βαθμός εμμονής της αύξησης των τιμών των εισαγωγών είναι καθοριστικής σημασίας για τις μακροοικονομικές επιπτώσεις. Όσο πιο επίμονος είναι ο πληθωρισμός των τιμών των εισαγωγών, τόσο μεγαλύτερες είναι οι απώλειες του ΑΕΠ μεσοπρόθεσμα. Ενδεικτικά αναφέρεται ότι μια προσωρινή αύξηση του πληθωρισμού των τιμών των εισαγωγών κατά 1 ποσ. μον. μειώνει το πραγματικό ΑΕΠ κατά 0,02% και 0,06% μετά από τέσσερα και οκτώ τρίμηνα αντίστοιχα. Η διατήρηση του πληθωρισμού των τιμών των εισαγωγών κατά ένα επιπλέον τρίμηνο, σε σχέση με το βασικό σενάριο, προκαλεί πρόσθετη σωρευτική απώλεια του πραγματικού ΑΕΠ ίση με περίπου 0,14% κατά τα δύο πρώτα έτη.

Επιπρόσθετα, τα αποτελέσματα επισημαίνουν ότι μια προσωρινή αύξηση στις τιμές του τομέα των υπηρεσιών ασκεί ισχυρές πληθωριστικές πιέσεις και επηρεάζει αρνητικά την οικονομική δραστηριότητα. Για παράδειγμα, μια προσωρινή αύξηση του πληθωρισμού στον τομέα των υπηρεσιών κατά 1 ποσ. μον. μειώνει το πραγματικό ΑΕΠ και τις ιδιωτικές επενδύσεις κατά περίπου 0,19% και 0,87% αντίστοιχα μετά από τέσσερα τρίμηνα. Η αύξηση της εμμονής του πληθωρισμού στον τομέα των υπηρεσιών ενισχύει τις αρνητικές επιπτώσεις στην οικονομική δραστηριότητα. Ενδεικτικά, η διατήρηση του πληθωρισμού στον τομέα των υπηρεσιών κατά ένα επιπλέον τρίμηνο, σε σχέση με το βασικό σενάριο, οδηγεί σε πρόσθετη σωρευτική απώλεια του πραγματικού ΑΕΠ ίση με 0,49% κατά τα δύο πρώτα έτη.

Εν κατακλείδι, τα ευρήματα δείχνουν ότι αν συνεχιστεί ο παρατηρούμενος πληθωρισμός στις τιμές των εισαγωγών στην Ελλάδα, είναι πιθανόν να ωθήσει τις εγχώριες επιχειρήσεις να μετακυλίσουν το υψηλότερο κόστος στις τιμές καταναλωτή προκειμένου να προστατεύσουν τα περιθώρια κέρδους τους, προκαλώντας περαιτέρω πληθωριστικές πιέσεις. Ενώ οι αρνητικές επιπτώσεις στη μακροοικονομία φαίνεται να είναι περιορισμένες βραχυπρόθεσμα, ο επίμονος πληθωρισμός των τιμών των εισαγωγών ενδέχεται να καταστήσει αναγκαία την υιοθέτηση πολιτικών που θα θέσουν υπό έλεγχο τις εγχώριες πληθωριστικές πιέσεις μεσοπρόθεσμα. Μια ακόμη μεγάλη πρόκληση για την ελληνική οικονομία αποτελεί ο περιορισμός των αυξανόμενων πληθωριστικών πιέσεων σε τομείς που χαρακτηρίζονται από έλλειψη ανταγωνισμού, όπως συμβαίνει με τον τομέα των υπηρεσιών, ώστε να αποφευχθεί η επιβράδυνση της τρέχουσας οικονομικής ανάκαμψης.

MACROECONOMIC EFFECTS OF SHOCKS TO IMPORT AND SERVICES SECTOR PRICES

Dimitris Papageorgiou
Economic Analysis and Research Department

1 INTRODUCTION

Global inflation has been rising since early 2021, as most economies have started to recover from the COVID-19 pandemic. The rising inflation can be largely attributed to the following two factors. The first factor is the sharp rise in energy prices observed since the beginning of 2021. The pandemic induced a significant cycle in oil prices, which fell during 2020 and recovered to their pre-pandemic levels at the beginning of 2021, generating strong base effects in energy inflation. The second factor is the reallocation in the consumption basket of households. After the outbreak of the pandemic there was a collapse in demand for services, as well as a strong increase in demand for goods. The former led to downward price pressures in the services sector during the pandemic, followed by strong base effects in prices after the re-opening of the economies. The latter created shortages in raw materials used in the production process, thereby leading to higher input prices and supply-side disruptions.[1]

Against this background, the aim of this paper is to investigate the macroeconomic effects of inflationary cost-push shocks that originate from the import and services sectors for the Greek economy in the context of a Dynamic Stochastic General Equilibrium (DSGE) model. To account for the uncertainty surrounding the persistence of the inflation drivers, the analysis also considers the implications from different degrees of persistence of the inflationary shocks.

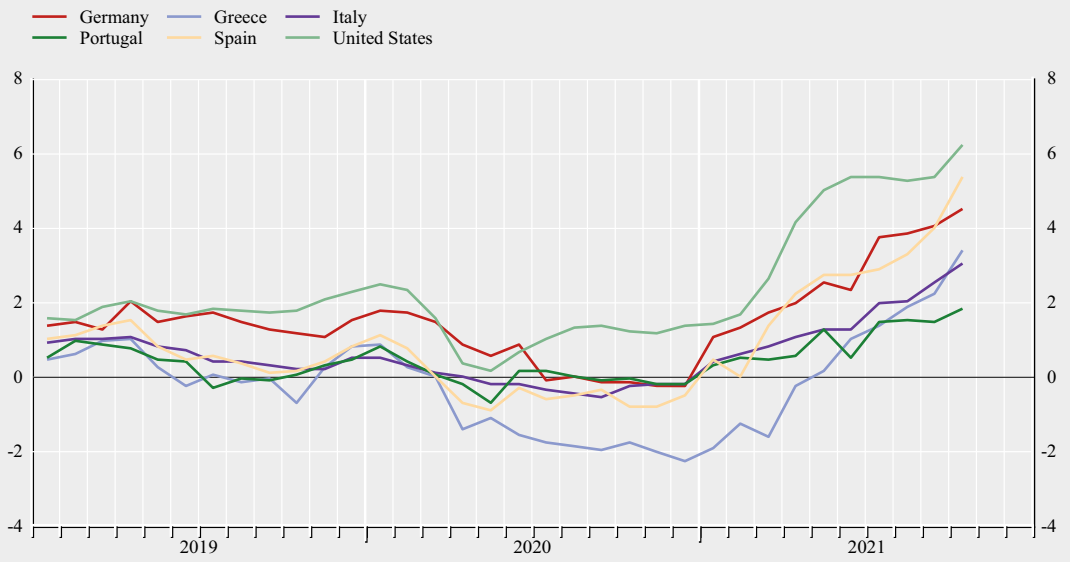
As is evident in most advanced economies, the Consumer Price Index (CPI) in Greece has increased since mid-2021 (see Chart 1). I am particularly interested in examining the effects of higher import price inflation on the Greek economy, as Greece is among the euro area countries that have displayed the highest increases in the import price index of goods and services, as well as in the import price index in industry since the beginning of 2021; see Charts 2 and 3 for the evolution of the respective import price indices for selected euro area countries.[2] At the same time, the imported goods that are used in the production process account for a large fraction of total imports in Greece (see Chart 4). To the extent that rising import prices drive up input costs, firms are likely to pass on some of these costs to output prices. As Chart 5 illustrates, input prices in the manufacturing sector have been rising since mid-2020 and reached a record high in October 2021. The rise in input prices was accompanied by an increase in output prices. The gap between input and output prices has widened since mid-2020, indicating that firms absorbed part of the higher input costs in their profit margins over that period. At the same time, the manufacturing Purchasing Managers' Index (PMI), which measures the performance of the manufacturing sector, has been rising since May 2020, reflecting the high demand for goods during the pandemic. This was followed by a rise in CPI inflation in goods that has been on an upward trend since March 2021, indicating a pass-through of higher input prices to consumer prices (see Chart 6). In an environment of rising input prices and demand for goods, it is likely that firms will seek to protect their margins in the future, thereby inducing a stronger pass-through of higher input prices to final consumer prices.[3]

Regarding recent developments in the services sector, activity expanded significantly follow-

1 See Lane (2021) and Schnabel (2021) for a discussion regarding the inflation dynamics during the pandemic.
2 Greece has exhibited the highest increase in the import price index of goods and services throughout the euro area since the beginning of 2021. Greece, Lithuania and the Netherlands are the countries with the highest increases in the import price index in industry.
3 Bobeica et al. (2019) show that it is more likely that higher costs will be passed on to output prices in periods of high demand and inflation.

Chart 1 CPI

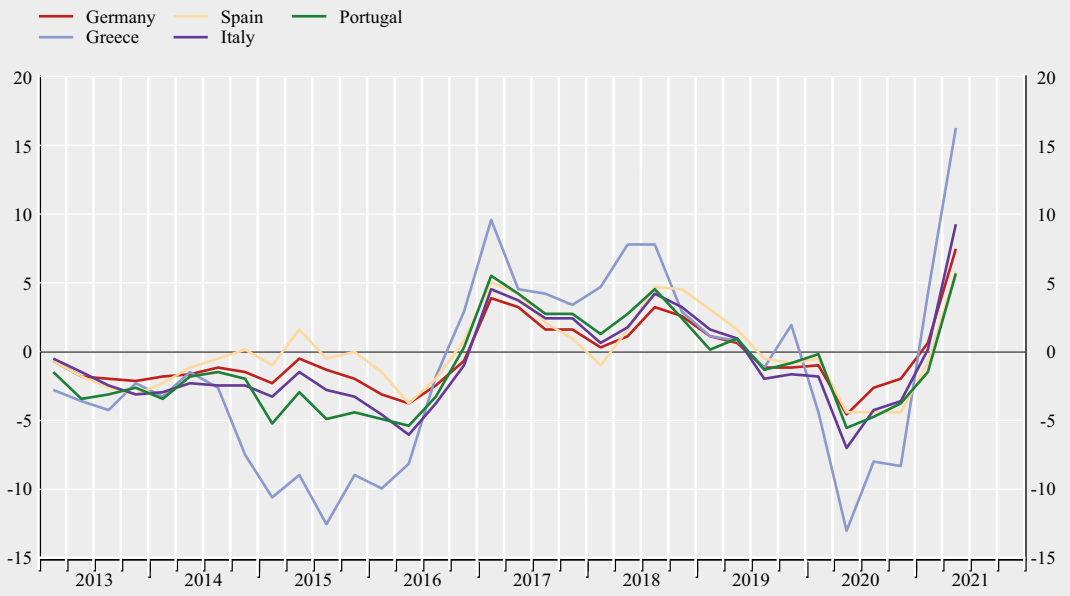
(annual % changes, monthly data)



Source: OECD.Stat.

Chart 2 Import price index of goods and services

(annual % changes, quarterly data)

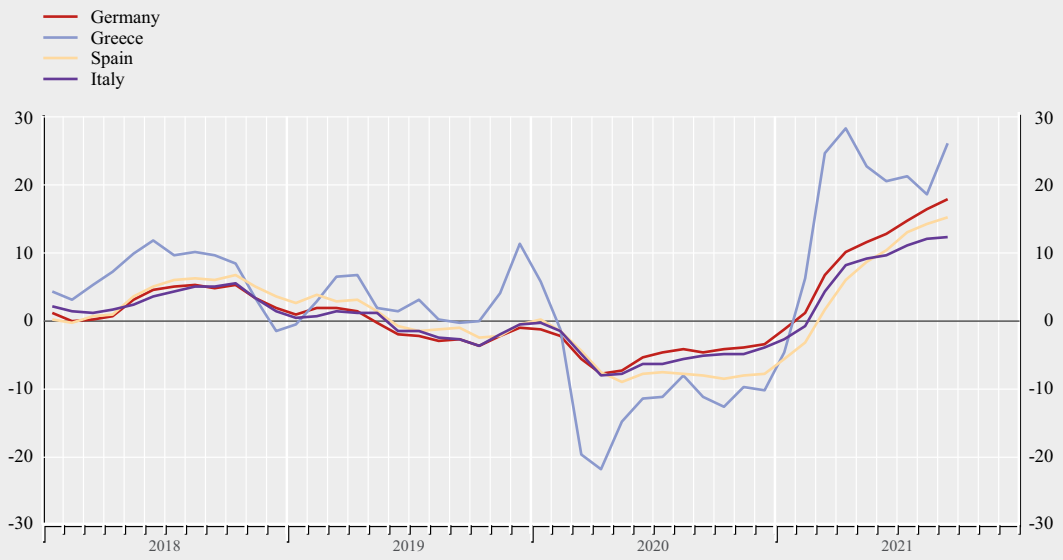


Source: Eurostat.

ing the easing of the pandemic-related restrictions. As Chart 7 illustrates, the confidence indicator in the services sector rose to 40.5 in October 2021, i.e. its highest value since Sep-

Chart 3 Import price index in industry

(annual % changes, monthly data)



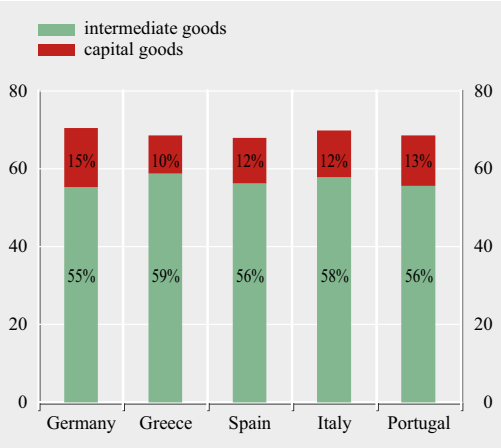
Source: Eurostat.

tember 2001. While pricing pressures in the services sector were muted until May 2021 due to the presence of strict containment measures, the relatively high markups and the lack of competition in the services sector in Greece, combined with rising demand, raise concerns about stronger inflationary pressures in the future.[4]

The set-up I employ is a small open economy medium-scale DSGE model that incorporates two sectors of production, namely a tradable and a non-tradable sector. The latter is used as a proxy for the services sector. There are two types of domestic firms. The first type produces final non-tradable goods under perfect competition using as inputs domestic non-tradable and tradable intermediate goods, as well as imported tradable intermediate goods. The second type of firms consists of monopolistically competitive firms that produce tradable and non-tradable intermediate goods, as well as importing firms that import intermediate goods from abroad, which are then supplied as inputs to the final goods firms. Firms in the tradable and the non-tradable sector, as well as importing firms set prices according to the Calvo-type scheme with partial indexation and prices are equal to a markup over the marginal

Chart 4 Imports of intermediate and capital goods (2017-2021)

(% of total)

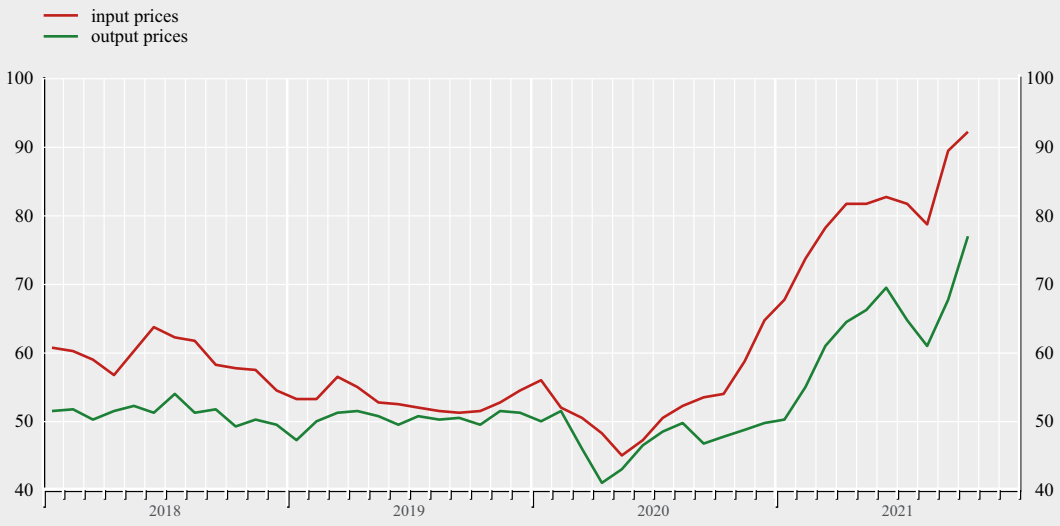


Sources: Eurostat and author's calculations.

4 See e.g. the study by Thum-Thysen and Canton (2015) that provides estimates of markups in the services sector for the EU countries.

Chart 5 Input and output prices in manufacturing

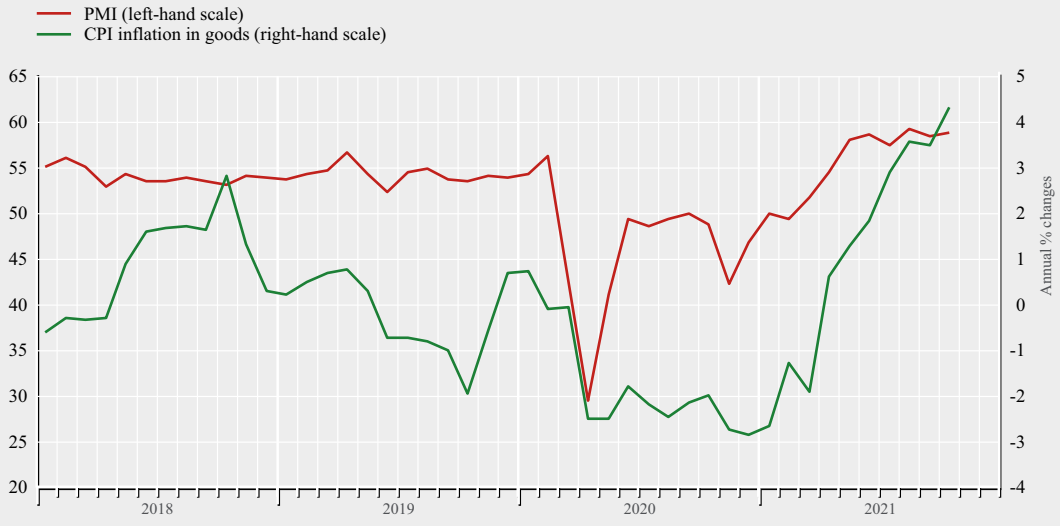
(monthly data)



Source: Markit.

Chart 6 PMI and CPI inflation in goods

(monthly data)



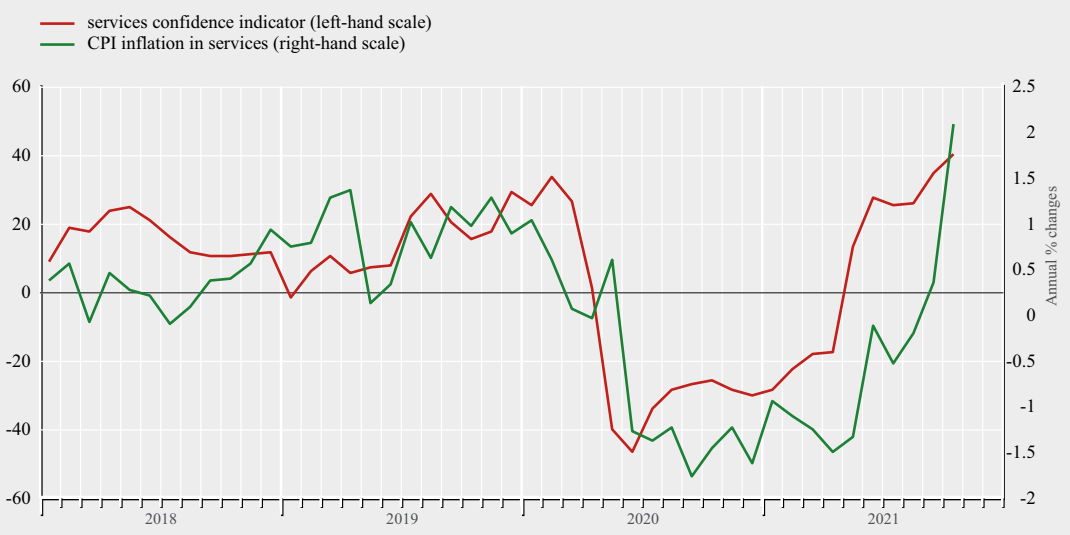
Sources: For PMI: Markit. For CPI: OECD.Stat.

cost. The incorporation of different production sectors in the model allows examining the implications of sector-specific shocks, namely shocks to the tradable, non-tradable and import sectors.

The results suggest that a rise in import price inflation negatively affects economic activity and leads to an increase in domestic prices. The implied pass-through to domestic CPI and GDP deflator inflation resulting from a 1 per-

Chart 7 Confidence indicator and CPI inflation in services

(monthly data)



Sources: For the services confidence indicator: European Commission, Business and consumer surveys. For CPI: OECD.Stat.

centage point (pp) change in import price inflation is 0.147 pp and 0.1 pp, respectively, which is in the range of estimates found in the relevant literature. The largest losses in output occur in the medium term, since in the short term the adverse effects are dampened by the presence of price rigidities and an import substitution effect that induces expenditure to switch towards domestically produced goods. The findings further suggest that the persistence of the rise in the price of imports matters for the adverse effects on economic activity in the medium term. The higher the persistence of import price inflation, the larger the output losses in the medium term. By way of illustration, a temporary increase of 1 pp in import price inflation reduces output by 0.02% and 0.06% after four and eight quarters, respectively. An increase in the persistence of import price inflation by one more quarter relative to the baseline scenario produces an additional cumulative loss in output equal to around 0.14% over the first two years after the shock and reaches a value of 0.28% over the first three years. Furthermore, the findings point out that an increase in the price of the non-tradable sector has an adverse effect on economic activity. For instance, a 1 pp increase in the inflation of the non-tradable sector decreases real GDP and private investment by around 0.19% and 0.87%, respectively, after four quarters. An increase in inflation persistence amplifies the negative effects on economic activity. For example, an increase in inflation persistence in the non-tradable sector by one more quarter results in an additional cumulative loss in output equal to 0.49% over the first two years after the shock.

To the best of my knowledge, this is the first paper that studies the effects of import price inflation for Greece in a general equilibrium framework. However, this is not only a country study, since it contributes to the literature that investigates the relationship between prices and exchange rates in the context of DSGE models. Corsetti and Dedola (2005), Corsetti et al. (2008), Choudhri and Hakura (2015) and Ortega and Osbat (2020) find that the exchange rate pass-through to import and hence consumer prices is incomplete and its degree depends on the nature of the shock that drives the exchange rate. Shocks to the exchange rate itself and monetary policy

shocks seem to have the largest impact on import and consumer prices.[5] There is also a large number of studies that provide empirical evidence on the impact of exchange rate and import price changes on consumer prices. Among many others, Ortega and Osbat (2020) provide recent estimates regarding the exchange rate pass-through to import and consumer prices for the euro area economies. They show that the pass-through to import prices is much larger than that to consumer prices and varies substantially across countries.[6] The paper also contributes to the literature that examines the effects of changes in the price of the services sector.[7] Papageorgiou and Vourvachaki (2017) examine the effects of structural reforms that enhance competition in the non-tradable sector for Greece. The present analysis differs in that the focus is on the investigation of inflationary pressures arising from the non-tradable sector.

The rest of the paper is organised as follows. Section 2 describes the theoretical model. Section 3 presents the main results. Section 4 concludes.

2 DESCRIPTION OF THE THEORETICAL MODEL

The model I use is a version of the Bank of Greece micro-founded Dynamic Stochastic General Equilibrium (DSGE) model that shares the standard main characteristics of structural models used by most central banks and international institutions, but also includes some features that are important to adapt the model to Greece.[8]

In particular, the domestic economy is modelled as a small open economy that belongs to a currency area in the sense that the nominal exchange rate is exogenous and there is no monetary policy independence. In the absence of autonomous monetary policy, the domestic nominal interest rate is determined by an exogenously given, risk-free, foreign nominal policy interest rate and a risk-premium component. The domestic economy consists of a large number of households, firms and a government. There are two types of households differing in their ability to participate in asset markets. The first type of households has access to the financial markets and can transfer wealth intertemporally by trading bonds and accumulating physical capital, whereas the second type of households is assumed to be liquidity constrained in the sense that it cannot lend or borrow. Both types of households receive labour income by working in the private and the public sector.

As regards the labour market in the private sector, households supply differentiated labour services and there are labour unions that act as wage setters in monopolistically competitive labour markets. As a result, private sector wages can deviate from the marginal product of labour due to labour unions' bargaining power. With regard to the production sector, the model features monopolistically competitive firms that produce tradable and non-tradable differentiated intermediate goods. Firms in the tradable sector sell their output domestically and in the rest of world (recorded as exports), while firms in the non-tradable sector sell their output only domestically. There are also importing firms that import intermediate goods from abroad and operate under monopolistic competition. Once differentiated, the imported intermediate goods are then supplied as inputs into the production of final goods. Firms set the prices of their differentiated output according to the Calvo-type scheme with partial indexation. All types of intermediate goods are used as inputs to produce consumption and investment final goods. The latter are produced by perfectly competitive firms and are sold to domestic households and the government.

5 See also Finn (2000) and Balke and Brown (2018) for the effects of energy price shocks in DSGE models.
6 Campa and Goldberg (2005) provide empirical evidence regarding the exchange rate pass-through to import prices in OECD countries. See Burstein and Gopinath (2014) for a review of the theoretical and empirical work on the relationship between prices and exchange rates.
7 See e.g. Forni et al. (2010).
8 For details of the main features of the model, see Papageorgiou and Vourvachaki (2017) and Papageorgiou (2014).

The model also includes a relatively detailed fiscal policy block. In particular, the government hires labour and combines public consumption and public employment to produce public goods that provide direct utility to households. It levies taxes on consumption and on income from labour and capital earnings, as well as lump-sum taxes, and issues one-period government bonds in the domestic bond market and the international markets. Total tax revenues plus the issue of new government bonds are used to finance public purchases of goods and services, public investment, government transfers and public sector wages. Public investment is used for the accumulation of public capital that creates production externalities to the private sector, thereby affecting the productivity of the private sector's factors of production, namely capital and labour. The model also features sovereign risk premia that are positively correlated with government indebtedness, thereby introducing a sovereign risk channel through which sovereign default risk is transmitted to the real economy.

Finally, the model includes a number of nominal and real frictions such as habit formation in consumption, investment adjustment costs and variable capital utilisation, which have been empirically identified as playing an important role in the transmission of structural shocks. Overall, the model captures well the key features of the Greek economy and thus provides a parameterised general equilibrium model suitable for policy simulations.

3 METHODOLOGY AND POLICY EXPERIMENTS

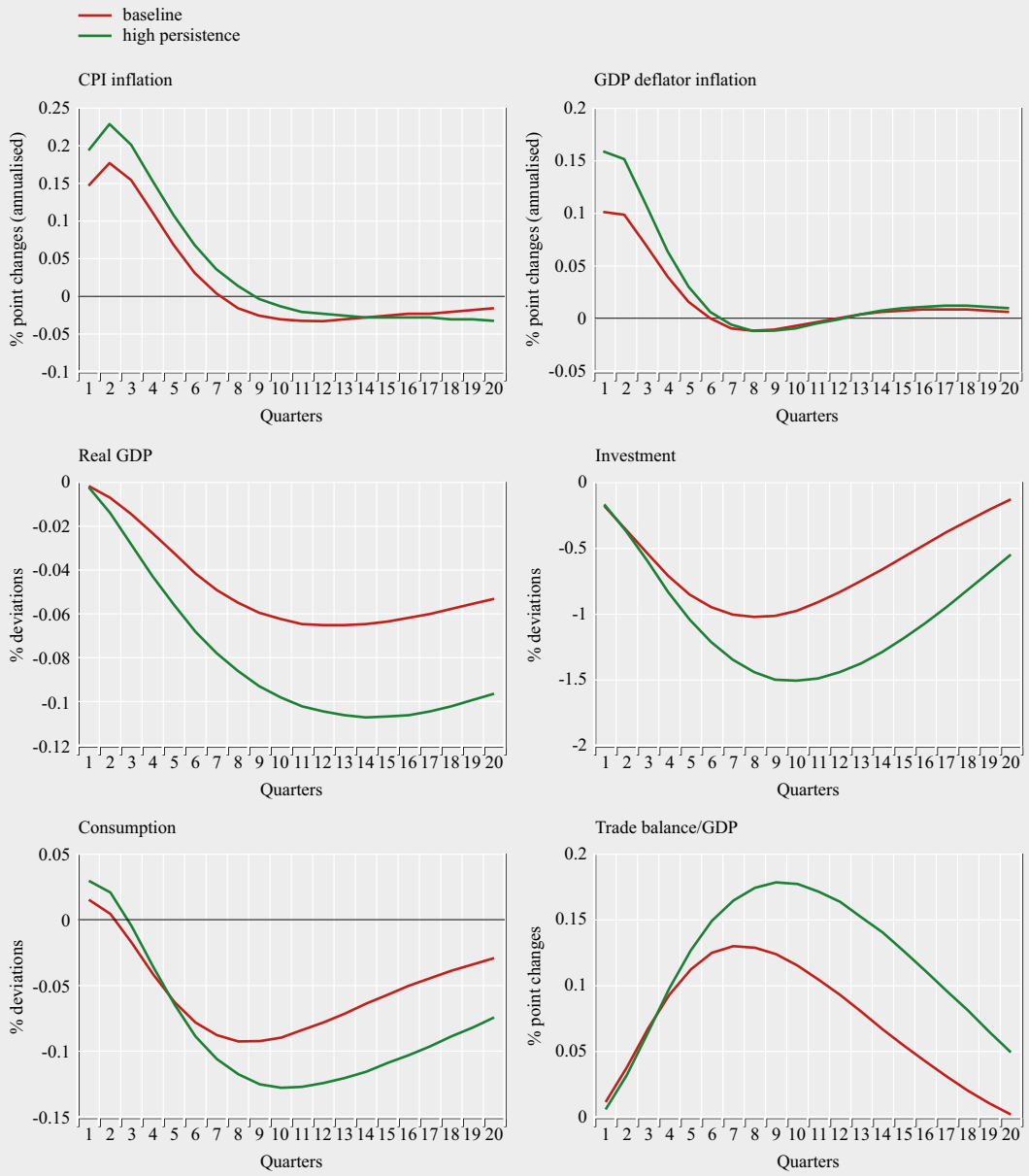
The approach to assessing the impact of inflationary shocks on the import and services sectors is summarised as follows: First, the model is calibrated for the Greek economy at a quarterly frequency. The values of the structural parameters are set as in Papageorgiou and Vourvachaki (2017) and Papageorgiou (2014). The exogenous fiscal policy instruments are set equal to their average values in the data over the period 2017-19. The main source of data is Eurostat. Then, in order to investigate the effects of an increase in the prices of the import and services sectors, I perform the following sets of experiments: (i) a temporary cost-push shock (i.e. a markup shock) to the import sector that increases the inflation rate of imports by 1 pp on impact; and (ii) a temporary cost-push shock (i.e. a markup shock) to the non-tradable (services) sector that increases the inflation rate of this sector by 1 pp on impact. To account for the uncertainty surrounding the persistence of the inflation drivers and the current inflation outlook, I implement these experiments for different degrees of persistence of the inflationary shocks. In the "baseline scenario", the persistence of the shocks is set so that the respective inflation rates gradually return to their initial levels after four quarters. In the "high persistence scenario", the persistence of the shocks is set so that the respective inflation rates gradually return to their initial levels after five quarters. The experiments are performed under perfect foresight, which means that households and firms fully anticipate the future transition paths of the exogenous variables.

3.1 EFFECTS OF AN INCREASE IN THE PRICE OF IMPORTS

Chart 8 shows the effects of the shock in the import prices of intermediate goods in the baseline and the high persistence scenario. All variables are expressed in percentage deviations from their steady state, except for the inflation rates and the trade balance-to-GDP ratio that are expressed as percentage point changes.

Regarding the propagation mechanism following an increase in import prices under the baseline scenario, a rise in the production costs of domestically produced final consumption and investment tradable goods is observed, which in turn triggers an increase in the respective prices. As a result, the domestic CPI, which is a weighted sum of the price index of domestic tradable and non-tradable con-

Chart 8 Dynamic effects of an increase in the price of imports



Source: Author's estimations.
Note: All variables are expressed in percentage deviations from the steady state, except for CPI inflation, GDP deflator inflation and the trade balance-to-GDP ratio that are expressed in percentage point changes.

sumption goods, rises. The estimated pass-through to domestic CPI inflation is equal to 0.147 pp at the impact period.[9] The pass-through to GDP deflator inflation is 0.1 pp on impact. Inflation in the domestic tradable and non-tradable intermediate goods sectors mimics the path of GDP deflator inflation, and

9 The pass-through to the domestic inflation rates is computed as the percentage point change in the respective inflation rate that results from a change of 1 pp in import price inflation.

the pass-through to the inflation rates of these sectors is about 0.088 pp. These results are consistent with previous findings in the relevant literature. For instance, Ortega and Osbat (2020) using a DSGE model calibrated for the euro area find that an increase of around 4 pp in import prices is followed by an increase of approximately 0.5 pp in consumer prices.[10]

Turing to the impact on the rest of the macroeconomic variables, the presence of price rigidities in domestic markets dampens the responses of the macroeconomic variables in the short run. At the same time, the rise in the price of imported intermediate goods generates an import substitution effect. More specifically, the imported intermediate goods are now more expensive, which leads to expenditure switching towards domestically produced intermediate consumption tradable and non-tradable goods. This effect is amplified by the high home bias in the production of consumption goods. Demand for domestically produced tradable intermediate investment goods also increases. Moreover, higher prices induce a negative wealth effect on households, prompting them to reduce consumption and investment demand. At the same time, since households expect prices to be higher in the future, they substitute future for today's consumption and investment (intertemporal substitution effect). As Chart 8 shows, the net effect on consumption is positive on impact, albeit very small. By contrast, private investment declines in the short run, since there is a low home bias in the production of investment goods and the import substitution effect is weaker. Consequently, the higher price of investment adversely affects demand for investment and capital stock accumulation. The effect on real GDP is marginally negative in the short run. This is driven by the fact that consumption demand is barely affected in the short run, as well as by an improvement in the trade balance due to reduced imports.

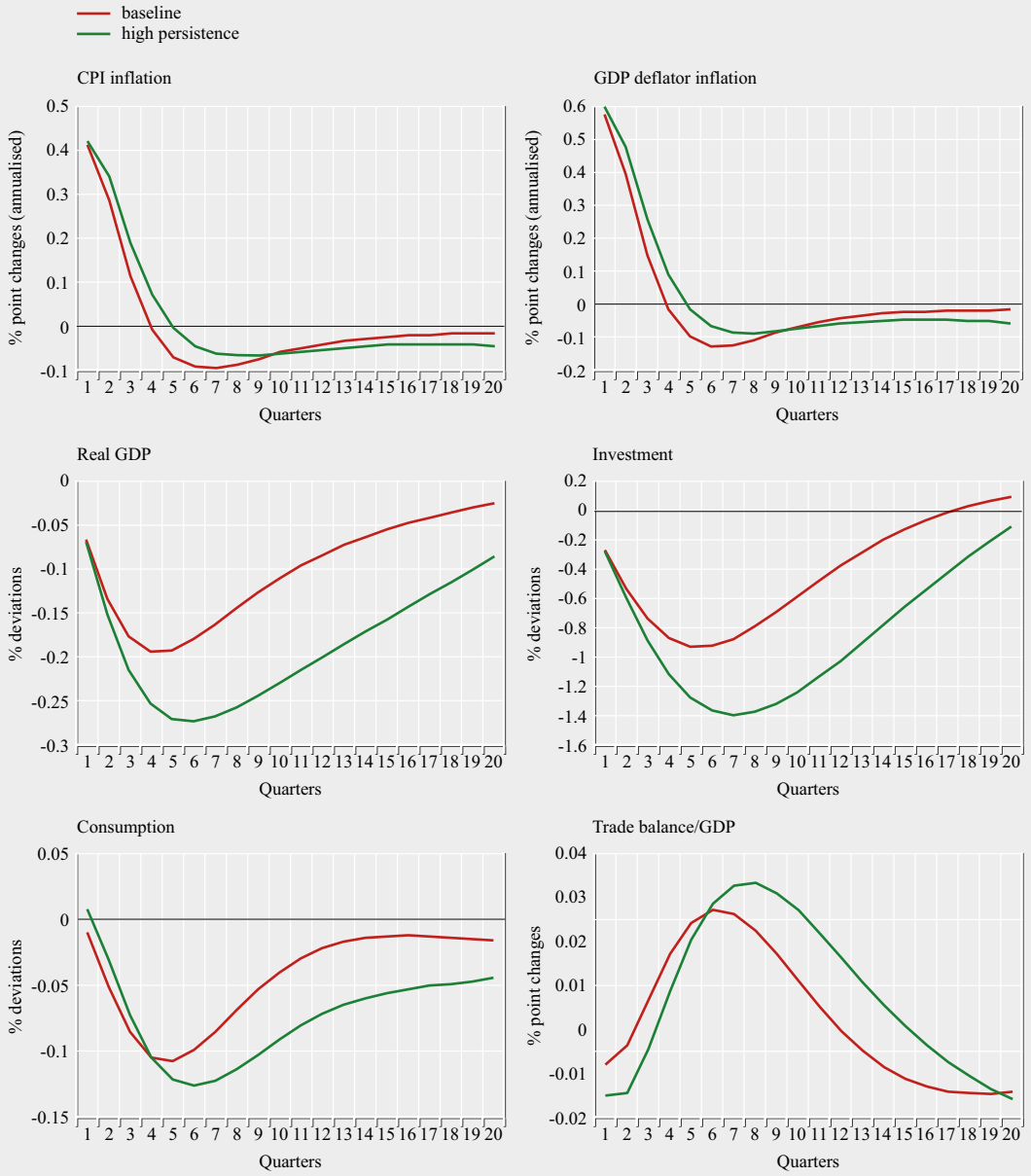
In the following periods of transition, the pass-through of import prices to domestic prices increases and adversely affects demand for consumption and investment. As a result, GDP declines. In particular, real GDP decreases by around 0.02% and 0.06% after four and eight quarters, respectively. The effects are more pronounced in what concerns investment, which declines by around 0.7% and 1% after four and eight quarters, respectively.

In the high persistence scenario, the pass-through to domestic CPI inflation is higher than in the baseline scenario and equal to 0.194 pp. The pass-through to GDP deflator inflation is 0.158 pp. Thus, the more persistent import price inflation is, the higher the pass-through to domestic prices. It should be noted that the increase in the pass-through is stronger for GDP deflator inflation as compared with CPI inflation. This is also reflected in the inflation of the domestic tradable and non-tradable sectors, in which the pass-through is 0.138 pp (0.088 pp in the baseline scenario). This is explained by the fact that intermediate goods firms expect future real marginal costs to be higher than in the baseline scenario and they set higher prices.

As in the baseline scenario, there is an import substitution effect. This effect is stronger in the high persistence scenario and produces a higher increase in demand for domestically produced intermediate consumption tradable and non-tradable goods, the production of which exhibits high home bias. As before, households face a negative income effect, forcing them to reduce consumption and investment demand. However, the intertemporal substitution effect for households is stronger since future prices are expected to be higher for a longer period relative to the baseline scenario. As a result, they are more willing to substitute future for current consumption and investment. Eventually, as Chart 8 illustrates, the reduction in demand for consumption and

10 See Chart 18 in Ortega and Osbat (2020). The findings are also in the range of estimates found in the empirical studies. For example, Ortega and Osbat (2020) for the euro area find that an increase of 0.3% in import prices is followed by an increase of 0.04% in consumer prices. Guilloux-Nefussi and Kharroubi (2008) using a panel of OECD countries find that a 1 pp increase in import price inflation produces a rise in CPI inflation of between 0.11 and 0.15 pp.

Chart 9 Dynamic effects of a price increase in the non-tradable sector



Source: Author's estimations.
Note: All variables are expressed in percentage deviations from the steady state, except for CPI inflation, GDP deflator inflation and the trade balance-to-GDP ratio that are expressed in percentage point changes.

investment in the short run is slightly lower than in the baseline scenario and further exerts upward pressures on domestic prices. However, in the following periods of transition the decline in consumption, investment and GDP is much bigger in the high persistence scenario. Real GDP shrinks by around 0.04% and 0.09% after four and eight quarters, respectively (0.02% and 0.06% in the baseline scenario). The present-value cumulative losses in GDP

from the higher persistence of inflation relative to the baseline scenario are 0.14% and 0.28% over the first two and three years, respectively, and around 1.1% in the long run.

3.2 EFFECTS OF HIGHER PRICES IN THE NON-TRADABLE (SERVICES) SECTOR

In this section I examine the macroeconomic effects of an inflationary cost-push shock that raises the price of the non-tradable sector. As in the previous section, the size of the shock is chosen so that the inflation rate in the non-tradable sector increases by 1 pp on impact under the different scenarios regarding the persistence of the shock (baseline and high persistence scenarios). Chart 9 presents the dynamic effects following the shock in the baseline and the high persistence scenario.

The increase in the price of the non-tradable intermediate goods produces a substitution effect that prompts households to substitute non-tradable for tradable goods. At the same time, higher prices in the non-tradable sector exert an upward pressure on the CPI and GDP deflator inflation rates, which increase on impact by 0.41 pp and 0.57 pp, respectively. Thus, the pass-through to the CPI and the GDP deflator is much higher than that of the import price shock. In turn, the rise in domestic prices has an adverse effect on the country's competitiveness, leading to a reduction in demand for exports and a deterioration in the trade balance. The price of investment also increases, leading to a decline in investment demand. Lower aggregate demand forces firms to reduce labour demand, thereby generating downward wage pressures. Consumption demand also decreases since households face a negative income effect, which dominates the intertemporal substitution effect and further dampens aggregate demand on impact. Eventually, the net effect on tradable output is negative, which along with lower non-tradable output implies a reduction in real GDP. In the following periods of transition, consumption, investment and exports continue to decline, ultimately leading to a reduction in real GDP and investment of around 0.2% and 0.87%, respectively, after four quarters.

When the shock to the price of the non-tradable sector is more persistent, the negative effect on real GDP is much stronger than in the baseline scenario over the medium term. This is mainly driven by reduced investment and exports and, to a lesser extent, consumption. Expectations of longer-lasting high prices induce a stronger substitution effect that mitigates the adverse effects on aggregate demand in the short run (households substitute future for current consumption and investment). Real GDP and investment decline by around 0.25% and 1.1%, respectively, after four quarters. The present-value cumulative loss from an increase in the persistence of the inflation rate by one quarter relative to the baseline scenario is 0.49% over the first two years and converges to 1.8% in the long run.

4 CONCLUSIONS

This paper studied the macroeconomic effects of cost-push shocks that increase prices in the import and services sectors. The set-up was a DSGE model calibrated for the Greek economy. Moreover, the analysis considered the implications from different degrees of persistence of the inflationary shocks.

The results suggest that an increase in import price inflation drives up domestic inflation and has an adverse effect on economic activity. The pass-through to CPI and GDP deflator inflation implied by the model is 0.147 pp and 0.1 pp, respectively. The largest output losses occur in the medium term, since in the short term the adverse effects are mitigated by the presence of price rigidities in the domestic market and an import substitution effect that leads to expenditure switching towards domestically produced intermediate goods. The results further suggest that inflation persistence matters for the impact on economic activity. A more persistent rise in import price inflation amplifies the adverse effects on economic

activity and increases the pass-through to domestic prices. Finally, the results indicate that a rise in the price of the services sector induces strong inflationary pressures and negatively affects the macroeconomy.

In summary, the findings point out that if the observed import price inflation in Greece persists, it will likely force domestic firms to pass through higher costs to consumer prices, thereby triggering further inflationary pressures. While the adverse effects on the macroeconomy seem to be subdued in the short run, persistent import price inflation might call for policies to bring domestic inflationary pressures under control in the medium term. A serious challenge for the Greek economy is to rein in the growing inflationary pressures in sectors with high market power, as is the case with the services sector, to avoid dampening its ongoing recovery.

I acknowledge that the import sector incorporated in the model is a stylised one, assuming away a number of features, such as an energy sector, that are typically found to be important for examining the effects of import price shocks on domestic prices (see e.g. Blanchard and Galí 2009). Adding such features would be an interesting extension. Nonetheless, given that the output and inflation effects resulting from the analysis are non-trivial, the findings provide useful insights and help understand the impact of inflationary shocks stemming from the import and services sectors on economic activity.

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THE 2021 REVIEW OF THE MONETARY POLICY STRATEGY OF THE EUROSYSTEM: AN ECONOMY OF FORCES

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ABSTRACT

This study delves into the rationale behind the 2021 review of the monetary policy strategy of the Eurosystem and elaborates on the main elements of the new strategy and its implications for monetary policy-making going forward. The profound changes in the economic landscape that have taken place since the last review in 2003 prompted the European Central Bank and the euro area national central banks to embark on a comprehensive review of the monetary policy strategy of the Eurosystem. The aim has been to ensure that the strategy reflects upon these unique challenges and remains well suited in pursuit of the primary objective of price stability. The key outcome of the strategy review, unveiled in July 2021, has been the reformulation of the price stability objective so as to adopt a symmetric commitment to the 2% inflation target over the medium term, as well as the confirmation of the flexible use of unconventional monetary policy tools when the economy operates close to the effective lower bound of interest rates. In addition, the new strategy has further incorporated financial stability and climate change considerations into the monetary policy framework. The present study outlines the enhancements embedded in the new strategy, as regards the fulfilment of the Eurosystem's price stability mandate. It also discusses the ways in which the new strategy could have, to some extent, addressed the challenges faced by the euro area and its individual members, with a focus on Greece, over the past crisis years.

Keywords: European Central Bank; monetary policy; strategy review; price stability; euro area economy; inflation; effective lower bound

JEL classification: E31; E50; E52; E58

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Η ΕΠΑΝΕΞΕΤΑΣΗ ΤΗΣ ΣΤΡΑΤΗΓΙΚΗΣ ΝΟΜΙΣΜΑΤΙΚΗΣ ΠΟΛΙΤΙΚΗΣ ΤΟΥ ΕΥΡΩΣΥΣΤΗΜΑΤΟΣ ΤΟ 2021

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ΠΕΡΙΛΗΨΗ

Η μελέτη αυτή εμβαθύνει στη λογική της επανεξέτασης της στρατηγικής της νομισματικής πολιτικής του Ευρωσυστήματος το 2021 και αναλύει τα κύρια στοιχεία και τις συνέπειές της για την άσκηση νομισματικής πολιτικής στο μέλλον. Οι θεμελιώδεις αλλαγές που έχουν συντελεστεί στο οικονομικό περιβάλλον από την τελευταία επανεξέταση το 2003 έδωσαν έναυσμα στην Ευρωπαϊκή Κεντρική Τράπεζα και τις εθνικές κεντρικές τράπεζες στη ζώνη του ευρώ να επανεξετάσουν διεξοδικά τη στρατηγική του Ευρωσυστήματος. Σκοπός είναι να διασφαλιστεί ότι η στρατηγική αντανακλά τις προκλήσεις αυτές και ότι παραμένει κατάλληλη για την εκπλήρωση του πρωταρχικού στόχου της σταθερότητας των τιμών. Τα κύρια συμπεράσματα της επανεξέτασης της στρατηγικής, η οποία ολοκληρώθηκε τον Ιούλιο του 2021, ήταν ο επαναπροσδιορισμός του στόχου της σταθερότητας των τιμών, με την υιοθέτηση συμμετρικής δέσμευσης ως προς την επιδίωξη ρυθμού πληθωρισμού 2% μεσοπρόθεσμα, και η επιβεβαίωση της χρήσης με ευέλικτο τρόπο των μη συμβατικών εργαλείων νομισματικής πολιτικής όταν η οικονομία λειτουργεί κοντά στο κατώτατο δυνατό επίπεδο για τα επιτόκια. Επιπρόσθετα, η νέα στρατηγική ενσωματώνει περαιτέρω παραμέτρους που σχετίζονται με τη χρηματοπιστωτική σταθερότητα και την κλιματική αλλαγή στο πλαίσιο της νομισματικής πολιτικής. Η μελέτη περιγράφει τις βελτιώσεις που συνεπάγεται η νέα στρατηγική για την εκπλήρωση της εντολής του Ευρωσυστήματος για σταθερότητα των τιμών. Εξετάζει επίσης τους τρόπους με τους οποίους η νέα στρατηγική θα μπορούσε να είχε αντιμετωπίσει, έως ένα βαθμό, τις προκλήσεις για τη ζώνη του ευρώ και τα μέλη της, με έμφαση στην Ελλάδα, κατά τη διάρκεια των προηγούμενων κρίσεων.

THE 2021 REVIEW OF THE MONETARY POLICY STRATEGY OF THE EUROSYSTEM: AN ECONOMY OF FORCES*

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Ποταμῷ γὰρ οὐκ ἔστιν ἐμβῆναι δὶς τῷ αὐτῷ
Ηράκλειτος

No man ever steps in the same river twice
[for it's not the same river and he's not the same man]
Heraclitus

1 INTRODUCTION

The 2021 review of the monetary policy strategy of the Eurosystem was a long time coming. The 18 years since the previous review in 2003 have seen profound changes in the realities of the world in which the Eurosystem[1] operates and, by implication, in the art of its monetary policy-making. On the one hand, the economic landscape has been transformed by major trends, such as population ageing, technological change, the global savings glut and slowing productivity growth, all of which have contributed to a decline in the equilibrium real interest rate to historically low levels. On the other hand, this period saw three major shocks unfolding: the global financial crisis, the sovereign debt crisis, which was central to the euro area, and the COVID-19 pandemic. To respond to these shocks, the Eurosystem had to defy orthodoxy, with its monetary policy-making embarking on largely uncharted waters. Notably, it slashed one of its key policy rates to levels below the zero lower bound, while it expanded its toolkit in innovative ways, deploying asset purchases and targeted longer-term refinancing operations on an unprecedented scale. At the same time, globalisation effects on the structure of goods, services and labour markets, as well as implications for prices attributed to climate change and the related transition policies to a carbon-free world, pose further challenges for the Eurosystem in fulfilling its price stability mandate.

Against this background, the ECB and the euro area national central banks embarked in 2020 on a lengthy and thorough re-assessment of the monetary policy strategy of the Eurosystem, to ensure that the strategy reflects upon these unique challenges and remains "*fit for purpose both today and in the future*".[2] The process has involved a new definition of the primary objective of price stability and the confirmation of the flexible use of unconventional monetary policy tools when the economy operates close to the effective lower bound of interest rates. It has also contemplated the further incorporation into the monetary policy framework of other considerations relevant to the pursuit of price stability, such as financial stability and climate change. The overall aim has been to provide the Governing Council[3] with "*a coherent analytical framework that maps actual or expected economic developments into policy decisions*".[4]

* The views expressed herein are those of the authors and do not necessarily reflect the views of the Bank of Greece and the Eurosystem. The study draws on the set of occasional papers (numbered 263 to 280) prepared in the context of the ECB's monetary policy strategy review during 2020-21 by separate work streams, to which the authors had contributed, alongside other Bank of Greece and Eurosystem staff. The authors would like to thank George Tavlas and Daphne Papadopoulou for valuable contributions to this study already during the strategy review process. The authors are also grateful to Hiona Balfoussia and Sophia Mariatou for important comments.

1 The Eurosystem comprises the European Central Bank and the national central banks of those countries that have adopted the euro.

2 See https://www.ecb.europa.eu/home/search/review/html/index.en.html.

3 The Governing Council is the main decision-making body of the Eurosystem. It consists of the six Executive Board members of the ECB and the Governors of the national central banks of the euro area countries.

4 See "An overview of the ECB's monetary policy strategy" (https://www.ecb.europa.eu/home/search/review/html/ecb.strategyreview_monpol_strategy_overview.en.html).

The new strategy, unveiled in July 2021, brings significant enhancements to the framework within which the Governing Council formulates monetary policy in the euro area and safeguards price stability.

This paper delves into the rationale and justification behind the strategy review, and elaborates on its main elements and the implications for monetary policy-making going forward. It provides an overview of the lessons learnt from the past crises and outlines the major strengths of the elements embedded in the new strategy in enhancing the ability of the Governing Council to safeguard price stability and address extraordinary contingencies. The paper first provides in Section 2 an introduction to the main elements of the monetary policy strategy of the Eurosystem, as first defined in 1998, and reviewed in 2003. Section 3 provides the motivation for the 2021 review, followed by a discussion of its main components in Section 4. Section 5 outlines the innovations to the actual implementation of monetary policy arising from the new strategy, focusing on the formulation of forward guidance, the calibration of the policy tools and the further incorporation of climate change considerations. A question that deserves consideration is whether the challenges for the euro area and for its individual members, with a focus on Greece, would have been different had the new strategy been in place during the past crisis years. Section 6 attempts to answer this question, building on a simple counterfactual case to explore the major implications of the new strategy against the performance of the previous formulation. Section 7 provides an assessment of the outcome of the strategy review, while Section 8 concludes.

2 MONETARY POLICY STRATEGY

The monetary policy strategy of the Eurosystem provides a framework within which the Governing Council —the main decision-making body of the ECB— takes decisions on the appropriate stance of the monetary policy in pursuit of its price stability mandate, as established in Article 127(1) of the Treaty on the Functioning of the European Union. The strategy prescribes general principles that aim to guide the successful and efficient conduct of monetary policy, which allows achieving inflation outcomes consistent with the primary objective of the Eurosystem to maintain price stability.

The main elements of the strategy, first defined in 1998, reviewed slightly in 2003 and in place until the recent review in 2020-21, can be summarised as follows:

i. The first element refers to the quantitative *definition of price stability*. When adopted by the Governing Council in 1998, price stability was defined as a year-on-year increase in euro area inflation of *below 2%* over the medium term. In 2003, it was clarified that the Governing Council aimed to maintain inflation rates of *below, but close to, 2%*. This definition consisted of, first, a range for inflation and, second, an imprecise inflation aim close to the upper bound of the range (usually interpreted[5] as inflation rates from 1.7% to 1.9%). It provided a ceiling on the aimed inflation rate, in order to safeguard the purchasing power of the euro and to ensure the transparency of the price mechanism, allowing consumers and businesses to make well-informed economic decisions regarding their consumption, saving and investment. At the same time, aiming at above zero inflation rates provides a safety margin to reduce the risks of deflation. It also helps address the implications of inflation differentials across the euro area countries and it takes into account the possibility of mismeasurement of true inflation, in the light of quality improvements in goods and services. Finally, the definition signified the Governing Council's commitment to avoid persistently too high, as well as too low inflation rates.

Further aspects of the definition are the following:

5 See speech by the former ECB President Jean-Claude Trichet in May 2003 entitled "The ECB's monetary policy strategy after the evaluation and clarification of May 2003" (https://www.ecb.europa.eu/press/key/date/2003/html/sp031120.en.html).

- Euro area inflation is measured on the basis of the Harmonised Index of Consumer Prices (HICP), which is compiled by Eurostat in accordance with harmonised statistical methods across all euro area countries, ensuring that price developments are measured on a comparable basis.

- The definition refers to the inflation rate in the euro area as a whole. In a currency union, the monetary policy decisions aim to steer the average level of money market interest rates of all member countries, which, through the monetary policy transmission mechanism, affects aggregate demand and prices. That is, a single monetary policy cannot set distinct policy rates in each individual country, despite heterogeneity across domestic inflation rates. The aim is to ensure that the average inflation rate in the Economic and Monetary Union is consistent with the definition for price stability and to safeguard the value of the single currency, the euro.

- The medium-term orientation provides the central bank with adequate flexibility to respond to economic shocks. Acknowledging that monetary policy may influence prices only with time lags and that inflation cannot be kept constant at a specific point target, policy decisions should not attempt to fine-tune short-term fluctuations in prices, but would rather focus on maintaining price stability over the medium term. Moreover, it allows monetary policy to respond appropriately to different types of shocks. In case of a demand shock, a monetary policy response that stabilises inflation supports at the same time economic activity. In case of a supply shock, a restrictive monetary policy response to rising prices could put a drag on real economic activity. It is, thus, sometimes warranted to look through supply-side shocks, for instance originating from sharp oil price hikes that usually have a short duration, and focus mainly on the medium-term inflation prospects.

ii. The second element is the thorough analysis of economic developments, which had been based on two complementary perspectives, referred to as the "two pillars": the *economic analysis* and the *monetary analysis*. By cross-checking the relevant information from both pillars, the Governing Council assessed the risks to price stability and determined the appropriate monetary policy stance.

- The *economic analysis* elaborates on the short-to-medium term determinants of price developments. In particular, the focus is given on real economic activity (inter alia, overall output, labour market conditions, global activity, etc.), a broad range of price and cost indicators, fiscal policy, asset prices and financial yields, as well as the macroeconomic projections produced by the staff of the ECB and the Eurosystem.

- The *monetary analysis* focuses on longer-term implications of monetary and credit developments for prices. Specifically, it examines money stock measures, several monetary aggregates and estimates of credit expansion to firms and households.

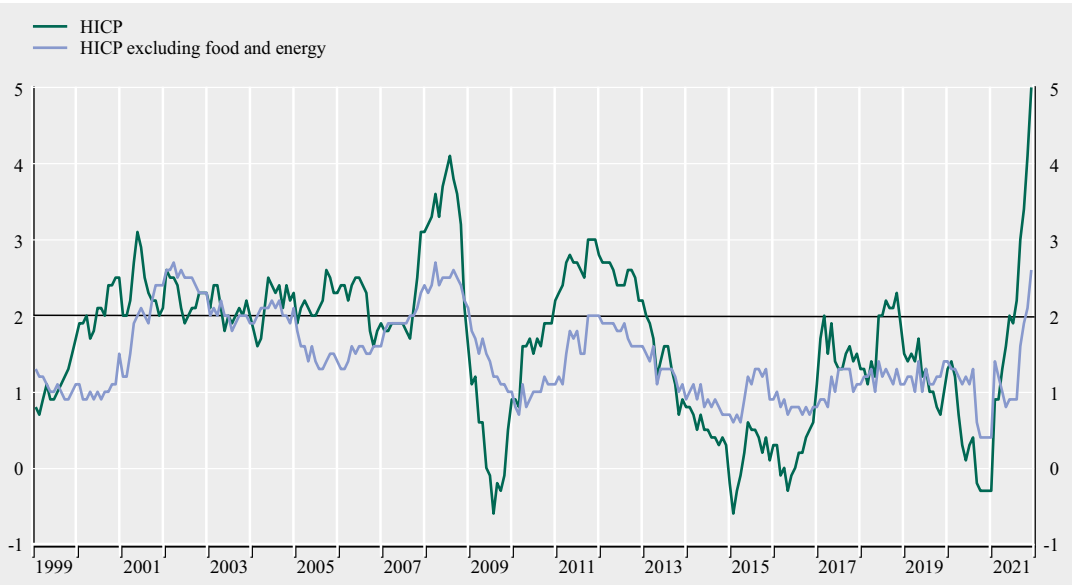
3 MOTIVATION FOR A REVIEW OF THE MONETARY POLICY STRATEGY

Since the first review of the monetary policy strategy, conducted in 2003, the euro area economy, similar to other economies, has undergone profound changes that called for a re-assessment of the strategy. Declining output growth, slowing productivity and an ageing population have driven interest rates in the euro area markets down to historically low levels. A substantial fall in the natural rate of interest[6] —i.e. the interest rate that is consistent with inflation being on target and economy operating at its potential— has been recorded. Although the natural rate of interest is unobserved, Brand et al. (2018) provide estimates, based on a range of econometric

6 At the natural interest rate (also called neutral or long-run equilibrium rate, and symbolised as r*) the desired levels of investment and saving come into balance and the monetary policy stance becomes neutral, i.e. neither contractionary nor expansionary.

Chart 1 Inflation in the euro area

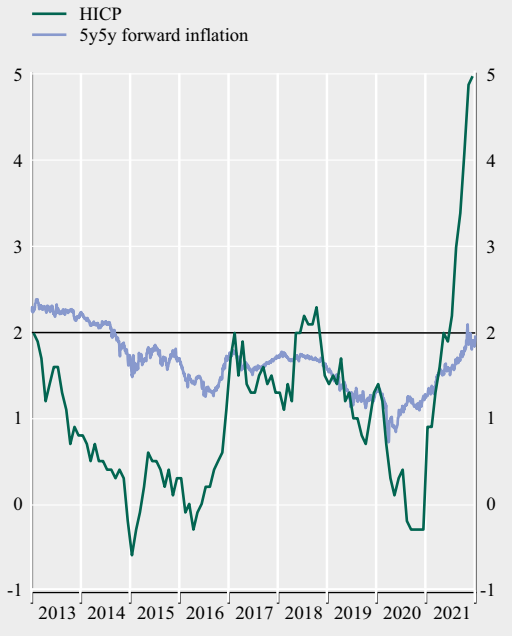
(HICP annual percentage changes, monthly data)



Source: Eurostat.

Chart 2 Inflation rate and market expectations in the euro area

(HICP annual percentage changes, monthly data; 5-year/5-year forward inflation-linked swap rate in percentages, daily data)



Source: Thomson Reuters.

models, showing that the natural rate has reached zero or even negative values in the euro area.

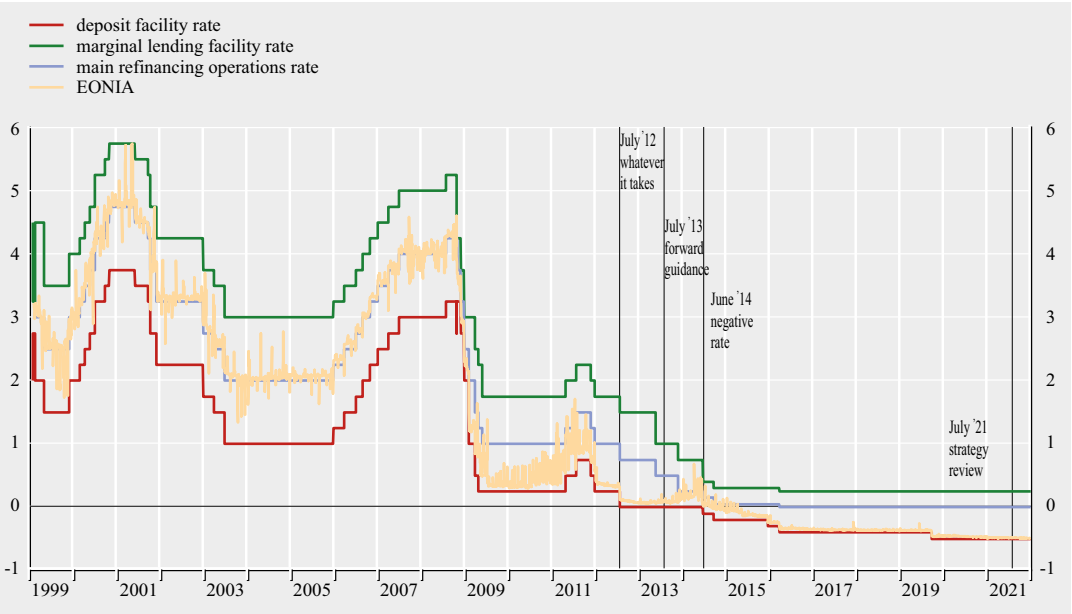
Meanwhile, the protracted decline in prices, stemming mainly from the recession that hit the euro area economy during the global financial crisis and the subsequent sovereign debt crisis, as well as from structural developments (such as globalisation and digitalisation), led to inflation outcomes persistently below the ECB's aim. Headline inflation remained too low for a very long period and even reached negative levels (see Chart 1). At the same time, inflation expectations, as measured by the 5-year/5-year forward inflation-linked swap rate, fell to historically low levels (see Chart 2), below the ECB's inflation aim.

With the ECB's policy rates close to their effective lower bound,[7] the scope for expansionary monetary policy through conventional interest

7 The effective lower bound refers to the point at which further cuts in the key monetary policy interest rates no longer provide stimulus to aggregate demand and inflation.

Chart 3 ECB policy rates and interbank market rate

(percentages, daily data)



Source: ECB.

rate cuts has diminished. The rate on the main refinancing operations was set to zero in 2016, whereas the deposit facility rate has been in negative territory since 2014 (see Chart 3). In proximity to the effective lower bound, conventional interest rate policy has limited space of additional easing in the face of a deflationary shock and further interest rate cuts become ineffective. Consequently, to achieve price stability and support economic activity, unconventional monetary policy measures were adopted by the Eurosystem, driving its balance sheet to unprecedented high levels (see Chart 4).

Furthermore, developments such as changing financial structures and increasing demand for safe and liquid assets in the wake of the global financial crisis weighed on market conditions, impaired the transmission of monetary policy and led to the emergence of fragmentation across euro area countries. Moreover, rapid digitalisation (including the rise of digital money) and globalisation effects on the structure of goods, services and labour markets, as well as implications for prices attributed to climate change and the related transition policies to a carbon-free economy, pose new challenges for the Eurosystem within its mandate to safeguard price stability.

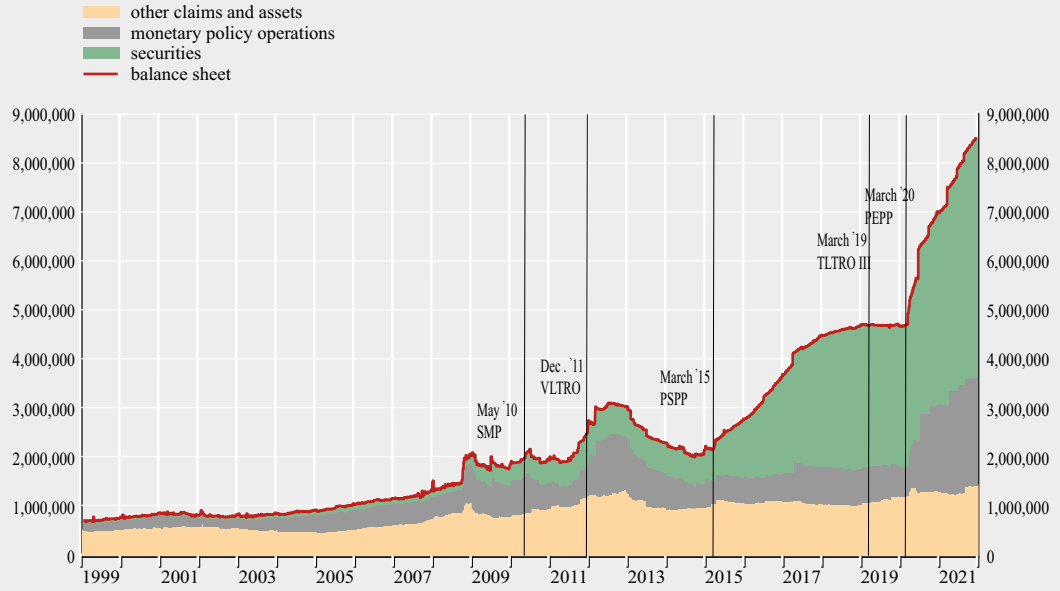
Against this backdrop, in early 2020, a second review of the monetary policy strategy was deemed warranted to ensure that the Eurosystem continues to fulfil its primary objective of maintaining price stability. Following in-depth discussions in the Governing Council and taking into consideration numerous comprehensive analyses and studies, the strategy review process was concluded in July 2021. Separate work streams looked at key topics for the strategy review, ranging from monetary policy tools to climate change, and a set of occasional papers[8] was published in September 2021.

During these 18 months, the ECB has gathered input from citizens and civil society organisations in order to better understand their perspectives and concerns. Participants were

8 See footnote 2.

Chart 4 Eurosystem balance sheet and selected assets

(EUR millions, weekly data)



Source: ECB.

invited to answer a number of key questions via the ECB Listens Portal, a web survey which ran until October 2020. A summary report of the responses has been published[9] on the ECB's website and fed into the Governing Council's deliberations on the monetary policy strategy review. At the same time, the ECB and the national central banks of the euro area hosted a series of listening events, which gave the general public and civil society organisations the opportunity to express their opinions. The ECB held the first virtual event[10] on 21 October 2020, hosted by President Christine Lagarde and Chief Economist Philip Lane. The Bank of Greece held its own listening event[11] entitled "The Bank of Greece Listens" on 10 February 2021; representatives of social partners and civil society submitted their views and suggestions, a summary of which was then transmitted to the ECB. The aim of these listening events has been to encourage dialogue between the Eurosystem and citizens, for whom the euro constitutes a public good as a universally accepted and trusted means of payment. As such, citizens need to fully understand the ECB's mission and the logic of the decisions of its Governing Council. Correspondingly, the Governing Council must fulfil its mandate in line with citizen expectations.

4 THE NEW ELEMENTS OF THE MONETARY POLICY STRATEGY

4.1 THE PRICE STABILITY OBJECTIVE

In the new strategy statement, the price stability objective has been reformulated in a way that the Governing Council can more effectively deliver on its mandate. In particular, the Governing Council considers that "*price stability is best maintained by aiming for 2% inflation over the medium term*". It has further clarified that "*commitment to this target is sym-*

9 See Summary report of the ECB Listens Portal responses (https://www.ecb.europa.eu/home/search/review/html/ecb.strategyreview002.en.html).
10 See ECB Listens event (https://www.ecb.europa.eu/pub/conferences/html/20200326_ecb_listens_event.en.html).
11 See https://www.bankofgreece.gr/en/news-and-media/events-list/events?event=fba73351-8100-44cb-8fb6-97b0dc33dc59.

metric" meaning that "*negative and positive deviations from this target are considered as equally undesirable*". Furthermore, the Governing Council takes into account the implications of the effective lower bound constraint on nominal interest rates, which, if persistent, could lead to prolonged periods of below target inflation outcomes. The new strategy explicitly states that "*in particular, when the economy is close to the lower bound, this requires especially forceful or persistent monetary policy measures to avoid negative deviations from the inflation target becoming entrenched. This may also imply a transitory period in which inflation is moderately above target.*"

Inflation measure

The Harmonised Index of Consumer Prices (HICP) has been retained as the appropriate index to measure inflation, given that it is provided in a timely manner and that it is reliable, credible and comparable over time and across countries. In addition to this index, the Governing Council will continue to monitor a wide set of other price indicators, including measures of underlying inflation, to assess the achievement of price stability. Moreover, the inclusion of the costs related to owner-occupied housing could further improve the representativeness of the HICP, since such costs account for a large part of households' expenses. The ECB estimates that including the owner-occupied housing costs would have added to the HICP around 0.2-0.3 percentage point (ECB 2021a). The Governing Council has thus decided to recommend a roadmap, foreseeing four stages, to move to an HICP, which, in the near future, will include owner-occupied housing costs and could serve as a valuable index to be monitored.

Inflation buffer

The reformulated objective continues to support a sufficiently positive inflation buffer. The main arguments brought forward to support a buffer during the 2003 strategy review, which still remain valid, are the following: (i) the persisting measurement bias; (ii) the inflation differentials across euro area member countries; (iii) the presence of downward nominal wage rigidities; and (iv) the need to provide a safety margin against the risk of deflation and to reduce the probability of effective lower bound episodes. The low inflation experience in the post-2013 period has reinforced the importance of a positive safety margin to ensure the effectiveness of monetary policy against deflationary pressures. In particular, the pronounced decline in the natural rate of interest implies that the effective lower bound on nominal interest rates shall put a constraint for the monetary policy conduct more frequently and for longer periods. Several studies[12] provide evidence that the decline in the natural rate of interest is consistent with a higher optimal inflation. An increased inflation target has been essential to enlarge the interest rate policy space and to reduce the effective lower bound incidence. As suggested by research[13] on the implications of the low interest rate environment, the frequency of a binding effective lower bound constraint is negatively related to the quantitative definition of the inflation objective. In a similar vein, recent research[14] suggests that, due to the decline in productivity growth amid downward wage rigidities, the optimal inflation associated with long-term growth trend has been higher compared with the past. In this regard, the abandonment of the double-key formulation (i.e. "the close to but below" clause) and the adoption of a higher point inflation target at 2%, was deemed warranted to improve inflation performance and strengthen monetary policy efficiency.

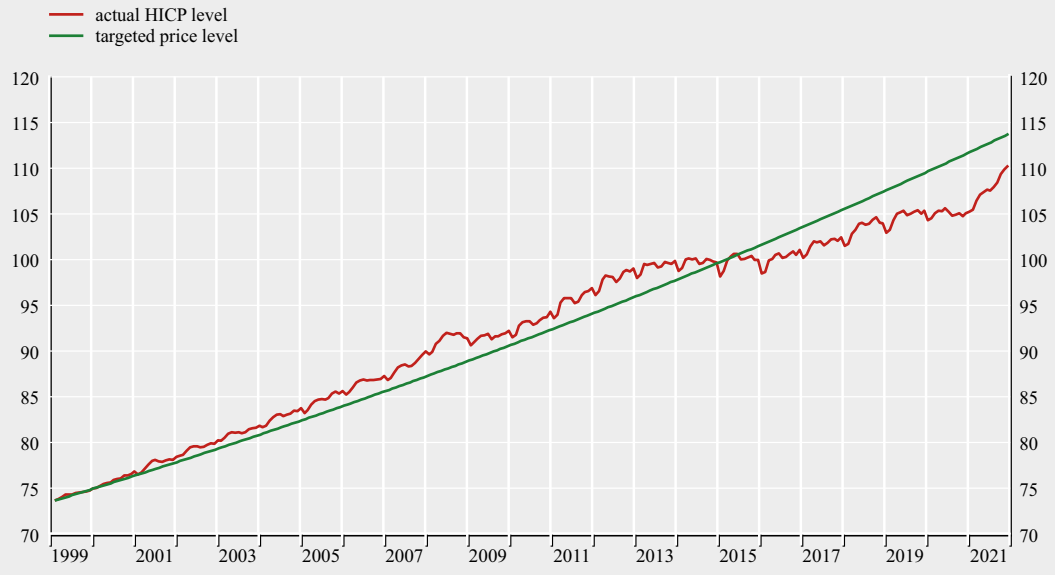
Symmetric inflation aim

Aiming at a single, focal point inflation rate is straightforward, easy to communicate and well equipped to steer inflation expectations to levels consistent with the inflation target. Although short-lived and moderate fluctuations of inflation around its target are unavoidable and acceptable, large sustained deviations in either direction require a monetary policy

12 See Andrade et al. (2019 and 2021), Adam (2021) and Fiorentini et al. (2018).
13 See Schmidt (2016).
14 See Abbritti et al. (2021).

Chart 5 Euro area actual price level versus price level assuming an inflation target of 1.9%

(index 2015=100, monthly data)



Source: Eurostat and authors' own calculations.

response. The Governing Council has thus long considered[15] deviations of inflation both above and below its target equally undesirable and had in the years closer to the strategy review communicated that its inflation target is symmetric.[16] The new formulation provides clarity, removes any ambiguity and corrects previous perceptions that the ECB was following an asymmetric inflation-targeting regime.

Market participants used to interpret the 2% aim as a ceiling (Paloviita et al. 2020 and 2021). Inflation rates above that level were seen as undesirable and needed to be addressed by monetary policy tightening. At the same time, low inflation rates were considered as acceptable and consistent with the price stability definition. Therefore, in case of disinflationary shocks, either there was no monetary policy response, or monetary policy easing was too late and too timid to help inflation, both actual and expected, escape from their low levels. Examples of such asymmetric response were witnessed in 2008 and 2011 (see Chart 3), when the Governing Council decided to prematurely increase its policy rates in response to rising prices, although inflationary pressures were not sustained. In contrast, at the outbreak of the global financial crisis, the ECB's reaction to falling inflation had been both delayed and weaker compared with other major central banks. Unconventional monetary policy tools were adopted in response to persistently low inflation only with a delay and at high cost, in terms of reduced output and employment.

As a result, public confidence in the ECB's ability to deliver on its mandate was seriously harmed and inflation expectations had de-anchored (see Chart 2), contributing to inflation persistently falling below the ECB's

15 See Introductory statement to the press conference (with Q&A), February 2014 (https://www.ecb.europa.eu/press/pressconf/2014/html/is140206.en.html), and speech by the former ECB President M. Draghi in June 2016 entitled "Delivering a symmetric mandate with asymmetric tools: monetary policy in a context of low interest rates" (https://www.ecb.europa.eu/press/key/date/2016/html/sp160602.en.html).

16 See speech by the former ECB President M. Draghi in June 2019 entitled "Twenty Years of the ECB's monetary policy" (https://www.ecb.europa.eu/press/key/date/2019/html/ecb.sp190618~ec4cd2443b.en.html).

objective. Cecioni et al. (2021) have estimated[17] an improvement in terms of average inflation (around 1 percentage point) and output gap (above 1 percentage point) from the adoption of a symmetric response around a focal point, in comparison with an asymmetric range. It is illustrative (see Chart 5) to see the difference between the actual evolution of prices in the euro area and the potential development of prices under an inflation rate of 1.9% that would be consistent with the previous inflation objective. Inflation had been falling short of its target for most of the period from 2009 to mid-2021 (see Chart 1). The index in July 2021 (just before the inflationary surge observed from August that year onwards) was almost 5% below the level it would have prevailed, had an 1.9% inflation rate been persistently achieved throughout the euro era.

Monetary policy tools

In order to reinforce its credibility under the new strategy, the Governing Council has committed to maintaining the symmetry of its inflation target with decisive actions. In particular, it acknowledges the effectiveness of unconventional monetary policy instruments[18] introduced during past crises in counteracting deflationary pressures, addressing market fragmentation and impairments in the monetary policy transmission mechanism, as well as affirming the irreversibility of the euro. In particular, given that the effective lower bound is expected to continue to impose constraints on the conventional interest rate policy, the use of forward guidance, asset purchases and longer-term refinancing operations will continue to be imperative to safeguarding price stability. Importantly, a key lesson learnt from the use of unconventional monetary policy tools is that a well-calibrated combination of instruments is more effective than any single instrument implementation. Their joint impact on financial market conditions has been remarkable.[19] Relevant research[20] shows significant impact of the unconventional measures on sovereign yields. The upward trend of government bond yields in vulnerable jurisdictions had been successfully reversed at times when bold measures were introduced (see Chart 6), whereas their spreads from the yields of respective assets issued by core countries had to a large extent been contained. In turn, benign financing conditions for the public and the private sector helped boost prices and economic activity. According to ECB estimates,[21] average economic growth and inflation would have been markedly lower in the absence of such measures. In addition, appropriate adjustments of the standard counterparty and collateral frameworks, as well as measures to mitigate unintended side effects, have been implemented in order to enhance the efficiency of the unconventional monetary policy measures. The Governing Council has also committed to responding flexibly to new challenges and to considering employing new policy instruments if needed. At the same time, it will perform thorough proportionality assessments with a view to minimising possible side effects of the monetary policy instruments, without compromising price stability.

Inflation overshooting

With a view to anchoring inflation expectations in an efficient way and to ensuring that inflation remains at levels consistent with the price

17 See also presentation by ECB Executive Board Member I. Schnabel in November 2021 entitled "A new strategy for a changing world" (https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp211124_1~98461a44c7.en.pdf).

18 See related research ECB (2021b), Andrade and Ferroni (2021), Coenen et al. (2021), Altavilla et al. (2019) and Rostagno et al. (2021).

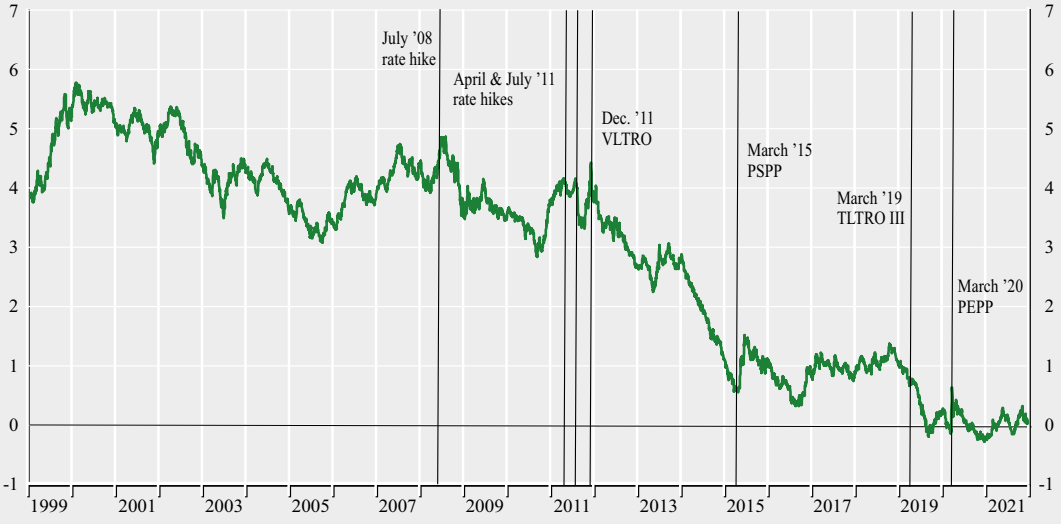
19 See estimations of the effects on the yield curve in the speech by ECB Executive Board Member P. Lane in November 2019 entitled "The yield curve and monetary policy" (https://www.ecb.europa.eu/press/key/date/2019/html/ecb.sp191125~b0ecc8e6f0.en.html).

20 Including, inter alia, Altavilla et al. (2021), De Santis and Holm-Hadulla (2020), Eser et al. (2019) and Rostagno et al. (2019).

21 As presented in the speech by ECB Executive Board Member P. Lane in February 2020 entitled "The monetary policy toolbox: evidence from the euro area" (https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200221~d147a71a37.en.html), the average annual contribution of the unconventional measures taken in the period from 2015 to 2019 to inflation is between 0.3 and 0.5 percentage point. At the end of 2019, the level of real GDP would have been lower by between 2.5 and 3 percentage points in case unconventional measures had not been implemented. Significant positive impact was also reported for the pandemic measures in the speech by ECB Executive Board Member P. Lane in November 2020 entitled "Monetary policy in a pandemic: ensuring favourable financing conditions" (https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp201126~c5c1036327.en.html), although, at that time, the inflation outlook had been completely different from that observed in late 2021. Similar results are found, among others, by Hutchinson and Mee (2020), Coenen et al. (2020) and Aguilar et al. (2020).

Chart 6 Euro area benchmark 10-year government bond yield

(percentages, daily data)



Source: ECB.

stability objective in the medium term, the Eurosystem allows inflation to temporarily overshoot its target, after a period of undershooting. In this regard, the shortcomings associated with the effective lower bound are counterbalanced by a stronger monetary policy response to negative deviations of inflation from its target than to positive ones. The explicit allowance for temporary and moderate inflation overshooting is an effective mechanism in steering inflation expectations and preserving price stability over the medium term. Had the commitment to allow temporary overshooting of inflation been an element of the previous strategy, decisions of premature tightening during the past crises (as mentioned above) would likely have been avoided. Unconventional monetary policy easing measures could probably have been introduced without delay in response to extensive inflation undershooting in the past.

Medium-term horizon

The new definition re-confirms the medium-term horizon for the attainment of the inflation target. Such an orientation is justified on the grounds of short-term uncertainties and lags in the mechanism of monetary policy transmission to the economy and inflation. The medium-term orientation provides central banks with the flexibility to assess the origin, the magnitude and the persistence of shocks hitting the real economy and prices, and to look through temporary deviations of inflation from its target that may dissipate over time. The Governing Council is, therefore, enabled to respond in a prudent and proper way to economic disturbances. At the same time, the medium-term orientation facilitates the ECB's monetary policy to cater for other considerations that are relevant for the pursuit of price stability. Such considerations[22] involve, inter alia, financial stability, given its importance for the smooth functioning of the monetary policy transmission mechanism, as well as economic activity, employment, welfare and climate change risks.

4.2 THE INTEGRATED ANALYTICAL FRAMEWORK

The ECB's monetary policy deliberations are to be based on an integrated analytical frame-

22 See Section 4.3 for more details.

work that combines two interdependent types of analysis: the *economic analysis*, and the *monetary and financial analysis*. Both analyses provide useful insights into economic, monetary and financial developments; together they contribute to a comprehensive assessment of the economic outlook and the risks to price stability.

The economic analysis maintains its focus on developments in economic growth, employment and inflation, as well as on the macroeconomic projections of key variables over a medium-term horizon. It further involves evaluation of the shocks that may hit the euro area economy and the risks to price stability, as well as thorough analyses of structural trends and their implications for inflation, potential output and the natural rate of interest. Adjustments in the economic analysis also reflect the use of newly available and higher-frequency data, improvements in modelling techniques and progress with the inclusion in the relevant models of the effects driven by demographic transition, climate change, globalisation and digitalisation on economic developments.

The monetary and financial analysis emphasises the transmission mechanism of the monetary policy (acknowledging the empirical weakening of the relationship between monetary aggregates and inflation in recent years) and recognises that financial stability should be assigned a more prominent role. After all, financial stability is inherently linked to monetary policy transmission. Under the monetary and financial analysis, financial vulnerabilities and their implications for output and inflation, as well as the possible side effects of monetary policy on financial stability, are assessed. The analysis examines monetary and credit aggregates, developments in the money, bond and stock markets, as well as financial indicators. Data on the banking system and on the financing conditions for households and firms are also important inputs. The analysis helps identify market tensions and impairments in the transmission mechanism, owing, for instance, to fragmentation across jurisdictions and sectors.

In addition, the analytical framework incorporates a careful *proportionality assessment* of the monetary policy measures. This assessment includes an analysis of the benefits and the side effects of the monetary policy instruments and their interactions. It involves evaluating the positive impact on financing conditions and, in turn, the effect on inflation. At the same time, it examines the possible unintended effects on the real economy and the financial system. The proportionality assessment takes into account the uncertainty about the efficiency of policy instruments, as well as the risks of de-anchoring of longer-term inflation expectations. It constitutes a substantial input for consideration by the ECB upon deciding the adoption of monetary policy measures and the calibration of their modalities, to limit undesirable side effects. Such side effects have been taken into account in the past:

- The footprint of the Eurosystem in the financial markets has increased. Since the start of the Asset Purchase Programme (APP) in 2015, Eurosystem government bond holdings have risen noticeably.[23] Still, the cautious implementation of purchases on behalf of the Eurosystem is thought to have minimised the likelihood of market distortions. In particular, both an issue and an issuer limit have been imposed in order to restrict the amounts of bonds held by the Eurosystem.

- Asset purchases could lead to temporary asset scarcity in repo markets. This phenomenon has been mitigated by the deployment of Eurosystem securities lending facilities and by accepting cash as collateral in securities lending.

23 Currently, the Eurosystem holds close to 25% of the outstanding euro area public sector bonds, i.e. more than 22% of US Treasury securities held by the Federal Reserve, but less than 35% of UK government securities held by the Bank of England and 43% of Japanese government securities held by the Bank of Japan, according to the estimates of the French Economic Observatory (OFCE) as of January 2021 (see https://www.ofce.sciences-po.fr/blog/public-debt-central-banks-to-the-rescue/).

- The exclusion of household mortgages from the loans eligible under the Targeted Longer-Term Refinancing Operations (TLTROs) aimed at avoiding to fuel house prices. TLTROs managed to safeguard credit provision to the real economy and boost economic activity, without causing unwarranted overvaluation of assets.

- The Negative Interest Rate Policy (NIRP) has, other things being equal, reduced the profitability of banks, by narrowing their lending margins. However, the increase in output driven by the APP has boosted banks' earnings. Thus, overall, banks are seen to have benefited from ECB measures. Moreover, credit risk has subsided and borrower creditworthiness has improved. The very favourable pricing rates for the third series of the TLTROs and the two-tier system for remunerating excess reserve holdings have also provided meaningful sources of support to banks' profits.

- The expansionary monetary policy has been beneficial for vulnerable households. Despite the fact that lower interest rates reduced gross interest income for net savers, they triggered a reduction in the cost of servicing both variable- and fixed-rate debt for net borrowers. In addition to these direct effects, benign macroeconomic conditions brought about an increase in employment, which benefited especially low-income households. This has led to a marginal reduction in income inequality.

- Regarding firms, the accommodative monetary policy stance, by stimulating demand and economic activity and by easing financial conditions, has been supporting investment. It has thus facilitated the entry of new firms and the recovery of firms under temporary financial constraints. Although it may have contributed to prolonging the survival of some otherwise distressed firms, the overall impact on aggregate productivity and economic growth has been positive.

4.3 CATERING FOR ADDITIONAL CONSIDERATIONS

The comprehensive analysis of a broad range of indicators is justified by the need to cater for additional considerations that are relevant for the pursuit of price stability over the medium term. According to Article 127 of the Treaty on the Functioning of the European Union, "*without prejudice to the objective of price stability*", the Eurosystem "*shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the Treaty on European Union*". Article 3 specifies in particular that such objectives include balanced economic growth, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. Balanced economic growth, full employment and price stability are complementary objectives. When inflation remains close to its target, agents are able to make better plans for the future, knowing the value of their money, and take more efficient decisions, thus strengthening economic activity and employment. In this regard, maintaining price stability is the best contribution that monetary policy can make to economic welfare.

At the same time, fiscal and structural policies are important drivers of macroeconomic stabilisation. In particular, countercyclical fiscal policy supports the economy during recessions and amplifies the effectiveness of monetary policy, especially when interest rates are in the proximity of the effective lower bound (see the ECB's monetary policy strategy overview note[24] published in July 2021). Evidence from past euro area crises, where tight fiscal consolidation has yielded self-defeating effects, underscores the need for alignment of monetary and fiscal policy objectives. In addition, the complementarity between monetary and fiscal measures during the pandemic period is an example of their successful interaction in

24 See footnote 4.

providing confidence and spurring economic recovery. The effectiveness of each policy in restoring sustainable economic, price and financial stability has been maximised. Moreover, the reform of the European fiscal rules and growth-enhancing measures supported by structural policies and productive investment (especially through Next Generation EU (NGEU) funding) continue to be critical for ensuring that the interest rate-growth differential —the so-called snowball effect[25]— remains beneficial (i.e. negative). In that case, concerns about debt sustainability are mitigated and favourable debt dynamics are provided (ECB 2009).

The Eurosystem is also competent for the prudential supervision of credit institutions and the stability of the financial system. Financial stability is a precondition for the achievement of price stability. The global financial crisis is a typical example of how the excessive risk appetite and the unregulated exposure to subprime mortgages revealed weaknesses in the financial markets and weighed on their functioning. Although macroprudential policy, along with microprudential supervision, is the first line of defence against the build-up of financial imbalances, the monetary policy response was significant in identifying and alleviating the doom loops that were underway and contributed to addressing market imperfections in an efficient way. Nevertheless, during the past crises, the transmission of monetary policy had been impaired in many jurisdictions of the euro area, with serious repercussions for financial stability, and market fragmentation has been one of the main challenges that was not fully coped with.

To the contrary, during the pandemic, impairments in the transmission mechanism and signs of fragmentation were identified early on and addressed effectively through the incorporation of valuable flexibility in the monetary policy instruments. For instance, the possibility of short-term deviations from the capital key allocation, the allocation of purchases over time, across asset classes and among jurisdictions, and the introduction of a waiver of the rating requirements for the eligibility of Greek government securities were some of the main features introduced in the Pandemic Emergency Purchase Programme (PEPP) to preserve the smooth transmission of monetary policy and avert fragmentation. Furthermore, the Eurosystem introduced mitigating measures to facilitate the availability of eligible collateral pledged by its counterparties in order to safeguard their participation in its liquidity providing operations. Easing the conditions under which credit claims are accepted as collateral, increasing the Eurosystem's risk tolerance in credit operations, and granting a waiver of the minimum credit quality requirements for Greek government assets have managed, among other things, to prevent a tightening of financial conditions and an unwarranted fragmentation. In order to further ensure collateral adequacy, additional measures were taken to temporarily grandfather the eligibility of counterparties' marketable assets used as collateral, in the event that they fall below minimum credit quality rating requirements, due to possible rating downgrades arising from the economic fallout from the pandemic.

At the same time, the possible implications of monetary policy measures for financial conditions have been, and will continue to be, taken into account. The non-eligibility of housing loans granted by banks for their participation in the TLTROs and the introduction of the two-tier system for remunerating banks' excess reserves held with central banks are characteristic examples of the importance attributed by the Eurosystem in limiting the side effects of the monetary policy decisions on the functioning of the financial system.

Finally, climate change[26] plays an important role for the fulfilment of the ECB's primary objective, as it affects the structure and the cyclical dynamics of the economy, prices and

25 The snowball effect indicates that a debt ratio tends to rise (decline) if the GDP growth rate is lower (higher) than the interest rate paid on government debt.
26 See ECB (2021c), Boneva et al. (2021), Andersson et al. (2020) and references therein.

the financial system. In line with the European Union (EU) climate goals and objectives, the Eurosystem, within its mandate, fully takes into account the implications of climate change and carbon transition policies in its monetary policy-making. Accordingly, in the context of its new strategy, the Governing Council has committed to an ambitious climate-related action plan, which focuses on two pillars. First, the ECB aims to improve estimating the macroeconomic impact of climate change; it is in the process of enhancing its analytical and macroeconomic modelling capacities and developing statistical indicators and tools to measure the carbon footprint of financial institutions and their exposures to risks related to climate change. Second, the ECB considers adapting the operational framework of monetary policy in relation to environmental sustainability disclosures, risk assessment methodology, corporate sector asset purchases and collateral framework. Section 5.2 provides a detailed presentation of the key areas of ongoing and planned actions.

Box

RATIONALE FOR THE INCORPORATION OF CLIMATE CHANGE CONSIDERATIONS IN THE NEW MONETARY POLICY STRATEGY OF THE EUROSYSTEM

The climate crisis is one of the world's top threats to humanity, according to the United Nations.[1] Risks related to climate change can cause economic instability and financial vulnerability, impair the monetary policy transmission channel and compromise price stability. Climate change is thus an issue that has in recent years been gaining increasing prominence in the agendas and workings of central banks and supervisors around the world. The Network of Central Banks and Supervisors for Greening the Financial System (NGFS),[2] which has been tasked with accelerating the greening of the world financial system, comprised just eight members in 2017 when it was established. Its membership grew to 100 members in November 2021.[3] This box aims to shed some light on the rationale underlying the greater involvement of central banks, and the Eurosystem in particular within its price stability mandate, with the issue of climate change.

There are two main channels through which climate change poses challenges for the core or dominant objective of central banks, which is to achieve price stability. First, through physical risks, that is the risks emerging from the incidence itself of more frequent and more severe weather events. Natural disasters such as floods and droughts or the rise in the sea level can directly damage the capital stock of an economy, bearing implications for production in certain economic sectors (for instance agriculture) and in turn for employment, income, consumption and therefore prices. Second, through transition risks, which emerge from the implementation of policies geared towards a carbon neutral economy. The most illustrative example is the introduction of carbon pricing, which affects production costs and thus prices. Both these avenues pose risks to price stability, an issue which lies at the heart of the mandate of central banks.

Climate change also affects the efficient transmission of monetary policy. Physical risks can cause significant damage to productive infrastructure or create stranded assets. Affected firms and households may face hardship in servicing their debt obligations, exposing the financial system to increased credit risk. In a similar vein, the delayed or abrupt implementation of mitigation

1 As highlighted in the keynote speech by Bank of Greece Governor Y. Stournaras at the Conference of the Parties (COP26) EU Side Event in November 2021 entitled "Climate crisis: Action in central banking" (https://www.bankofgreece.gr/en/news-and-media/press-office/news-list/news?announcement=96b3e9b0-4595-4dee-b072-340e9b99c694).
2 See https://www.ngfs.net/en/first-comprehensive-report-call-action.
3 See https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp211103_1~981d1ed885.en.html.

policies may also severely affect carbon intensive sectors, which could in turn imply an increased probability of default for firms in that sector. The impact of higher loan defaults and asset valuation losses on bank balance sheets could on the one hand impair credit provision to the real economy, with significant implications for the smooth transmission of monetary policy, and on the other hand give rise to financial system losses posing a threat to financial stability.[4]

Climate change also has implications for the monetary policy space. Expectations regarding the materialisation of climate change-related risks imply a downward pressure on the natural rate of interest. Such pressure needs to be seen over and above that already posed on the rate due to structural factors, most notably globalisation and population ageing. At the same time, other forces such as increased demand for investment to replace damaged infrastructures or higher productivity due to clean energy innovation imply an upward pressure on the natural rate of interest. The balance of these forces has significant ramifications for monetary policy. In case the net effect is negative, the policy space for conventional monetary policy would be narrowed, while the effective lower bound may become binding more often (see ECB 2021c, p. 108).

Central banks are also directly exposed to risks due to climate change, as it affects the value and risk profile of the assets held in their balance sheets acquired mainly in the context of their asset purchase programmes, but also for other purposes, including own funds investment, potentially leading to an unwanted accumulation of climate-related financial risks.[5]

The European Union (EU) Treaties provide the legal underpinnings that justify the involvement of the ECB in addressing climate change. Without prejudice to its primary objective, the Treaties give the Eurosystem the obligation to contribute to the achievement of the objectives of the EU (as laid down in Article 3 of the Treaty on the European Union) that include "*high level of protection and improvement of the quality of the environment*". As highlighted by F. Elderson in an ECB blog post[6] that attempts to provide a close reading of the Treaties to underline the rationale for the ECB to act, "*this mandate, which is sometimes referred to as the ECB's 'secondary objective' stipulates a duty, not an option, for the ECB to provide its support*".

Apart from the monetary policy and legal considerations outlined above, which justify the contribution of the Eurosystem, without prejudice to its price stability objective, to the need to tackle climate change, there are additional considerations that call for central bank involvement. "*Greenhouse gas emissions are externalities and represent the biggest market failure the world has seen*", as Lord Nicholas Stern put it (Stern 2008, p. 1). The two prominent market failures linked to climate change are discussed below, with a view to shedding some light on their mechanisms in discouraging action to address climate change by those contributing to it and on the potential role of central banks in addressing these failures.

The first such failure relates to the "tragedy of the horizon", a term used by Mark Carney[7] in a 2015 speech to explain the lack of incentive for action today to address the catastrophic impact of climate change, which is mostly seen as relevant for the longer term. Given that the horizon of monetary policy only extends 2 or 3 years ahead, monetary policy action is seen as irrelevant

4 For a further elaboration, see https://www.ecb.europa.eu/pub/pdf/other/ecb.climateriskfinancialstability202107~87822fae81.en.pdf, https://www.bis.org/review/r210429h.htm, https://www.imf.org/external/pubs/ft/fandd/2021/09/isabel-schnabel-ECB-climate-change.htm, and https://www.ecb.europa.eu/press/blog/date/2021/html/ecb.blog210318~3bbc68ffc5.en.html.
5 See https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708_1~f104919225.en.html.
6 See https://www.ecb.europa.eu/press/blog/date/2021/html/ecb.blog210213~7e26af8606.en.html.
7 See https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability.

for climate change on the grounds of this "horizon mismatch".[8] Such a stance can have irreversible consequences, the main reason being that, as Carney put it in his 2015 speech, once climate change becomes a detrimental issue for price or financial stability, "*it may already be too late*". It is, therefore, imperative that central banks take action today, in order to mitigate these long-run repercussions. Otherwise, it will be hard, if possible, to reverse the course of climate change.

The second failure relates to the "tragedy of the commons". Individuals or firms that generate negative effects on the environment out of self-interest can reap the benefits from such exploitation, while the cost is born by society. As individuals or firms do not internalise the cost of their actions on the environment, their short-sighted strategy cannot be optimal for society in the longer term. It is important to devise a pricing mechanism that internalises the costs implied for society by those contributing to climate change. Central banks can play an important role in ensuring that climate externalities are correctly priced in the financial system.

Addressing these externalities calls for collective action. It is important that central banks do not turn away from this public responsibility, but actively engage in the effort to correct, to the extent possible and within their mandate, prevailing market failures.[9] Although the main responsibility for addressing climate change lies with governments, central banks "*cannot just stand on the sidelines*".[10] Climate change poses a threat to price stability and financial stability, allowing no room for complacency for central banks to act, within their mandate.

On these grounds, the Eurosystem decided to elevate climate change to an issue of utmost importance in the context of its strategic review. The Governing Council agreed on the need to explicitly account for the implications of climate change and the carbon transition when designing and implementing its monetary policy. In July 2021, it developed and announced a detailed action plan that sets out an ambitious timeline with the aim to integrate climate change considerations into its monetary policy framework.[11] Such work is expected to progress along three major milestones, which are discussed in Section 5.2.

8 See https://www.eba.europa.eu/sites/default/documents/files/document_library/Final%20EBA%20report%20on%20undue%20short-term%20pressures%20from%20the%20financial%20sector%20v2_0.pdf.
9 As stated by ECB Executive Board Member I. Schnabel in a September 2020 speech entitled "When markets fail – the need for collective action in tackling climate change" (https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200928_1~268b0b672f.en.html).
10 See inter alia interview with *Focus* by ECB Executive Board Member I. Schnabel in August 2021 (https://www.ecb.europa.eu/press/inter/date/2021/html/ecb.in210821~186713780d.en.html).
11 See footnote 5 herein.

4.4 COMMUNICATION AND NEXT REVIEW

Given the significant role of financial market expectations in the transmission mechanism of monetary policy, central bank communication has traditionally been tailored to steer efficiently the views of expert audiences. This focus has already borne fruit for the Eurosystem. Extensive research[27] has shown that ECB policy announcements, with forward guidance being the most prominent tool, have had a significant impact on interest rates at all maturities and on anchoring inflation expectations. The new strategy emphasises that consistent, coherent and clear communication of the narrative motivating the monetary policy decisions facilitates the transmission of the policy signal, eliminates misinterpretations and unwarranted financial volatility, and reinforces the credibility of the ECB. A streamlining of the useful communication tools currently in use —namely

27 See ECB (2021d), Goodhead (2021), Altavilla et al. (2019), Rostagno et al. (2021), Andrade and Ferroni (2021) and Ehrmann et al. (2019).

monetary policy statements, press releases, monetary policy accounts and the *Economic Bulletin*— has been warranted in order to make them more easily and better understood. In particular, the structure of the monetary policy statements has been aligned with the integrated analytical framework and sets out the narrative, drawing on the information assessed under the economic, monetary and financial analyses. The monetary policy accounts and the *Economic Bulletin* present the full range of arguments underlying monetary policy deliberations and the proportionality assessment considered at the monetary policy meetings of the Governing Council, improving the transparency of the decision-making process and accountability.

The new strategy also places emphasis on drawing the attention of the general public[28] and improving its understanding and trust in the ECB's monetary policy decisions. Therefore, the reformulated communication is complemented by layered and visualised versions, which are more readable and engaging for the wider public. To advance interaction with the general public, it is deemed useful to expand the focus of the ECB's communication to issues beyond its primary objective, which are of special importance to the public, most notably disposable income, unemployment and climate change. Moreover, outreach events are scheduled to take place across the euro area countries, drawing on the success of the listening events hosted by national central banks during the strategy review period. Strengthening financial literacy is a further step in the much-needed direction to enhance public understanding and trust. This can be achieved by organising educational seminars for students and citizens and by making available relevant material to a broader audience, furthering the presence of the central bank not only in traditional media, but also on social media platforms.

As a final point of the strategy review, the periodical assessment of the appropriateness of the ECB's monetary policy strategy is warranted in view of the rapidly evolving economic and financial environment. Further structural changes, developments in the financial landscape and advances in digitalisation, as well as possible new economic shocks and financial disturbances, are factors that may affect the inflation process and the transmission mechanism of the monetary policy in unknown and unexpected ways. Presently, the next strategy review is expected to be carried out in 2025.

5 OPERATIONALISING THE NEW MONETARY POLICY STRATEGY

5.1 FORMULATION OF FORWARD GUIDANCE AND CALIBRATION OF ASSET PURCHASES

The new strategy brought innovations to the actual implementation of monetary policy. Just a couple of weeks after the conclusion of the review in July 2021, the Governing Council[29] reformulated its forward guidance on policy rates accordingly to reflect the new definition for price stability. In particular, the forward guidance adopted in late July clarified three conditions that must be met before the interest rates got raised.

- The first two conditions for (i) "*inflation reaching 2% well ahead of the end of our projection horizon*" and (ii) "*durably for the rest of the projection horizon*" provided reassurance that inflation should have converged towards its new target in a sufficiently advanced and sustained way at the time of rate lift-off. This hedged monetary policy against the risk of reacting to forecast errors and to transitory price pressures that were expected to fade away before the end of the projection horizon. Further clarification was provided by ECB President Lagarde[30] at the press conference following the July monetary policy

28 See Coibion et al. (2020a, 2020b and 2020c) and Ehrmann and Wabitsch (2021).
29 See July 2021 monetary policy decision (https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.mp210722~48dc3b436b.en.html).
30 See July 2021 Press conference (https://www.ecb.europa.eu/press/pressconf/2021/html/ecb.is210722~13e7f5e795.en.html).

meeting that inflation had to reach the 2% target by the midpoint of the 3-year projection horizon and stay at this level for the rest of the horizon.

- The third condition required that "*progress in underlying inflation is sufficiently advanced to be consistent with inflation stabilising at 2% over the medium term*" and refers to monitoring core measures of inflation that exclude volatile (notably energy-related) components. In this respect, this condition safeguarded against a potential policy tightening in the face of cost-push shocks that might elevate headline inflation temporarily but then fade.

- Finally, in consistency with the revised strategy, the reformulated forward guidance reaffirmed that "*a transitory period in which inflation is moderately above target*" can be tolerated when monetary policy is constrained by the effective lower bound.

As in the previous formulation, the forward guidance continued to be outcome-based. Recent studies[31] provide evidence that state-contingent formulations of forward guidance about future interest rates, which are kept at easing levels for longer than suggested by a standard interest-rate rule conditional on the state of the economy, are more efficient in steering markets' expectations and shielding yield rates from overreaction to economic developments. In turn, they exhibit stronger macroeconomic stabilisation properties. Initial evidence following the reformulation of the forward guidance suggested that market expectations on future interest rates had been effectively steered. Markets had adjusted the date of the expected Eurosystem interest rate lift-off in tandem with the forward guidance. At the same time, market-based inflation expectations rose towards levels consistent with the new definition of price stability and got anchored (see Chart 2). Markets' expectations moved in line with what could be expected following the modifications in the ECB's strategy and forward guidance. The alignment of the forward guidance with the new strategy succeeded in eliminating past perceptions of asymmetry and established firmer conditions in terms of inflation convergence to its new higher target.

In the second half of 2021, the Governing Council was carefully assessing the inflation surge since mid-2021 —inflation met the 2% target in May and reached 5% in December, i.e. its highest level since the establishment of the euro area— and highlighted three largely transitory factors that have pushed up prices.[32] First, the base effect due to the extremely low prices during 2020, driven by the sharp drop in economic activity related to the pandemic. Second, supply bottleneck pressures and demand-supply mismatches following the re-opening of the economy and a stronger than expected economic recovery. Third, an unexpectedly large increase in global energy prices. Although there was a risk that price rises could become more permanent and feed into labour negotiations, such a risk has been thus far considered to be contained as wage developments remained subdued. These three factors were anticipated to wane over the medium term and inflation to decelerate in the course of 2022. According to the results of the December 2021 Eurosystem staff macroeconomic projections, inflation was anticipated to average 2.6% in 2021 and 3.2% in 2022, before decelerating to 1.8% in both 2023 and 2024. Therefore, over the medium-term horizon, inflation was expected to fall short of its target. As a result, the index of prices at the end of the projection horizon was anticipated to stand below the level it could have reached if the inflation target had been achieved throughout the euro era.

The Governing Council has concluded in its monetary policy meeting in December 2021 that the outlook for inflation over the medium term remained subdued and the three conditions, as

31 See ECB (2021d), Altavilla et al. (2021), Ehrmann et al. (2019), Coenen et al. (2020) and Rostagno et al. (2021).
32 See welcome address by ECB Executive Board Member P. Lane in November 2021 entitled "Inflation in the short term and in the medium term" (https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp211108~c915d47d4c.en.html).

prescribed in the reformulated forward guidance mentioned above, would be hardly met in the near term. In the face of supply-driven shocks that are not expected to be sustained in the medium term, monetary policy must not overreact. Persistent and patient monetary accommodation is required to ensure that inflation dynamics build up in a robust way in order to safeguard price stability over the medium term and a sustained economic recovery. Showing its commitment[33] to the new strategy and the reformulated forward guidance, the ECB kept its interest rate policy stance unchanged in the face of inflationary pressures that were expected to fade away in the medium term. Any premature normalisation of the monetary policy stance would be inconsistent with the commitment to allow temporary overshooting of the inflation objective over some period. It might de-anchor inflation expectations and raise credibility issues.[34] Thus, an unwarranted contractionary response to transitory price pressures could risk derailing the still fragile economic recovery from the pandemic, amplifying the downward impact on output as inflation would start to decelerate.

Moreover, the Governing Council assessed that the progress of economic recovery and of inflation towards its medium-term target permitted an unwinding in the pace of its net asset purchases in 2022. The PEPP would be discontinued at the end of March 2022, as scheduled. In the second and the third quarter of 2022, the monthly pace of purchases under the APP would increase in order to ensure that the monetary policy stance continues to be accommodative and consistent with inflation stabilising at its target. Thereafter, the Governing Council would continue net asset purchases at a lower level for as long as necessary, and until shortly before it started raising the key ECB interest rates.

However, monetary accommodation was considered still warranted in order to safeguard favourable financing conditions and ensure that funding costs for households, firms and the public sector do not increase unduly. It must be kept in mind that financial conditions, amid heightened uncertainty, are characterised by large volatility and are highly dependent on consistent monetary policy support. A premature tightening of financing conditions could not be justified in times when purchasing power is already under pressure by high costs. In this regard, the flexibility with which the pandemic-related measures were implemented, on the basis of a joint assessment of financing conditions and the inflation outlook, continues to play a significant role in ensuring the smooth transmission of monetary policy, as well as in limiting market inefficiencies and fragmentation risks that could weigh on the sustained attainment of the price stability objective and put a drag on the economic rebound.

In view of the heightened uncertainty, the Governing Council decided to maintain flexibility and optionality in the conduct of asset purchases to counter threats to the monetary policy transmission that jeopardise the attainment of its price stability objective. It therefore committed that reinvestments under the PEPP could be adjusted flexibly across time, asset classes and jurisdictions in the event of renewed market fragmentation related to the pandemic. This could entail purchases of Greek government securities over and above rollovers of redemptions in order to avoid an interruption of purchases in Greece, for as long as the country did not hold an investment-grade rating, which would allow the inclusion of Greek government securities in the Public Sector Purchase Programme (PSPP). The Governing Council strongly supported the importance of safeguarding the smooth transmission of monetary policy to the Greek economy while it was still recovering from the fallout of the pandemic. If needed, net purchases under the PEPP could also be resumed to counter negative shocks related to the pandemic.

33 See speech by ECB President C. Lagarde in November 2021 entitled "Commitment and persistence: monetary policy in the economic recovery" (https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp211119~3749d3556c.en.html).

34 As illustrated by Coenen and Schmidt (2016), asset purchase programmes have been crucial in forestalling a de-anchoring of expectations by credibly signalling the ECB's commitment to deliver price stability.

5.2 COURSE OF ACTION ON CLIMATE CHANGE

Turning to climate change, one of the main results of the ECB strategic review has been the construction of an ambitious roadmap[35] to outline the intended course of action for the Eurosystem over the next two to three years with respect to the further integration of climate change considerations into its monetary policy operational framework. Such work is expected to progress along three major milestones[36] elaborated below.

The first milestone focuses on the expansion of the analytical capacity of the Eurosystem in macroeconomic modelling and statistics with regard to climate change. This work intends to address the major impediment for the Eurosystem in understanding and assessing the impact of climate change risks on the economy, which is the lack of availability of sufficient high quality data and modelling tools necessary for assessing climate change risks. Accordingly, the first leg of this milestone will focus on gathering consistent, reliable and comparable data, and on developing indicators to assess the carbon footprint of financial institutions and measure their exposure to climate-related risks. The second leg will aim to fill the gap in the present Eurosystem workhorse macroeconomic models with respect to capturing the transmission channels of climate risks. Building on the progress with data availability, the Eurosystem central banks will develop new analytical tools and review and adapt existing ones, to simulate the complex interactions of climate change with the economy. Through this process, the Eurosystem will gain better understanding of the implications for the transmission of monetary policy and ultimately for price stability as well as for financial stability. The resulting assessment based on the enhanced modelling and forecasting capabilities will feed into enhanced decision-making process for the Governing Council.

In a second milestone, the Governing Council will work towards enriching its knowledge on climate change-related issues. Work will progress along three directions. First, towards gaining better knowledge of the Eurosystem's own exposure to climate risks. The Eurosystem will start conducting climate stress tests of its own balance sheet, the first such exercise being scheduled for 2022. Through this exercise, the Eurosystem central banks will gain better insight into the extent to which physical and transition risks related to climate change may imply potential losses on their balance sheets. Second, the Eurosystem will aim to better understand the exposure of banks it supervises and of other companies to climate risks. As a first step, the Eurosystem already conducted an economy-wide stress test[37] in 2021, which showed that the costs of an orderly and gradual transition to a greener economy are lower to those related to deferring the handling of the impact of natural disasters in the future.[38] The exercise also revealed that in a scenario in which climate change is not further addressed, the most vulnerable banks could see the default probabilities of their corporate loan portfolios rise by 30%.[39] In a next step, the ECB will conduct a supervisory climate stress test exercise of individual banks in 2022, to identify potential vulnerabilities in the banking sector related to climate change. Third, in a major building block of this second milestone, the Eurosystem will introduce climate-related disclosures as a requirement for private sector assets to be made eligible as collateral in its credit oper-

35 See the action plan "Detailed roadmap of climate change-related actions" (https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708_1_annex~f84ab35968.en.pdf), which accompanied the July ECB announcement on the new ECB strategy, and "ECB presents action plan to include climate change considerations in its monetary policy strategy" (https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708_1~f104919225.en.html).

36 See "What's our roadmap to greening monetary policy?" (https://www.ecb.europa.eu/ecb/climate/roadmap/html/index.en.html).

37 See "Firms and banks to benefit from early adoption of green policies, ECB's economy-wide climate stress test shows" (https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210922~59ade4710b.en.html).

38 See blog post by ECB Vice-President L. de Guidos in March 2021 entitled "Shining a light on climate risks: the ECB's economy-wide climate stress test" (https://www.ecb.europa.eu/press/blog/date/2021/html/ecb.blog210318~3bbc68ffc5.en.html).

39 See remarks by ECB President C. Lagarde in her welcome address at the ECB Forum on Banking Supervision in November 2021 (https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp211109_1~6cdc943638.en.html) and her speech at the Finance at Countdown event in October 2021 entitled "The contribution of finance to combating climate change" (https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp211012~bfe7738d35.en.html).

ations and to qualify for purchase under its asset purchase programmes. Such requirements will take into account EU policies in sustainability reporting. Fourth, the Eurosystem will review the extent to which climate change risk is duly and consistently reflected in internal and external credit ratings.

The third milestone builds on the two preceding milestones and outlines the action to be considered by the Eurosystem on the basis of the data and knowledge it will have gathered. The first leg of such action refers to the collateral framework and will explore the prospect of differential treatment of assets with higher climate risks when mobilised as collateral in Eurosystem credit operations. Accordingly, the valuation and risk control frameworks for such assets may become more restrictive relative to assets with lower climate risks. As a further step, the Eurosystem could also consider whether the risks and externalities arising from climate change require an adjustment of the eligibility criteria for the collateral framework (Deutsche Bundesbank 2021). The second leg of such action will encompass the Corporate Sector Purchase Programme (CSPP). The Eurosystem plans to adjust the framework guiding the allocation of corporate bond purchases to incorporate climate change criteria, in line with its mandate. This may potentially translate to a tilting approach to purchases, according to which the CSPP could be adjusted on the basis of sustainability considerations. Such considerations involve the alignment of issuers with, at a minimum, EU legislation implementing the Paris Agreement through climate change-related metrics or commitments of the issuers to such goals.[40]

With this action plan the ECB has "*acknowledged that climate change is an essential challenge for the world and is of strategic importance for the ECB's mandate*", as recognised by ECB President Lagarde[41] at the press conference following the announcement of the strategy review. In this context, the ECB and a number of euro area central banks, including the Bank of Greece, have elevated climate change work to a strategic priority, without prejudice to their price stability mandate. Already in January 2021, the ECB established a Climate Change Centre[42] to shape and steer its climate agenda and help coordinate action across the various disciplines involved. In turn, the Bank of Greece, one of the first central banks globally to respond to the issue of climate change, set up in 2021 a Climate Change and Sustainability Centre,[43] to design, coordinate, support and implement the climate and sustainability activities of the Bank in the future.

6 THE IMPLICATIONS OF THE NEW STRATEGY FOR THE EURO AREA AND ITS MEMBERS – A COUNTERFACTUAL ANALYSIS

The new monetary policy strategy of the Eurosystem has aimed to adapt the "philosophy" of the Eurosystem to the fundamental challenges facing the euro area economy in the period since the 2003 review. A period that was determined, first, by the incidence of the twin crises and, more recently, by the pandemic crisis. The country affected most by these challenging crisis times has been Greece. A question that therefore deserves consideration is whether the consequences for the euro area and for its individual members, with the focus on Greece where relevant, would have been different had the new strategy been in place during the crisis years. This section will touch upon the situation for the euro area and will explore the major implications of the new strategy against the performance of the previous formulation. Useful insight is gained from the recent Eurosystem response to the pandemic crisis, which can largely be seen as a showcase of the effectiveness of certain strategy elements in addressing a crisis situation, although such elements were only formalised as part of the new strategy in the summer of 2021.

40 See also page 152 of ECB (2021c).
41 See the opening remarks to the press conference of 8 July 2021 (https://www.ecb.europa.eu/press/pressconf/2021/html/ecb.sp210708~ab68c3bd9d.en.html).
42 See "ECB sets up climate change centre" (https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210125_1~3fc4ebb4c6.en.html).
43 See https://www.bankofgreece.gr/en/the-bank/organisation/climate-change-and-sustainability-centre.

A counterfactual analysis for the euro area

To set the stage, the situation facing the euro area since the previous review in 2003 needs to be recalled. As nicely put by Rostagno et al. (2019, p. 6),[44] the history of the first two decades of the euro is largely "*a tale of two regimes: one —stretching slightly beyond the ECB's mid-point— marked by decent growth in real incomes and a distribution of shocks to inflation almost universally to the upside; and the second —starting well into the post-Lehman period— characterised by endemic instability and crisis, with the distribution of shocks eventually switching from inflationary to continuously disinflationary*". The focus of the discussion in this section will be on this latter period, as achieving the mandate of price stability has proved to be a moving target for successive years. Given that the euro area economy was facing "tectonic plate" changes over this period, it would be oversimplistic to argue that monetary policy on its own, even in a different configuration, would have played a determinant role in resolving the crisis. Acknowledging the multifaceted, unique and deep-rooted challenges facing the euro area economy, this section will take an ex-post perspective to touch upon certain dominant features of the new strategy and discuss in what ways these features could have helped in alleviating the consequences of the crisis on euro area inflation and growth. It will also shed some light on the deficiencies of the previous strategy, which the new one has aimed to fix. What should be kept in mind is that the new strategy in essence builds on and consolidates the lessons learnt from the crisis, to ensure that the Eurosystem remains well equipped to fulfil its price stability mandate in a sustained manner and to effectively respond to future contingencies.

Implications of a clear, symmetric inflation target and a higher inflation buffer

To begin with, as discussed under Section 4.1, the old formulation of price stability entailed a lower and ambiguous inflation aim. The non-specification of a point target has from the early years of the euro sparked a debate as to the exact numerical value of the price stability objective. According to Paloviita et al. (2021, p. 127), different interpretations of the inflation target may have increased inefficiency in monetary policy-making, posing risks to the anchoring of inflation expectations and to the effective transmission of monetary policy. Moreover, according to the same study, the price stability formulation in the previous strategy was consistent with a lower *de facto* inflation aim: drawing from real time data from the ECB/Eurosystem quarterly macroeconomic projection exercises, the authors suggest that the previous formulation set a *de facto* inflation target of between 1.6% and 1.8%. A low *de facto* inflation aim may have made it more difficult for the ECB to steer actual inflation towards 2%, an important reason being that it may have led to shaping inflation expectations to lower than intended levels. In turn, pronounced negative deficits of inflation expectations from the inflation target contributed to a decline in nominal rates and to record-low, below-zero since the summer of 2014, levels of the policy rate. The lower inflation target in the previous strategy formulation is thus thought to have led to a higher probability of hitting the effective lower bound, reducing the monetary policy space and the leeway for the Eurosystem to respond to negative shocks. This is also illustrated in Cecioni et al. (2021), who show that a lower inflation target is associated with larger disinflationary bias, higher volatility of inflation and more frequent incidence of effective lower bound episodes. The commitment to a higher inflation target in the new strategy widens the safety margin above the effective lower bound and, thus, reduces the likelihood of hitting it (Deutsche Bundesbank 2021).

Moreover, the double-key formulation of price stability in the context of the previous strategy entailed an inherent *asymmetry* in the reaction function. Negative deviations from the inflation target were seen to be in line with the price stability objective and called for a weaker monetary policy response relative to positive

44 For an additional assessment of the 20 years of the ECB monetary policy, see Hartmann and Smets (2018).

deviations, to which the ECB was seen as prone to react more proactively and aggressively. This led to a misperception of low-inflation bias in the ECB's monetary policy, with implications for both inflation and output. According to Cecioni et al. (2021), in the presence of a binding effective lower bound, an asymmetric range target with a focal point ceiling produces approximately three times lower average inflation and double (negative) output gap relative to a symmetric response around the same focal point. Clarity with regard to a specific *point symmetric* target in the new strategy is seen to provide the ECB with the impetus for strong action in response to both positive and negative deviations, with favourable effects on inflation and output.

The presence of downward wage rigidities in the euro area also supports the case for a higher inflation target. When wage contracts are sticky, firms and workers often show resistance to reductions in nominal wages, even when faced with large adverse shocks. Since nominal wages do not easily decline when warranted by economic conditions, firms respond to sluggish demand and compressed profit margins through depressed hiring rates, leading to higher or more protracted unemployment, with negative implications for output. In other words, when downward wage rigidities become binding, macroeconomic adjustment is managed in terms of quantities (unemployment) rather than in terms of prices (Consolo et al. 2021).

An increase in the inflation target could offer the advantage of less frequent episodes of binding downward wage rigidities and, by implication, lower unemployment and higher output levels. Abbritti et al. (2021) provide evidence that the constraint on downward wage rigidity becomes more binding in an environment of low growth, low inflation and high volatility, advocating the case for a high inflation target in such context. Benigno and Ricci (2011) examine the macroeconomic implications of downward wage rigidities in a low inflation environment. They show that at high inflation the inflation-output trade-off is virtually vertical, but becomes flatter at low inflation, which indicates that increasing inflation would imply gradually lower output costs. Fahr and Smets (2010) show that at low steady state inflation rates adverse shocks imply larger costs for downward wage adjustments than at higher inflation rates. Accordingly, a positive but low inflation rate target can be seen to provide an insufficient safety margin against adverse and persistent effects on unemployment and output. Brought to the euro area context, these findings are consistent with the view that had a higher inflation target of 2% been sought and achieved in the crisis years, more room for downward adjustments to prices and wages would have been made available, before rigidities became binding. This would have implied that some of the costs in terms of higher unemployment and lower output growth for the region as a whole (and for Greece in particular) would have been alleviated.

Implications of a forceful and persistent use of monetary policy instruments

The new strategy would have called for the timely adoption, as well as the forceful and persistent use of a combination of unconventional monetary policy instruments earlier in the crisis. By guiding the Governing Council towards an unconventional policy toolkit, and notably towards earlier recourse to large-scale purchases of government bonds, such a strategy could have contained to some extent the fallout on the euro area economy and persistent deflation. As explained by Altavilla et al. (2021, p. 21), a pronounced downward drift in inflation expectations took place in the euro area, "*partly due to a perceived reluctance on the side of the ECB to embark on unconventional policy early in the post Great Financial Crisis phase and with sufficient conviction*".[45]

The public sector arm of the expanded asset purchase programme (i.e. the PSPP) was only

45 Inflation developments in the euro area over this period reflect various developments, including – but not limited to – persistent weakness in oil prices, the tight fiscal stance and the euro exchange rate (see Altavilla et al. 2021).

announced in January 2015, at a time when euro area headline inflation had already turned negative for the second consecutive month, after hovering at around 1% on average over the preceding 2.5 years. ECB purchases of government bonds under the Securities Markets Programme (SMP) implemented earlier in the crisis (from May 2010)[46] were targeted at restoring the impaired monetary policy transmission mechanism in certain stressed jurisdictions (including Greece) but did not affect the stance, as the liquidity provided through these operations was sterilised. As noted in Hartmann and Smets (2018, p. 48), SMP interventions were seen to be timid by market participants and "*did not succeed in stemming the rise in sovereign spreads*".[47]

The effects of this delayed implementation on the euro area economy were exacerbated by various factors, including a restrictive fiscal stance, unprecedented market uncertainty, banking vulnerabilities, structural weaknesses, the incomplete institutional set-up of the euro area, and country-specific policy decisions, the analysis of which is beyond the scope of this paper. A different constellation of monetary policy, as bestowed upon the new strategy and first tested in the context of the pandemic, could have to a certain extent contained the fallout, as it would have supported:

i. The timely adaptation of the unconventional monetary policy toolkit in an innovative and flexible way. A major innovation included the design of the new TLTRO-III series during the pandemic: depending on their lending performance, banks could receive longer-term funding under the TLTRO-IIIs at interest rates below the negative deposit facility rate.[48]

ii. The forceful or persistent implementation of unconventional monetary policy. The ECB embarked on the PEPP, a private and public sector asset purchase programme unprecedented in size, already in March 2020, illustrating its strong conviction and determination to counter early on the acute phase of the crisis.

iii. Leaning against financial market fragmentation and impaired monetary policy transmission, via implementing more flexible asset and country allocation. The PEPP was equipped with the flexibility to adjust the volume of purchases over time, across asset classes and among jurisdictions.[49] Event-study evidence reviewed by Altavilla et al. (2021, p. 13) shows that the greater flexibility imbedded in the PEPP may have contributed to its stronger impact on sovereign yields compared with the APP, for a given envelope.

iv. Flexibility across assets and jurisdictions under the PEPP has implied that Greek government securities were made eligible for purchase under the programme, despite the fact that these assets did not meet the minimum credit quality requirements at the time. This decision has been instrumental in containing more adverse dynamics that might have otherwise occurred in Greek markets. Eligibility for purchase under the PEPP defused the risk of fragmentation in the Greek bond market and averted a pronounced tightening in financing conditions.

In essence, the new strategy would have allowed the Eurosystem to embark early enough and with sufficient resolve on unconventional monetary policy. Euro area countries could have seen faster and more sustained convergence of inflation to its target,

46 SMP interventions started in May 2010 and faded out in the relatively stable first half of 2011, but as the sovereign debt crisis negatively affected Italy and Spain in July 2011, a reactivation of the SMP was effected on 7 August 2011 (Hartmann and Smets 2018). The termination of the programme was announced in August 2012.

47 The Outright Monetary Transactions (OMTs) announcement in September 2012 managed to address impairments in the transmission channel and euro redenomination fears, although OMTs have never been activated.

48 See speech by ECB Executive Board Member I. Schnabel in October 2021 entitled "Lessons from an unusual crisis" (https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp211001~ca589c6afc.en.html).

49 For more information on the PEPP, see https://www.ecb.europa.eu/mopo/implement/pepp/html/index.en.html and https://www.ecb.europa.eu/mopo/implement/pepp/html/pepp-qa.en.html.

more favourable financing conditions and bolder economic recovery. The commitment to an especially forceful or persistent monetary policy action would have alleviated the fallout on the economy from the severe shocks experienced in many jurisdictions, most notably Greece, paving the way for macroeconomic stabilisation and growth. Such a response would have showcased the flexibility, potency and determination of the ECB to react to the past crisis in a timely, forceful and persistent manner.

Implications of patience and commitment

The new strategy provides a device for the Governing Council to commit itself to avoiding a premature tightening, which, as laid down in the monetary policy strategy statement, "*may imply that inflation runs moderately above the target for a temporary period*".[50] On certain occasions, once in 2008 and twice in 2011, the Governing Council was confronted with the situation of supply-side disturbances, causing inflation to rise above target in the short term, while projections indicated inflation subsiding to below mandate levels in the medium term. The Governing Council opted for a rate hike in all these episodes of transitory inflation spikes, decisions which were reversed shortly afterwards. Had the explicit allowance catered for in the new strategy for a temporary overshooting of the inflation objective been considered then, the Governing Council could have been inclined to look through the build-up of temporary price pressures on these occasions, thereby avoiding the premature tightening of rates, which posed downside risks to the economic activity.

Implications for fiscal and monetary policy interactions

The interactions between fiscal and monetary policies in the euro area need to be seen through the lens of the unique establishment offered by the European Monetary Union with single monetary policy that lacks a single fiscal counterpart. Under this set-up, monetary policy has been mandated by the EU Treaty[51] with the primary objective of price stability, and was not made subject to any other considerations. Fiscal policy on the other hand, which remained under decentralised responsibility, was made subject to specific rules, which intended to stabilise fiscal behaviour. The euro has been based on monetary dominance, out of concerns that fiscal dominance would compromise central bank independence, a prerequisite for currency stability. As I. Schnabel (2020) has put it, the principle of monetary dominance is "*buttressed by far-reaching political dominance, the prohibition of monetary financing of public debt and a comprehensive fiscal framework*".[52]

The strict interpretation of this principle, however, has in practice led to the perception that fiscal and monetary policy had to work separately to achieve their targets, and not in complement to each other. When monetary policy became constrained by the effective lower bound for much of the past decade, it was left with relatively little room for manoeuvre to stabilise the economy and lift inflation. Fiscal policy, which could have played a significant stabilisation role, remained overly restrictive, as governments strived to correct large fiscal imbalances, a process which further fuelled deflationary pressures. According to Bini Smaghi (2021), the overall fiscal stance in the euro area tightened between 2013 and 2019 from a primary deficit of 0.6% of GDP to a surplus of 0.8% of GDP. Greece, in particular, went through one of the toughest fiscal consolidation efforts ever experienced in an OECD country, turning a deficit of 15.1% of GDP in 2009 into a surplus of 1.1% of GDP in 2019.

To illustrate the impact on euro area inflation, had the fiscal stance been supportive to the monetary policy stance in the context of the sovereign debt crisis, Bańkowski et al. (2021) have examined a simple counterfactual

50 See "An overview of the ECB's monetary policy strategy", p. 10.
51 See the Treaty on the Functioning of the European Union, Article 127(1).
52 See the opinion piece by ECB Executive Board Member I. Schnabel published in *Frankfurter Allgemeine Zeitung* in October 2021 entitled "The ECB's independence in times of mounting public debt" (https://www.ecb.europa.eu/press/inter/date/2020/html/ecb.in201010~438af28894.en.html).

scenario. The results indicate that had a patient and countercyclical fiscal policy accompanied the implementation of the APP on the part of the ECB from 2015 onwards, a large part of the second downturn in the euro area associated with the sovereign debt crisis would have been alleviated and inflation could have been closer to the 2% target.[53] What is more, rates would have hit the lower bound with a delay of almost two years (by end-2017, instead of the actual mid-2015). Fiscal policy would thus have augmented monetary space with positive implications for growth and employment, on average, for Europe and notably for Greece, considering the fiscal multipliers that prevailed.

The pandemic has marked a break with the tradition prevailing in the preceding decade. It has provided a remarkable showcase of the great potential that monetary and fiscal policies can deliver when they complement one another, especially at the zero lower bound. On the one hand, the ECB has made forceful use of its unconventional monetary policy tools safeguarding favourable financing conditions and enabling the smooth functioning of the transmission mechanism. The commitment through the forward guidance that policy rates will not increase until inflation rises to its medium-term target in a durable manner produces higher fiscal multipliers.[54] Asset purchases in turn, by shifting the sovereign yield curve lower, reduce borrowing costs for governments and add fiscal space. On the other hand, the fiscal response to the pandemic, unprecedented in size and scale, has played a major stabilisation role. Such combined policy implementation, which puts emphasis on macroeconomic stabilisation, ultimately enhances the sustainability of sovereign debt, since it allows the economy to grow. In this way, fiscal policy makes its best contribution to price stability, complementing the scope of monetary policy and amplifying its effectiveness.

The new ECB strategy has built on this circumstance. It has acknowledged the importance in complementarity —as opposed to substitutability— of monetary and fiscal policies, especially in crisis situations. As recognised in the strategy overview note,[55] "*countercyclical discretionary fiscal policy is important in times of crisis and especially in proximity to the lower bound*". The implications of this recognition are important for all euro area countries. For as long as the real natural interest rate remains very low and the growth rate is positive, the difference between the two, which is the relationship that drives debt dynamics, will be close to zero or negative. Therefore, the debt ratio can be less of a source of concern. Fiscal policy could use the increased fiscal space to support the recovery and raise inflation.

Going forward, and outside of the strategic review, the call for more fiscal coordination among national authorities needs to be pursued further. This has been especially evident from the success that the euro area governments have seen in coordinating their policies to combat the economic effects of the pandemic. Moreover, stronger fiscal integration at the European level can be effected. The NGEU recovery instrument has been a critical step towards this direction and should be complemented by further similar initiatives in a more permanent way. Finally, the introduction of a Eurobond would be a significant step towards the enhancement of safe assets availability and serve as a milestone in the completion of the euro area architecture. Through these avenues, better stabilisation outcomes can be achieved, with positive indirect repercussions for price stability.

Implications for the adjustment of macroeconomic imbalances across member countries

The accumulation of weaknesses across several euro area countries in the run up to the global financial and sovereign debt crises, including current account deficits but also fiscal and financial imbalances, was followed by

53 See also keynote speech by ECB Executive Board Member F. Panetta in June 2021 entitled "Monetary-fiscal interactions on the way out of the crisis" (https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp210628~695f98b30c.en.html).
54 See footnote 53.
55 See footnote 50.

significant adjustment efforts in the second decade of the euro. As Gibson et al. (2013, p. 13) highlight, monetary unions are faced with "*reduced flexibility to adjust to asymmetric shocks. In the face of such shocks, real-exchange-rate adjustments in individual countries need to be brought about entirely through adjustments of domestic prices and wages, that is, through internal devaluations.*" In the context of the euro area crisis, the effort to achieve the required adjustment was further hampered by the low-inflation, low interest-rate environment prevailing in the euro area over this period. With the decline in average inflation to low and even negative rates in the aftermath of the sovereign debt crisis, it became more difficult for some countries to achieve the required internal devaluation. As discussed in Rostagno et al. (2019, p. 71), "*in a currency union the union-wide inflation rate sets the bar around which cross-country relative price adjustments need to take place*". A bar set to very low levels implies that some countries would actually need to run into deflation to be able to regain their competitiveness.

Greece can provide the prime example of this circumstance. As illustrated in Consolo et al. (2021) in a simple purely mechanical counterfactual analysis, had the euro area-wide inflation target objective of "below, but close to, 2%" been reached in the second decade of the euro, the periods with negative inflation rates would have been less prolonged (although not altogether avoided). Prolonged negative inflation in the context of this exercise is defined[56] as negative inflation of four or more consecutive quarters. Over the 2009-2019 period, prolonged periods of negative core inflation were actually experienced in Ireland, Slovenia, Greece, Spain and Cyprus. Assuming that euro area inflation had stood at 1.9% over this period, the exercise shows that only Greece and Ireland would have experienced prolonged periods of negative core inflation, still of lower duration. By implication, in the new strategy context, assuming that the target of 2% had been achieved, the Governing Council would have been required to calibrate its monetary policy in line with an even more accommodative stance, implying that negative headline and core inflation rates could have been less protracted and prevailed for even shorter periods of time.

Accordingly, a higher inflation target, as embedded in the new strategy, would have offered a wider safety margin against deflation risks for Greece and, more broadly, for the euro area. On this premise, the overview note of the ECB's new monetary policy strategy states explicitly that "*an inflation buffer allows for a smoother adjustment of macroeconomic imbalances, avoiding inflation in individual countries persistently falling into negative territory*".[57] The debate on how to ameliorate adjustment costs is still vibrant, and calls to complete the euro area architecture and increase risk sharing have received great attention. In this direction, topics like a common fiscal capacity, the advancement of the capital markets union and a common European deposit insurance scheme need to feature more prominently in the European agenda.

7 ASSESSMENT OF THE STRATEGY REVIEW

The outcome of the strategy review was overall positively received by market participants and analysts. The majority were content with the more transparent and ambitious inflation target, its symmetric formulation and the introduction of the overshooting clause. According to the special ECB survey of professional forecasters on the new monetary policy strategy,[58] three-quarters of the respondents considered the new strategy to be an improvement and to make it easier for the ECB to meet its mandate. Around one-third of the respondents had

56 To distinguish with transitory periods of up to three consecutive quarters.
57 See footnote 4.
58 See the results of a special survey of professional forecasters on the ECB's new monetary policy strategy (https://www.ecb.europa.eu/stats/ecb_surveys/survey_of_professional_forecasters/html/ecb.spf202111_specialsurvey~a0b43ca7b3.en.html).

changed or would change their expectations following the announcement of the strategy review. Their forecasts regarding the ECB's policy measures were revised in the direction of an easing of the policy stance. Results from the survey from the Deutsche Bundesbank Online Panel Households[59] show that the new definition of the inflation target is associated with moderately higher inflation expectations in the next years.

Still, a share of people was less satisfied; some would have preferred the ECB to aim a higher inflation target and to compensate for past negative deviations of inflation from its target, by explicitly allowing inflation to overshoot rates consistent with the definition of price stability, while others saw risks associated with inflation exceeding its target even temporarily. In the survey conducted by the Centre for Macroeconomics (CFM) – Centre for Economic Policy Research (CEPR),[60] 60% of the experts questioned argued that the ECB should systematically allow inflation to exceed its target in order to make up for periods of below target inflation, i.e. to adopt an average inflation targeting regime. 40% of the experts preferred the current policy of standard inflation targeting, under which present monetary policy decisions are not dependent on past inflation outcomes – as the saying goes, "let bygones be bygones".

Average inflation targeting is an alternative strategy for maintaining price stability, classified under history-dependent monetary policy regimes, that aims to stabilise an average rate of inflation over a specific period. The Federal Reserve System adopted an asymmetric type of average inflation targeting regime in its 2020 strategy review. In particular, the Federal Reserve Board announced[61] that "*following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time.*" Under this regime, the Federal Reserve Board commits to compensating only for negative past deviations from the inflation target in order to keep average inflation on target – although without specifying the time period over which the average of the inflation rate is calculated.

Reichlin et al. (2021) have suggested that if the ECB followed the Fed's approach, it would be better equipped to manage inflation shortfalls and to ensure that inflation is, on average, consistent with its numerical objective. Average inflation targeting strategies, which are credible and well understood by market participants, can be successful in steering expectations for future inflation in the right direction towards levels consistent with the desired target. Households and firms are basing their consumption, saving and investment decisions on their expectations about future economic conditions and policy rates, thus influencing overall economic activity and price setting. Therefore, under make-up strategies, it is easier to undo the negative biases in inflation induced by the effective lower bound and requires less forceful intervention. Empirical research[62] compares the macroeconomic stabilisation properties of standard inflation targeting and history-dependent strategies, namely average inflation targeting and price level targeting. According to their findings, average inflation targeting is more successful, compared with inflation targeting regime, in reducing distortions of inflation and generating fewer episodes where the effective lower bound becomes binding. The inclusion of a make-up component in the formulation of the price stability objective could contribute to better inflation performance in the euro area. Even the mere announcement could be sufficient to drive market and public expectations on future inflation to levels consistent with price stability, without the central bank having to take actual policy actions.

59 See https://www.bundesbank.de/en/publications/research/research-brief/2021-43-inflation-target-881212.
60 See https://cfmsurvey.org/surveys/ecb-monetary-policy-and-catch-inflation.
61 See the Fed's statement on longer-run goals and monetary policy strategy (https://www.federalreserve.gov/monetarypolicy/files/fomc_longerrungoals.pdf).
62 See ECB (2021b), Deutsche Bundesbank (2021) and Busetti et al. (2020).

However, several studies[63] point out that the effectiveness of make-up strategies in general hinges on the degree to which they are credible and well understood by the private sector, the extent to which market expectations are forward-looking and rational, and the consistency in households' and firms' economic behaviour. Such regimes are subject to weak credibility, since market participants may speculate that the central bank will refrain from allowing inflation to overshoot its target once it is achieved. Moreover, it is difficult to justify a monetary policy stance that is not aligned with economic developments. For instance, a central bank may find it hard, in case inflation had been above target in the previous period, to not adopt an expansionary monetary policy in response to falling inflation during a recession, and vice versa. In order to be efficient, make-up strategies have to be carefully communicated and provide specific information on the period over which average inflation is calculated, as well as on the size of acceptable deviations from the target.

What is also worth exploring further is the adaptation of the standard ECB toolbox. The unconventional measures introduced during the crises need to remain available under normal times and not only in the vicinity of the effective lower bound. Especially, the flexibility embedded in the measures adopted during the pandemic crisis must be incorporated into the permanent tools. The wide inclusion of bonds across asset classes and among jurisdictions under the PEPP has been successful in limiting segmentation and fragmentation, and in safeguarding the smooth transmission of the monetary policy (Costain et al. 2021). Thus, there is scope for lowering the minimum credit quality thresholds to enable a wider range of government securities to qualify for purchase under the APP, in the spirit of the PEPP. It is crucial to guarantee adequate representativeness of all member countries in the purchase programmes and the credit operations, and to safeguard favourable financing conditions in every jurisdiction. This could be further enhanced by restraining reliance on external rating agencies, for instance by defining eligibility criteria based on in-house credit assessment systems.

Moreover, the imposition of limits may come to the detriment of the effectiveness of the asset purchase programmes. The issue and issuer limits under the PSPP, imposed to prevent the central banks from holding the largest share of public debt, have restricted the potential amount of assets that could be purchased and hence the potential monetary policy accommodation. Simulations by the Deutsche Bundesbank (2021) provide evidence of a marked increase in inflation towards its 2% target if purchase programmes had been implemented without limits.

Furthermore, inclusion of additional asset classes, also across the entire maturity spectrum, may be required to ensure adequacy of purchasable securities and effective targeting of the yield curve. Flexibility in terms of allocation of purchases over time and provision of sufficient leeway facilitates a regular and consistent presence in the markets and preserves benign market conditions in the face of potential short-term market tensions. The possibility to step up the pace of purchases in the event of unwarranted tightening in financing conditions, but also to decelerate purchases if not deemed necessary, is key to strengthening the ability of the central bank to safeguard price stability. Needless to say, flexibility could compensate for higher volumes of purchases. The less flexible the purchase programme, the larger its envelope would have to be. Conversely, a smaller envelope would be sufficient if the purchase programme is flexible enough.

Regarding the temporary easing measures that were adopted under the collateral framework, they have managed to augment the eligible collateral pledged by banks to participate in the Eurosystem's refinancing operations. In combination with the amendments of the

63 See Coibion et al. (2020b), Coenen et al. (2021) and Candia et al. (2020).

modalities of the third series of the TLTROs, the ECB succeeded in ensuring wide participation and high take-up in its liquidity-providing operations, as well as in providing ample liquidity to the financial sector. Streamlining the eligibility criteria for securities posted as collateral and further enlarging the available collateral pool is thus essential in order to address financial pressures and limit market inefficiencies. At the same time, it can contribute to maintaining favourable financing conditions for the real economy and continue to support banks' credit provision to households and firms.

Finally, prudent and clear communication remains a fundamental tool to anchor expectations about future policy actions and has a significant impact on interest rates at all maturities. There is still some potential for improvement. Financial markets have sometimes misinterpreted the ECB's policy statements, leading to more volatility than justified. One reason for this misinterpretation is the existence of cacophony. Dissenting voices are detrimental to the efficient transmission of the policy signal. In addition, on certain occasions, the ECB's messages could have benefited from more precision and clarity. Therefore, coherent communication by all Governing Council members would reinforce the credibility of the decisions taken and improve the public interpretation of the policy messages. Accurate and clear communication is necessary to enhance markets' understanding of complex central banking issues. In particular, expanding the focus of the central bank communication to include issues that matter most to the public —especially wealth, unemployment and inequality— would help explain the ECB's insights into these matters, but also clarify the limits of what the Eurosystem can achieve in these areas. Furthering the presence of national central banks that constitute part of the Eurosystem in general-interest local media, as well as on social media platforms could also help directly reach out for a broader audience, especially younger people.

8 EPILOGUE

The strategy review marks a historic shift for the monetary policy of the Eurosystem. In practice, the changes reflect the legacy of the previous crises; they systematise the lessons learnt from past mistakes and misachievements. They also consolidate the successful use of the policy instruments employed to overcome the effective lower bound and to restore the transmission mechanism. As Jean Monnet wrote in his memoirs in 1976, "*Europe will be forged in crises, and will be the sum of the solutions adopted for those crises*". In this connection, the new elements of the monetary policy strategy mirror the necessary adaptations made in the conduct of monetary policy with a view to empowering the Governing Council to deliver on its price stability mandate. A first testament to the success of the new strategy was the response of the Eurosystem to the pandemic emergency. What remains to be seen is how the new strategy will take on new challenges, such as the further incorporation of financial stability and climate change considerations into its monetary policy framework.

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THE IMPORTANCE OF SELECTED STRUCTURAL COMPETITIVENESS INDICATORS FOR EXPORTS: A COMPARATIVE ANALYSIS BETWEEN THE EURO AREA AND GREECE

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ABSTRACT

Structural (non-price) competitiveness departs from price or cost competitiveness and captures a multitude of dimensions, both quantitative and qualitative, affecting a country's trade and openness. Greece over time has lagged behind in key structural competitiveness indicators relative to other euro area countries, but has improved its position in some of the indicators in the recent years, in terms of relative prices and unit labour costs. The paper examines the evolution of selected price and structural competitiveness indicators approximated with institutional quality indicators (published by international organisations), recording the performance of Greece and euro area countries over the last decade, on an annual basis, in order to gain more insight into how exports are affected. A panel regression of an export demand function is estimated for the 19 euro area member countries, separately for each of the selected indicators. It is confirmed that structural competitiveness, along with price competitiveness, has played an important role in determining exports in the euro area and in Greece over the 2007-19 period. Greater sensitivity of Greek exports to institutional quality indicators is found, compared with average euro area exports. This is an indication of the faster pace of refortm implementation in other euro area countries, while the reforms in Greece are in a process of catching up. The implementation of structural reforms in the direction of improving institutional deficiencies has contributed, among other factors, to the observed post-crisis export-led growth in Greece. In conclusion, the pace of reforms already under way should be accelerated and this will be mirrored in the country's structural competitiveness indicators and expressed as better scores and higher rankings converging towards the performance of the other euro area countries.

Keywords: structural competitiveness indicators; competitiveness; exports; panel estimator

JEL classification: F13; F14; C51

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Διεύθυνση Οικονομικής Ανάλυσης και Μελετών

ΠΕΡΙΛΗΨΗ

Η μελέτη εξετάζει την εξέλιξη της διαρθρωτικής ανταγωνιστικότητας, η οποία προσεγγίζεται με δείκτες ποιότητας των θεσμών που καταρτίζονται από διεθνείς οργανισμούς, καθώς και την εξέλιξη της ανταγωνιστικότητας ως προς τις τιμές, καταγράφοντας τις σχετικές επιδόσεις της Ελλάδος και των χωρών της ζώνης του ευρώ κατά τη διάρκεια της τελευταίας δεκαετίας, σε ετήσια βάση. Στη συνέχεια, μελετά την επίδραση των παραπάνω δεικτών στις εξαγωγές. Η διαρθρωτική ανταγωνιστικότητα διαφοροποιείται από την ανταγωνιστικότητα σε όρους τιμών ή κόστους εργασίας. Υπολογίζεται με βάση διαφορετικές προσεγγίσεις, τόσο ποσοτικές όσο και ποιοτικές, και διερευνάται η επίδρασή της στις διεθνείς εμπορικές συναλλαγές και την εξωστρέφεια μιας χώρας. Η Ελλάδα καταγράφει διαχρονικά μικρότερη βελτίωση σε βασικούς δείκτες διαρθρωτικής ανταγωνιστικότητας σε σχέση με άλλες χώρες της ζώνης του ευρώ, αλλά τα τελευταία χρόνια έχει βελτιώσει τη θέση της όσον αφορά την ανταγωνιστικότητα ως προς τις σχετικές τιμές ή το κόστος εργασίας ανά μονάδα προϊόντος. Εκτιμώνται παλινδρομήσεις σε μορφή πάνελ της συνάρτησης ζήτησης εξαγωγών για τις 19 χώρες-μέλη της ζώνης του ευρώ, με τη χρήση χωριστών πάνελ για κάθε έναν από τους επιλεγμένους δείκτες. Επαληθεύεται ότι, πέραν της ανταγωνιστικότητας των τιμών, και η διαρθρωτική ανταγωνιστικότητα αποτελεί σημαντικό προσδιοριστικό παράγοντα των εξαγωγών της ζώνης του ευρώ και της Ελλάδος την περίοδο 2007-2019. Διαπιστώνεται μεγαλύτερη ευαισθησία των ελληνικών εξαγωγών στους δείκτες ποιότητας των θεσμών, σε σχέση με το μέσο όρο των εξαγωγών της ζώνης του ευρώ. Η διαφορά αυτή εκφράζει την ταχύτερη υλοποίηση μεταρρυθμίσεων στις άλλες χώρες της ζώνης του ευρώ από ό,τι στην Ελλάδα, η οποία ωστόσο πρόσφατα έχει κάνει βήματα βελτίωσης του ανταγωνιστικού της πλεονεκτήματος. Επίσης, καταδεικνύεται ότι η υλοποίηση διαρθρωτικών μεταρρυθμίσεων προς την κατεύθυνση της βελτίωσης των θεσμικών ελλείψεων έχει συνεισφέρει, μεταξύ άλλων παραγόντων, στην παρατηρούμενη αύξηση των ελληνικών εξαγωγών μετά την οικονομική κρίση. Συμπεραίνεται ότι ο ρυθμός υλοποίησης των μεταρρυθμίσεων που έχουν ήδη ξεκινήσει θα πρέπει να επιταχυνθεί και αυτό θα αντικατοπτριστεί στους δείκτες διαρθρωτικής ανταγωνιστικότητας της χώρας με υψηλότερες βαθμολογίες, οδηγώντας σε σύγκλιση προς τις επιδόσεις των άλλων χωρών της ζώνης του ευρώ και περαιτέρω ενίσχυση των εξαγωγών.

THE IMPORTANCE OF SELECTED STRUCTURAL COMPETITIVENESS INDICATORS FOR EXPORTS: A COMPARATIVE ANALYSIS BETWEEN THE EURO AREA AND GREECE

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1 INTRODUCTION

During the global financial crisis, the euro area experienced significant heterogeneity in external imbalances across countries, which was related to cross-country differences in competitiveness. Research evidence put emphasis on the important role of non-price competitiveness factors (NPCFs) that were shown to significantly explain export variability, a key determinant of trade performance.[1] These findings form the basis for the interpretation of phenomena such as the "Spanish paradox", according to which a country's export shares in major markets increase while its price/cost competitiveness decreases. Improvements in trade performance are then attributed to the positive effect of NPCFs (see Cardoso et al. 2012; Giordano and Zollino 2016). A general conclusion of this literature confirms that NPCFs evolve differently across euro area countries, accounting for the differences in external imbalances.

The concept of competitiveness has received various definitions related to its different aspects. Originally in trade, competitiveness assessed price or cost competitiveness that refers to relative export prices or the terms of trade, whereby a country's domestic prices or costs are compared with the respective international prices or costs. Non-price competitiveness departs from the above in the sense that it is not associated with prices or costs. It is extended to take into account different perspectives and captures a multitude of dimensions, not only quantitative but also qualitative, affecting a country's trade and openness. The World Economic Forum defines competitiveness as "the set of institutions, policies and factors that determine the level of productivity of a country". These NPCFs encompass micro and structural issues, such as product quality, productivity, technology advancements through R&D improvements, labour market and product market institutions, the quality of the regulatory environment and justice, market flexibility, economic and political freedom, the fight against corruption, transparency and the quality of infrastructure, and reflect the country's current situation and the scope for further reforms.

The main goal of this study is twofold. Firstly, it presents the evolution of selected price and structural competitiveness indicators with regard to institutional quality in various sectors of economic activity, recording the performance of Greece and euro area countries over the last decade on an annual basis. Further comparisons of Greece's average performance with the euro area average are performed. Tracking the evolution of structural competitiveness for Greece and determining the country's position among euro area countries is important, since relative improvement in this respect can contribute to the gradual recovery of the Greek economy from one of the deepest recessions ever and lead to policy recommendations on achieving and sustaining growth. The results have implications for identifying areas of structural competitiveness where improvement is needed, in order to increase export performance and economic growth.

Secondly, the importance of institutional quality indicators in explaining exports is examined. Previous research finds that the quality of institutions affects economic growth and development as well as employment and investment (Hämäläinen 2003; Acemoglu et al. 2001; Paldam and Gundlach 2008; Drine 2012). Nico-

1 Standard export demand equations consider price competitiveness, which is usually expressed by real effective exchange rates and external demand to explain exports. However, it has been shown that such a type of estimation explains only 55% of export variability (see ECB 2012).

letti and Scarpetta (2003), for instance, find that divergences in institutional-regulatory patterns, as well as rigidities in the labour market and entrepreneurial activities, have unfavourable effects on productivity and are responsible for the observed dispersion of growth rates in OECD countries during the 2000s; expanding on the above mentioned rationale, trade literature has explored the effect of institutional features on export performance. Adding to the robustness of these results, we augment the traditional export demand equation with a selection of institutional quality indicators, as compiled by a large number of organisations, in order to gain more insight into how inefficient institutions affect exports.[2] A separate panel regression for the 19 euro area member countries is estimated for each indicator. The effect for Greece in particular is derived for comparison purposes. It is verified that structural competitiveness, along with price competitiveness, plays an important role in determining exports in the euro area and in Greece over the 2007-19 period. Improvements in institutional quality that have been observed for the euro area and for Greece have been shown to foster the use of international trade channels and increase trade flows, exports and openness, thereby contributing to the internationalisation of the markets and leading to growth, economic development and, consequently, improved prosperity. Further, regarding Greece in particular, since the recovery from the crisis up until 2019 was to a large extent export-driven, the exploration of the role of non-price competitiveness gains importance. The present study, in line with related research, concludes that the implementation of structural reforms in the direction of improving institutional deficiencies may have contributed, among other factors, to the observed post-crisis export-led growth in Greece.

This paper consists of five sections. Following the introduction, Section 2 provides a review of the relevant literature. Section 3 provides information on price and structural competitiveness indicators for Greece and compares them with the euro area average. The empirical specification exploring the relationship between exports and competitiveness is defined and estimated in Section 4. Section 5 presents the conclusions of the empirical outcome and policy implications.

2 LITERATURE REVIEW

As mentioned in the introduction, the trade literature that has emerged during the years of the global financial crisis focuses on non-price competition to explain export behaviour and, indeed, evidence supports the existence of NPCFs. This approach draws on the so-called "new trade theory" developed in the late 1980s (Krugman 1989). According to this theory, the competitiveness of a country is a broader concept depending on other parameters besides price and cost, i.e. the so-called non-price competitiveness factors. These are more qualitative factors based on monopolistic competition heterogeneity among firms rather than countries – giving a lesser role to comparative advantage. Through technological change or innovation, exporters introduce new products of different quality or variety, which are more difficult to substitute, and they enjoy monopolistic power. These factors are considered as firm-specific and include, on the supply side, technological competitiveness and innovation intensity, which are proxied by R&D expenditure and spending on innovation activities, as well as by the number of patents, or are more of a structural nature, such as human capital, i.e. education, beyond the traditional variables (foreign demand and price/cost competitiveness) and have been used as proxies for NPCFs in the export equation.[3,4]

2 The determinants of a country's export performance besides global demand for its products and price competitiveness –as export prices depend on the exchange rate and unit production costs– include an additional set of non-price factors such as quality, innovation, design, brand image, distribution networks and customer support services (see DG Trésor 2014).

3 The significance of R&D expenditure is confirmed for the euro area, the United Kingdom, the United States and Japan (see ECB 2005).

4 The literature also includes foreign direct investment (FDI), inward or outward, to take into account innovation and technology. However, the results are less clear since a large part of the period covered comprises the financial crisis, during which FDI flows were subdued.

In this context, non-price competitiveness effects have been assimilated into productivity effects. The relevant empirical literature introduces total factor productivity (TFP) in the export demand equation to capture the effects of NPCFs. Giordano and Zollino (2016), for example, find a positive and significant impact of TFP on the exports of the largest euro area countries. In a similar vein, the literature embodies effects from the services sector, as measured by the contribution of TFP to value added in the financial, real estate and other sectors.

A more agnostic approach considers NPCFs as unobservable and identifies them with the residuals of a traditional export demand equation (see Xifre 2019; Monteagudo and Montaruli 2009; and Andersen et al. 2012). The strand of literature that deals with the effect of product quality overcomes the empirical problem that it is not directly observable and connects it with the higher prices that consumers are willing to pay. The drawback of this approach is that the use of highly disaggregated data is necessary in order to calculate unit values, which however reflect not only differences in quality, but also variations in a product's costs.

An emerging body of literature provides evidence regarding improvements in the quality of institutions, which can lead to economies of scale and product differentiation as a source of trade, explaining a country's evolution of exports (see also Melitz 2003). Levchenco (2007) considers institutional differences among countries as a source of comparative advantage. It is shown, using a large number of countries and across industries, that the quality of contracts affects imports. Several alternative measures of distortions in institutional intensity are used for robustness, adopting weighting schemes such as the Gini or the Herfindahl indices, to derive institutional inequality in terms of contract enforcement, and capital and skill intensity are added and shown to be significant in explaining imports.

Bournakis and Tsoukis (2013) emphasise the importance of institutional rigidities in affecting export performance. Adopting market structure indicators such as barriers to entrepreneurship, barriers to competition and barriers to FDI, they find that their interaction with the more traditional measure of technological competitiveness, namely the R&D effectiveness, affects significantly export performance.

Böwer et al. (2014) attribute Greece's stagnant exports to the existence of a competitive gap resulting from low performance in institutional quality (NPCFs), while cost competitiveness records major improvements. This evidence refers to the last two decades and is more pronounced during the years of the economic crisis. A gravity model in trade is augmented to include indicators of structural competitiveness such as the World Economic Forum (WEF)'s Global Competitiveness Index (GCI), the World Bank's Doing Business and Worldwide Governance Indicators (WGI) and the OECD's Sustainable Governance Indicators (SGI). They claim that "structural reforms must address non-cost competitiveness factors to unlock Greece's export growth potential".

On the other hand, Bierut and Kuziemska-Pawlak (2016) show that the quality of the institutional environment and in particular regulatory quality lead to higher export market shares in Central and Eastern European (CEE) countries. The results regarding the effect of institutions are more robust than those referring to price/cost competitiveness. Their estimation results show that regulatory quality plays the most important role and has a positive impact on export performance.

Cazacu (2015a) shows that economic growth is linked to both price and non-price competitiveness factors. However, fast-growing countries are not necessarily the most competitive, as a shock in GDP levels has a small positive impact on GCI.

Katsoulacos et al. (2015) conclude that a key determinant of competitiveness is the quality of the set of rules and regulations that govern the operation of markets. Low quality of regulation

is generally associated with greater inefficiency and poor economic outcomes. Reforms can have a pivotal role for the restructuring and productive potential of the economy.

Cezar and Cartellier (2019) suggest that the increasing internationalisation of production within global value chains reinforces the dependence of export prices on the prices of imported inputs. The change in relative costs is used as proxy for the price component of competitiveness. The residuals in their equation express the contribution of the non-price component to the change in exports, so the evolution of a country's exports is primarily due to fluctuations in foreign demand and to the effects of global economic conditions.

ILO (2009) comments that reforms can take time, which means that they may not be reflected immediately. Besides, the rankings are competitive, so that if neighbours also make changes, the relative rankings may stay the same, even though all of them have improved their business climates. Finally, reformers should not expect that better scores will immediately attract foreign investment, but should instead understand that a better business climate leads to better domestic investment and prosperity, both key elements for eventually attracting foreign business interest.

Kovačič (2005) notes that countries, which are not among the most innovative ones, often reach economic development by absorption of new technologies from others. However, if a country does not create a good business environment for companies, it will not reach a higher level of development.

Leichter et al. (2010) argue that increased economic and financial integration at the global and regional levels, combined with the large and rising presence of firms from dynamic emerging and developing economies, has augmented pressure on market participants to strengthen competitiveness in both domestic and export markets. To increase a country's competitiveness, policy makers must pursue structural reforms, which boost productivity, increase flexibility in product and labour markets and facilitate firms' adjustment to the new global environment.

Kalimeris (2012) states that there exist several levels of causality in some of the most important macroeconomic variables that the WEF selects to construct its competitiveness index. Porter's Diamond framework does not refer to trade among countries, but is rather a more general analysis of country-specific sources of advantage that enhance the international competitive advantage of firms. Nevertheless, as countries become more open to international trade, they are able to attain higher competitiveness levels, which are reflected in stronger and more sound indices (see Kharlamova and Vertelieva 2013).

Alternatively, Nurbel (2007) offers a definition of ex *ante competitiveness* as driven by the evolution of real exchange rates, while ex *post competitiveness* depends on the state of the current account balance. Finally, Porter et al. (2000) deal with government policies and institutions that promote long-term growth. "National competitiveness" corresponds to the relative quality of a country's economic structures and government institutions for economic growth within the structure of the global economy.

Overall, the above evidence provides a motivation for the present paper, which attests to the important role of NPCFs, as approximated with a selection of institutional quality indicators, regarding the 19 euro area member countries as a whole and Greece.

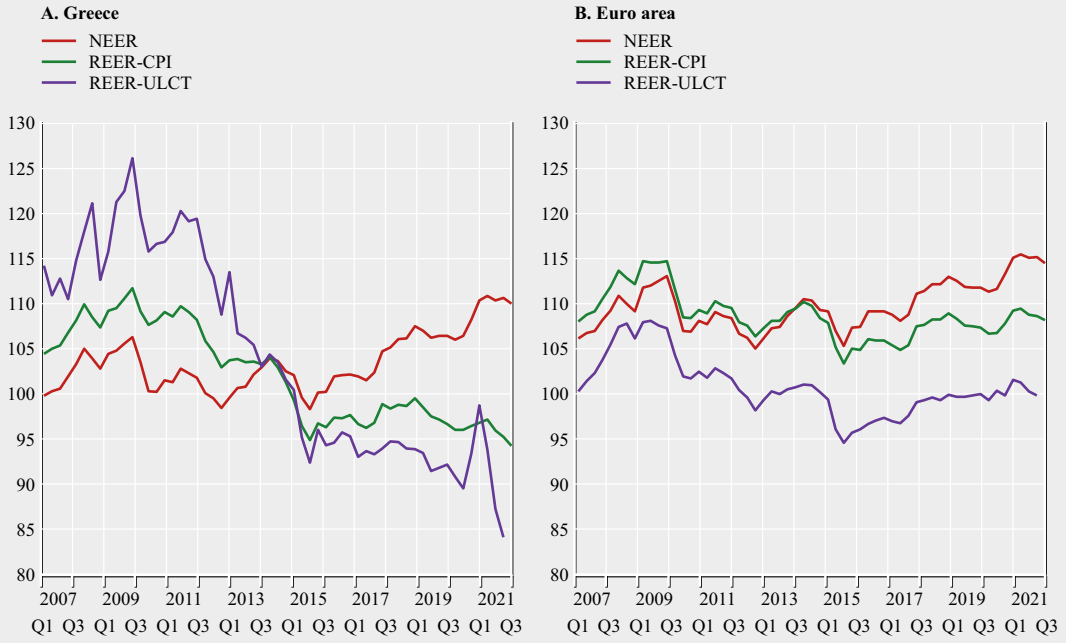
3 INDICES OF PRICE AND NON-PRICE COMPETITIVENESS

3.1 PRICE COMPETITIVENESS INDICATORS: EURO AREA AVERAGE AND GREECE

Price competitiveness is affected by the positive or negative gap between Greek and euro area relative prices, consumer prices and unit labour costs, as well as by the evolution of

Chart 1 Price competitiveness in Greece and the euro area (2007Q1-2021Q3)

(indices 1999Q1 = 100)



Source: ECB, Statistical Data Warehouse (SDW).
Note: NEER: nominal effective exchange rate; REER-CPI: real effective exchange rate deflated by the consumer price index; REER-ULCT: real effective exchange rate deflated by unit labour costs for the total economy.

nominal effective exchange rates. In nominal terms, Greece's price competitiveness worsened to a larger extent compared with the euro area as a whole, limiting competitiveness gains. In addition, the appreciation of the euro affected negatively all euro area countries. However, because of the country's efforts to cope with the economic crisis, price competitiveness in terms of relative prices and unit labour costs improved more for Greece. The effect of the measures to address the socio-economic consequences of the COVID-19 pandemic has not changed the relationship described above (see Chart 1). The positive inflation differential between Greece and euro area countries, which stand as its main trading partners, resulted in competitiveness gains for Greece. Recent developments in price competitiveness in Greece show that price competitiveness based on both the consumer price index (CPI) and unit labour costs has improved. Greece's price competitiveness, whether improving or deteriorating, lies below the euro area average. Factors like energy prices affect differently euro area economies depending on their production model.

3.2 NON-PRICE COMPETITIVENESS INDICATORS: EURO AREA AVERAGE AND GREECE

During the 2007-19 period, the competitiveness of the Greek economy in terms of relative prices and unit labour costs improved because of the policies implemented to address the debt crisis. As a result of this improvement, the country's openness was boosted. However, in terms of structural competitiveness, despite the improvement observed in some indicators, Greece still appears to lag behind the euro area average.

When deciding on which country to invest in, prospective investors, in addition to competitiveness factors in terms of relative prices and

Table 1 Selected structural competitiveness indicators and sources of origin

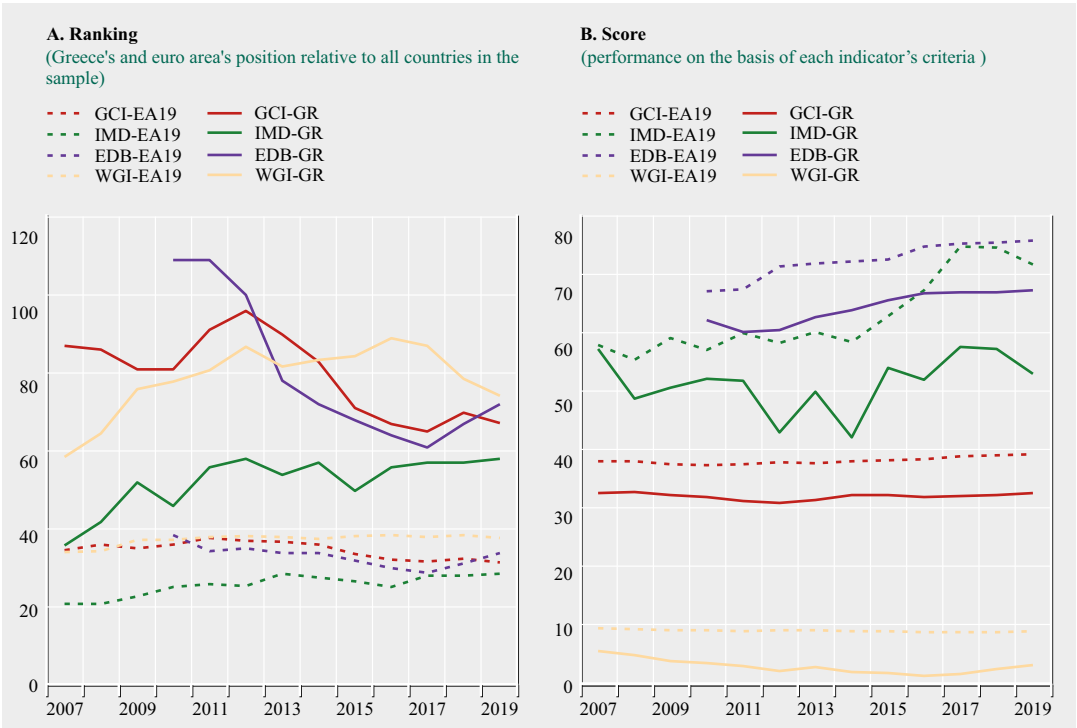
Indicator	Description	Greece's latest developments	Sources
Global Competitiveness Index (WEF-GCI)	Organised in 12 pillars: institutions; infrastructure; ICT adoption; macroeconomic stability; health; skills; product market; labour market; financial system; market size; business dynamism; and innovation capacity.	Although Greece's assessment improved in the latest report for 2019 by 0.5 basis point, it ranked 59th among 141 countries, i.e. two places lower than in the previous report. The best-performing pillars for Greece include health (23rd) and infrastructure (37th), while the most vulnerable ones are still the financial system (115th), due to limited financing to small and medium-sized enterprises (SMEs) and the situation regarding bank stability and non-performing loans, and the labour market (111th), due to high taxation and reduced flexibility in wage formation (25.9.2020).	World Economic Forum (WEF)
World Competitiveness Ranking (IMD-WCR)	Consists of four sub-indices: economic performance; government efficiency; business efficiency; and infrastructure.	Improvement was recorded in two sub-indices, whereas two sub-indices have remained stable, with progress being more pronounced in business efficiency (up to 44th place from 51st) and economic performance (up to 52nd place from 55th). The main challenges for Greece now include: introducing special measures to mitigate the social and economic impact of the COVID-19 pandemic; expanding the national production base by promoting industrial investments; easing access to funding for private enterprises; introducing special programmes for the transformation of local industrial sectors towards industry 4.0; and accelerating the digital transformation of the public sector (17.6.2021).	International Institute for Management Development (IMD)
Ease of Doing Business index (WB-EDB)	Consists of ten pillars: starting a business; dealing with construction permits; getting electricity; registering property; getting credit; protecting minority investors; paying taxes; trading across borders; enforcing contracts; and resolving insolvency.	According to the latest report (2019), Greece's position deteriorated and the country now ranks 79th, from 72nd in 2018. Improvement was recorded in starting a business (WB-SB), protecting minority investors and registering in a business register, while getting credit and enforcing contracts worsened. The procedure of starting a business (11th) and protecting minority investors (37th) improved, as the time to register a company with commercial registry was reduced and the requirement to obtain a tax clearance was removed. Greece ranked lower in 2019 in the "getting credit sub-index" (119th) and in enforcing contracts (146th) (24.10.2019).	World Bank
Worldwide Governance Indicators (WB-WGI)	Comprising six distinct indicators: voice and accountability; political stability and absence of violence/terrorism; government effectiveness; regulatory quality; rule of law; and control of corruption.	There is no composite indicator and Greece improved its average ranking by one position. Specifically, improvement occurred in the subcomponents of Government Effectiveness (65th from 70th), Rule of Law (78th from 83rd) and Control of Corruption (87th from 92nd), while the indicator of Political Stability and Absence of Violence/Terrorism deteriorated (104th from 91st). It is noted that the Worldwide Governance Indicators (WGI) are a research dataset summarising the views on the quality of governance provided by a large number of enterprises, citizen and expert survey respondents in industrial and developing countries. These data are gathered from a number of survey institutes, think tanks, non-governmental organisations, international organisations and private sector firms. The WGI do not reflect the official views of the World Bank, its Executive Directors, or the countries they represent. The WGI are not used by the World Bank Group to allocate resources (25.9.2021).	World Bank
Heritage Index of Economic Freedom	The Index of Economic Freedom evaluates the extent and effectiveness of government activity in 12 areas known to have a significant impact on levels of economic growth and prosperity: property rights; judicial effectiveness; government integrity; tax burden; government spending; fiscal health; business freedom; labour freedom; monetary freedom; trade freedom; investment freedom; and financial freedom.	Greece ranked 100th among 180 countries, up by 6 positions, mainly due to the improvement in government integrity (12.11.2020).	Heritage Foundation
Fraser Economic Freedom	It is a composite index consisting of five major areas in which government policies are assessed: size of government and taxation; legal system and security of property rights; sound money; freedom to trade internationally; business, labour and capital markets regulation.	Greece improved its ranking due to advances in the area of size of government (government investment component), despite a small deterioration in the area of business regulation. The report examines the developments of 2019 (14.9.2021).	Fraser Institute
Corruption Perceptions Index (CPI)	It is a composite index looking at corruption in the public sector: bribery; diversion of public funds; private use of public office; nepotism in public administration; and influence of interest groups on the functioning of the state.	Greece ranked 59th among 180 countries in 2020, higher than in the previous year's report. However, since 2012 it has recorded the highest cumulative progression (by 14 places). Countries performing well in this index invest more in health services and are less likely to breach democratic rules (28.1.2021).	Transparency International
Legatum Prosperity Index	It is a composite index, consisting of twelve pillars: safety and security; personal freedom; governance; social capital; investment environment; enterprise conditions; market access and infrastructure; economic quality; living conditions; health; education; and natural environment.	Greece's position was upgraded by one place (from 42nd to 41st) according to the latest data for 2020.	Legatum Institute

unit labour costs, also consider qualitative factors that could hinder or facilitate the realisation and efficiency of their investment. Such factors include, *inter alia*, the effective functioning of institutions and justice, economic freedom, market flexibility and corporate taxation. Structural competitiveness indicators reflect a country's current situation, as affected by these factors, and the scope for reforms. They also capture both the relative ranking and the absolute score of each country. The relative ranking refers to a country's performance relative to other countries, while the absolute score indicates whether a country's score is moving upwards or downwards. Moreover, as data collection for the compilation of the indicators is mainly based on business surveys, these indicators are affected by changes in the overall macroeconomic conditions. The structural competitiveness of the Greek economy, although still comparatively low vis-à-vis the European and international levels, is improving in some areas, such as reducing business costs in terms of taxation and employer contributions or increasing the efficiency of the public sector. For the purposes of this article, the indicators presented in Table 1 were selected based on the extent and frequency of their use in decision-making, as well as on data availability.

3.3 COMPARISON WITH THE EURO AREA AVERAGE

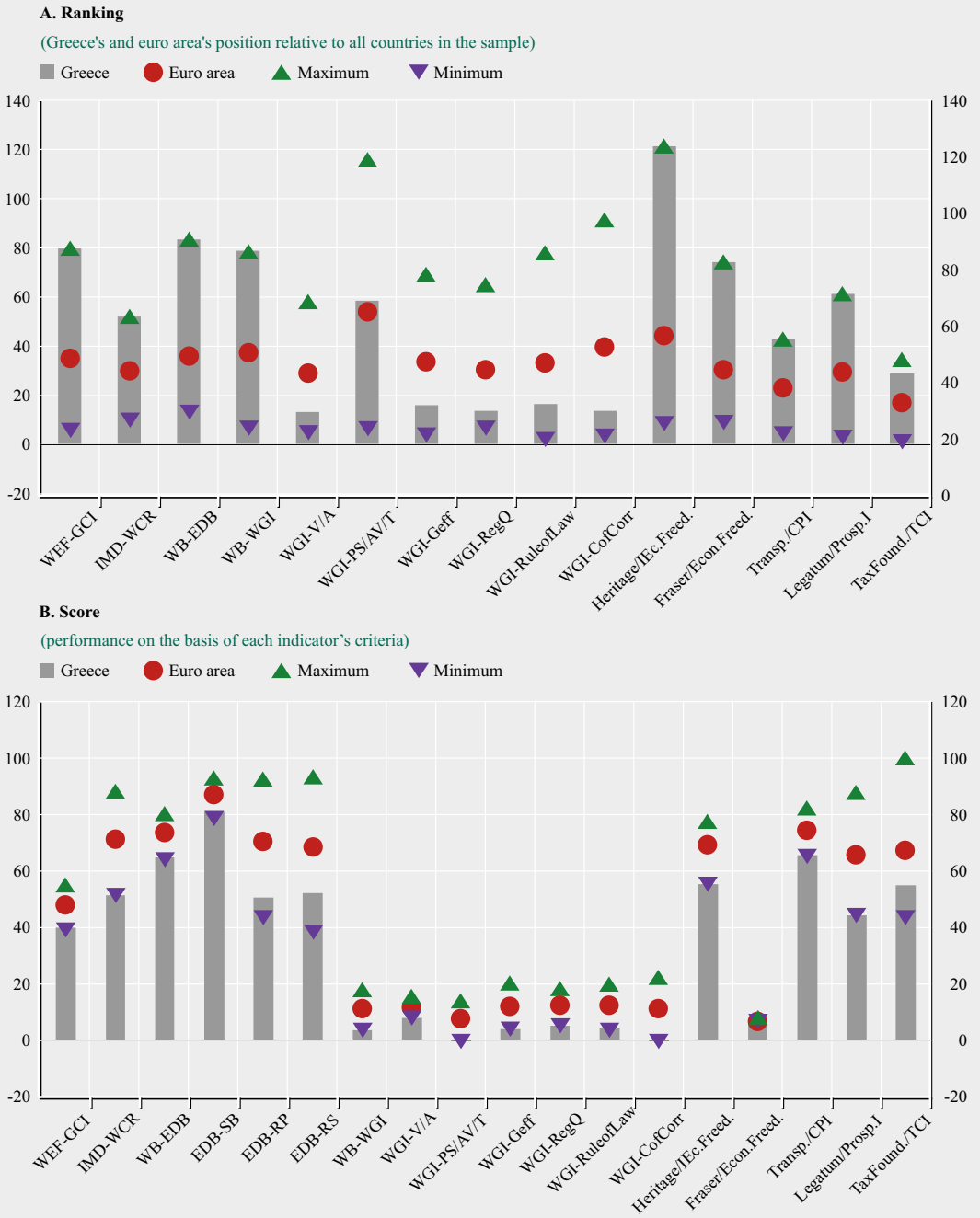
Over time, Greece has lagged behind in key structural competitiveness indicators relative to other euro area countries, with a lower (higher) value corresponding to a better (worse) ranking (see Chart 2A). Indeed, while

Chart 2 Evolution of key structural competitiveness indicators for Greece and the euro area average based on their rankings and scores (2007-2019)



Sources: GCI: World Economic Forum, *Global Competitiveness Report*. IMD: International Institute for Management Development, *IMD World Competitiveness Yearbook*. EDB: World Bank-IFC, *Doing Business*. WGI: World Bank, Worldwide Governance Indicators.
Note: GR: Greece; EA19: euro area - 19 countries.

Chart 3 Greece's position in key structural competitiveness indicators based on rankings and scores relative to the euro area average and the distance from the top- or bottom-ranking country (2007-2019 average)



Sources: WEF-GCI: World Economic Forum, *Global Competitiveness Report*. IMD-WCR: International Institute for Management Development, *IMD World Competitiveness Yearbook*. WB-EDB: World Bank-IFC, *Doing Business*. WB-WGI and all WGIs: World Bank, Worldwide Governance Indicators. Heritage/IEc.Freed.: Heritage Foundation, Index of Economic Freedom. Transp./CPI: Transparency International, Corruption Perceptions Index. Fraser/Econ.Freed.: Fraser Institute, Economic Freedom of the World. TaxFound./TCI: Tax Foundation, International Tax Competitiveness Index. Legatum/Prosp.I: Legatum Institute, Legatum Prosperity Index.
Note: WGI-V/A: voice and accountability, WGI-PS/AV/T: political stability and absence of violence/terrorism, WGI/Geff: government effectiveness, WGI-RegQ: regulatory quality, WGI-RuleofLaw: rule of law, WGI-CofCorr: control of corruption.

the indicators for euro area countries do not fluctuate sharply on average, they deteriorated substantially for Greece during the crisis to recover gradually thereafter. As expected, euro area countries score higher than Greece, with a higher (lower) value pointing to a better (worse) score (see Chart 2B). Chart 3 illustrates Greece's position in key structural competitiveness indicators based on its ranking and score in relation to the euro area average, as well as its distance from the country with the highest or the lowest score. With the exception of governance indicators, Greece's ranking is lower than the euro area average, while in several indicators the country ranks among the last in the euro area, despite the progress made in recent years. The difference between ranking and scoring shows the faster pace of implementation of reforms in other euro area countries.

4 EMPIRICAL ESTIMATION OF EXPORT DEMAND: EURO AREA AND GREECE

The purpose of the empirical analysis that follows is to estimate the main determinants of exports for the euro area and Greece, emphasising the role of institutional quality factors. In order to explore this link, eight panel regressions are estimated (as many as the institutional quality indicators examined). The sensitivity of the results to the choice of a specific index provides a robustness check. In addition, besides revealing common patterns across the 19 member countries regarding export demand and its determinants, the estimates specifically for Greece are reported providing information about the country's position.

4.1 DATA, EMPIRICAL SPECIFICATION AND METHODOLOGY

Our dataset is built using national accounts data (ESA 2010) on the volume of exports (chain-linked volumes: real exports of goods and services at constant 2015 prices) of the 19 euro area member countries. The sample period covers approximately the past decade from 2007 to 2019 and data are of annual frequency. World demand indicators for goods and services for each of the countries are drawn from ECB sources and are used to account for foreign demand (converted from quarterly to annual frequency). Price competitiveness is approximated with the ECB's CPI-deflated real effective exchange rate index for each of the 19 euro area countries.

The impact of institutional quality is measured using the following extensive selection of indicators, which is more informative compared with related recent studies:

- the Global Competitiveness Index (GCI) of the World Economic Forum (WEF), which ranges from 1 to 7;
- the World Competitiveness Ranking (WCR) of the International Institute for Management Development (IMD);
- the World Bank's Ease of Doing Business and Starting a Business indices (WB-EDB, WB-SB);
- the World Bank's Worldwide Governance Indicators (WGI);
- the Index of Economic Freedom of the Heritage Foundation (HERITAGE);
- the Economic Freedom indicator of the Fraser Institute (FRASER);
- the Corruption Perceptions Index (CPI) of Transparency International; and
- the Legatum Prosperity Index by the Legatum Institute[5] (LEGATUM).

The specification adopts the traditional Goldstein and Khan (1985) export demand model, with real exports measured by the export volumes of country i during time t, (x_{it}), as a

5 The definition contained in Table 1 describes the qualitative factors defining prosperity, which include structural competitiveness indicators.

dependent variable explained by foreign demand (y_{it}^{w}), approximating world demand of the countries in the relevant markets,[6] and the corresponding real effective exchange rate ($reer_{it}$). The equation is augmented to include a variable corresponding to each of the above described nine types of institutional quality indicators (I_{it}). Following the literature, a logarithmic functional form is adopted so that the coefficients derived from the estimation are elasticities. Specifically, the augmented export equation takes the following form, with lower case letters corresponding to natural logarithms:

$$x_{it}=a_{it}+\beta_1 y_{it}^{w}+ \beta_2 reer_{it}+\beta_3 I_{it}+\varepsilon_{it} \qquad (1)$$

The estimation method uses panel regressions, combining time series and cross-sectional data, allowing for fixed effects for each country. Using country dummies enables controlling for heterogeneity across countries, thus eliminating common shocks.

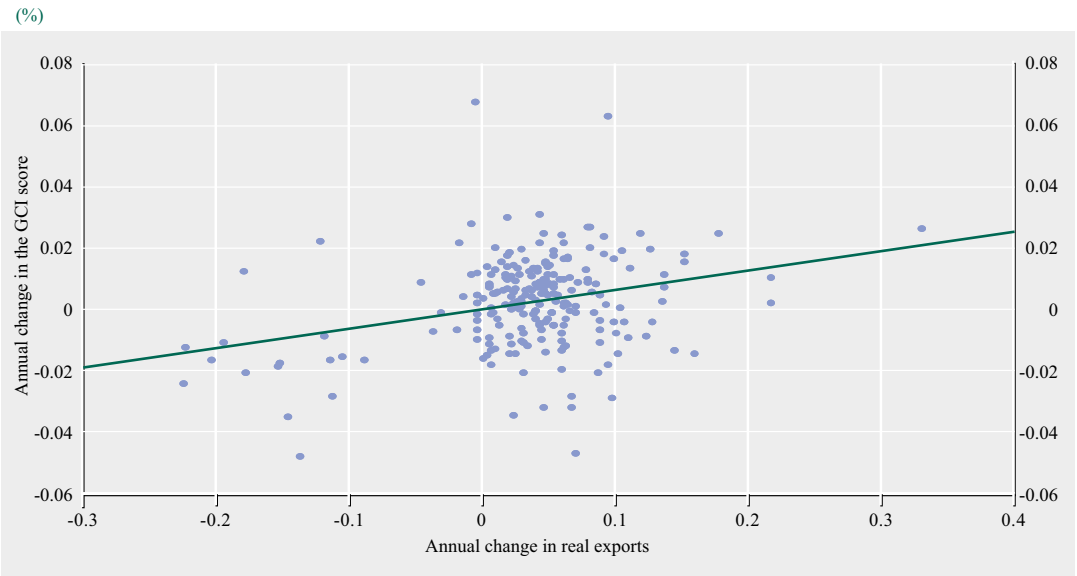
4.2 PANEL ESTIMATION RESULTS

To improve our intuition of the export performance-institutional quality relationship, we first provide a scatter plot (see Chart 4), where the ability of the countries included in the sample to exploit advantages in institutional quality improving export performance can be visualised over the sample period. The WEF's GCI is chosen among the indicators and the chart shows its positive correlation with exports.

Based on the empirical specification, which was determined using the theoretical developments discussed in Section 2 and applying panel OLS to equation (1), we explore the determinants of real exports in the euro area and Greece, paying attention to the institutional factors' effects. Our pooled OLS estimates are presented in Tables 2 and 3. Table 2 uses the indicators measured as scores, while Table 2 uses the same indicators measured as rankings. The Root Mean Square (RMS) at the bottom of the tables measures the efficiency of the empirical estimation. Overall, RMS is rather close to zero, indicating the good performance of the estimated model. The coefficients referring to

6 According to ECB calculations, where world demand is a geometric average of the import volumes of goods and services of a country's major trading partners (the superscript *w* is used to denote world demand).

Chart 4 Institutional efficiency and real exports of euro area countries (2007-2019)



Sources: World Economic Forum, Global Competitiveness Index, and Eurostat.

Table 2 Panel estimation of the export equation adding institutional quality indicators' scores for the euro area and Greece (2007-2019)

(institutional quality indicators calculated as scores)

Dependent variable	Export volume							
	(01)	(02)	(03)	(04)	(05)	(06)	(07)	(08)
Constant	11.260 (20.044)	10.658 (24.41)	11.33 (15.91)	13.651 (21.40)	1.777 (2.956)	9.244 (9.848)	6.074 (5.876)	0.444 (2.321)
y^w_{it}	0.447 (2.381)	1.018 (18.06)	0.824 (6.102)	0.595 (3.866)	0.907 (7.174)	1.230 (17.52)	1.021 (43.14)	0.644 (10.947)
$reer_{it}$	-0.340 (-4.629)	-0.204 (-1.888)	-0.222 (-1.725)	-0.383 (-4.259)	-0.310 (-2.311)	-0.378 (-3.720)	-0.168 (-4.033)	-0.091 (-2.190)
GCI	0.729 [1.451] (3.640, 3.709)	-	-	-	-	-	-	-
WCR	-	0.174 [0.176] (3.131, 2.864)	-	-	-	-	-	-
WGI	-	-	0.167 [0.154] (3.662, 2.991)	-	-	-	-	-
SB	-	-	-	-0.283 [-0.270] (-3.007, -2.777)	-	-	-	-
HERITAGE	-	-	-	-	0.744 [1.035] (2.723, 5.222)	-	-	-
FRASER	-	-	-	-	-	1.139 [1.001] (2.898, 11.039)	-	-
LEGATUM	-	-	-	-	-	-	1.119 [1.284] (4.319, 18.305)	-
CPI	-	-	-	-	-	-	-	0.145 (5.251)
Number of observations	171	130	247	145	188	238	209	247
Trend correction	AR(4) trend squared	AR(5)	AR(5)	AR(5) and linear trend	-	AR(4)	AR(2)	AR(1)
RMS	0.049	0.046	0.072	0.034	0.033	0.046	0.047	0.031

Note: In equation (04) the coefficient of the SB index is negative, which results from the way the indicator is calculated measuring the distance of a country's performance from the best performing country. Country fixed effects were included in the estimation. Time effects were not included. Correction for autocorrelation and trend were used instead, as indicated in each case. T-statistics are in parentheses calculated using heteroscedasticity robust standard errors. The coefficients of the institutional quality indicators regarding Greece are in brackets and are estimated as the coefficient of the interaction term of Greece's fixed effect with the corresponding institutional quality indicator.

the standard variables of foreign demand and price competitiveness have the correct signs (positive and negative, respectively) and are significant, suggesting the importance of these factors in export determination.

Beyond these effects, the high significance of the coefficients of the institutional variables in estimations (1)-(8) and (1)-(7) in Tables 2 and 3, respectively, attests to the importance of institutional factors in explaining export behaviour in the euro area.[7] The same is confirmed for the respective coefficients referring to Greece. More explicitly, the estimates show that beyond the usual factors an improvement in the countries' rankings according to composite institutional quality indicators exerts a favourable effect on exports.

The effect is found to be inelastic for the euro area as a whole, as the value of most of the estimated coefficients is below one, except for two cases (i.e. when LEGATUM and FRASER are considered as scoring indicators). A given percentage improvement, i.e. an average 1%

7 In addition, advancement in institutional quality may have an impact on attracting foreign investors, with additional effects on export performance and economic growth.

Table 3 Panel estimation of the export equation adding institutional quality indicators' rankings for the euro area and Greece (2007-2019)

(institutional quality indicators calculated as rankings)

Dependent variable	Export volume						
	(01)	(02)	(03)	(04)	(05)	(06)	(07)
Constant	12.61 (18.13)	11.81 (29.95)	11.09 (58.31)	11.72 (10.802)	12.69 (16.807)	12.107 (22.99)	12.60 (29.17)
y_{it}^{w}	1.326 (20.046)	1.177 (15.514)	0.883 (14.034)	1.317 (21.09)	1.295 (19.191)	0.770 (8.836)	0.587 (3.840)
$reer_{it}$	-0.591 (-3.953)	-0.293 (-3.301)	-0.163 (-8.253)	-0.476 (-2.176)	-0.573 (-3.658)	-0.345 (-3.512)	-0.385 (-4.942)
GCI	-0.058 [-0.183] (-2.104, -2.384)	-	-	-	-	-	-
WCR	-	-0.071 [-0.438] (-2.805, 2.788)	-	-	-	-	-
WGI	-	-	-0.046 [-0.439] (-2.286, -8.178)	-	-	-	-
EDB	-	-	-	0.085 [0.103] (2.815, 7.389)	-	-	-
HERITAGE	-	-	-	-	-0.088 [-0.330] (-2.854, -2.941)	-	-
FRASER	-	-	-	-	-	-0.050 [-0.266] (-3.157, -2.307)	-
LEGATUM	-	-	-	-	-	-	-0.064 [-0.275] (-1.918, -2.331)
Number of observations	171	218	209	144	133	190	171
Trend correction	AR(4)	AR(4)	AR(2) and linear trend	AR(1) and linear trend	AR(2)	AR(2) and linear trend squared	AR(4) and linear trend squared
RMS	0.056	0.046	0.044	0.065	0.051	0.046	0.049

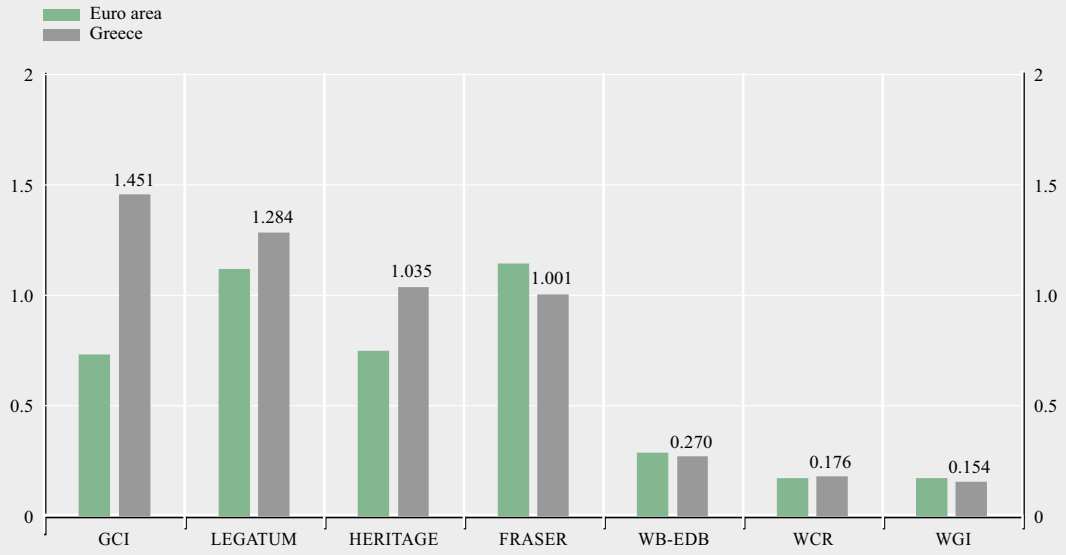
Note: In equation (04) the coefficient of the EDB index is positive, which results from the way the indicator is calculated measuring the distance of a country's performance from the best performing country. Country fixed effects were included in the estimation. Time effects were not included. Correction for autocorrelation and trend were used instead, as indicated in each case. T-statistics are in parentheses calculated using heteroscedasticity robust standard errors. The coefficients of the institutional quality indicators regarding Greece are in brackets and are estimated as the coefficient of the interaction term of Greece's fixed effect with the corresponding institutional quality indicator.

improvement, in the scoring or ranking indicators examined for all 19 euro area countries over the reviewed period leads, with a few exceptions, to less percentage strengthening of exports, i.e. to a 0.6% increase in exports when the indicator represents scores and to a 0.07% increase in exports when the indicator denotes rankings. With regard to Greece, the indicators' effect as score is above unity in four cases (GCI, LEGATUM, HERITAGE and FRASER) and the indicators' effect as ranking is below unity in all cases. Specifically, over the sample period and across the eight indicators, the average impact on exports from a 1% improvement in institutional quality is almost 1% when scores are used and 0.4% when rankings are used.[8] The above estimated greater sensitivity of Greek exports than that of euro area exports, on average, can be interpreted by improvements in Greece's weaker position during that period, compared with most euro area countries, regarding the attainment of good levels of institutional quality that intensified towards the past few years of recovery. Turning to these indicators, most of the euro area countries had already achieved

8 This entails that improvements in the factors measured by the structural competitiveness indicators, thereby reflecting improvements in the business environment and the functioning of institutions, are important for Greece's openness and trade performance.

Chart 5 Effect of selected structural competitiveness indicators' scores on the export volumes of the euro area and Greece

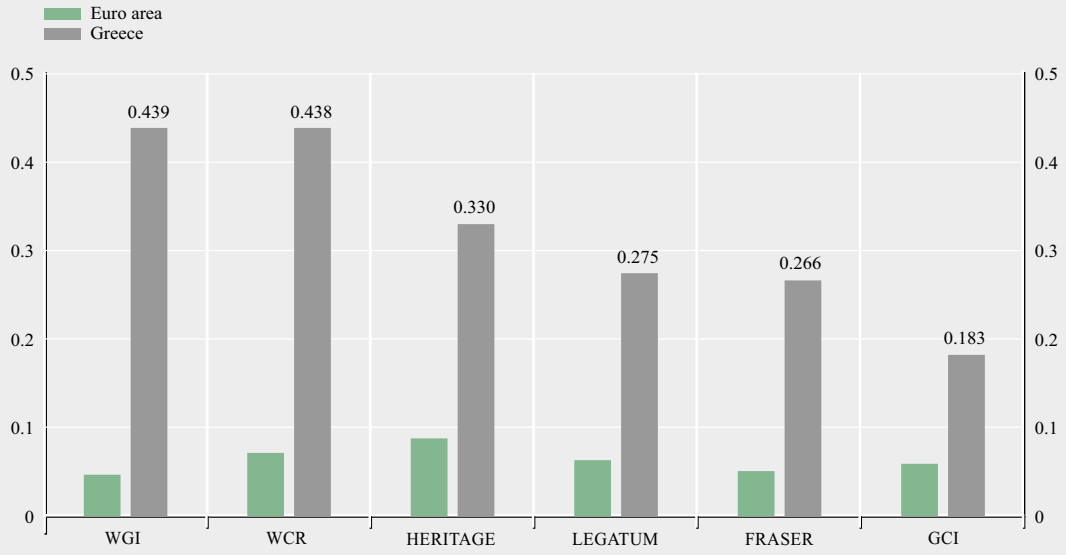
(separate panel regressions)



Sources: GCI: World Economic Forum, *Global Competitiveness Report*. LEGATUM: Legatum Institute, Legatum Prosperity Index. HERITAGE: Heritage Foundation, Index of Economic Freedom. FRASER: Fraser Institute, Economic Freedom of the World. WB-EDB: World Bank-IFC, *Doing Business*. WCR: International Institute for Management Development (IMD), *IMD World Competitiveness Yearbook*. WGI: World Bank, Worldwide Governance Indicators.

Chart 6 Effect of selected structural competitiveness indicators' rankings on the export volumes of the euro area and Greece (2007-2019)

(separate panel regressions)



Sources: WGI: World Bank, Worldwide Governance Indicators. WCR: International Institute for Management Development (IMD), *IMD World Competitiveness Yearbook*. HERITAGE: Heritage Foundation, Index of Economic Freedom. LEGATUM: Legatum Institute, Legatum Prosperity Index. FRASER: Fraser Institute, Economic Freedom of the World. GCI: World Economic Forum, *Global Competitiveness Report*.

higher levels of performance following a more stable path. This also explains the finding of smaller coefficients of the ranking indicators referring to the euro area, compared with those referring to Greece. Generally, according to the above results, the countries in the sample exploit improvements in structural competitiveness to promote growth and openness. This is more pronounced in the case of Greece, confirming the positive contribution of reforms to export performance and growth.

Chart 5 depicts and classifies the eight estimated coefficients of structural competitiveness indicators based on scores and Chart 6 illustrates the corresponding indicators based on rankings for the euro area and for Greece.[9] The separate estimation using each of the indicators identifies, when scores are used, the elements of competitiveness included in the GCI, LEGATUM, HERITAGE and FRASER indicators as the most important in export performance for both the euro area and Greece in particular.

The effects of the indicators based on rankings regarding Greece are of similar size, but significantly higher than those that correspond to the euro area. This result mirrors differences in the speed of implementation of reforms between euro area countries and Greece. Furthermore, the importance of these effects is consistent with improvements in Greece's rankings that are observed over the recent years of the sample. For example, during 2018-19 the GCI records improvements in the pillars regarding health and infrastructure, the composite LEGATUM index is upgraded by one place, while the HERITAGE index is up by six positions. Improvements in WCR and WGI are also recorded in 2020, a year that is not included in our sample.

5 CONCLUSIONS – POLICY RECOMMENDATIONS

This paper, after describing the evolution of selected institutional indicators of structural competitiveness and comparing Greece's average development with that of the euro area, investigates their role in determining exports for the euro area and Greece. The structural competitiveness of the Greek economy, although still low, has improved. However, the pace of implementation of reforms falls short of that of other euro area countries, so that any improvement does not allow Greece to move up vis-à-vis its competitors. During the crisis, Greece's comparative position declined in many international rankings and showed some improvement in the following years. Many of the difficulties that hamper business and investment decisions remain after the crisis, mainly concerning taxation, non-wage labour costs, energy costs, financing costs and the institutional framework.

A review of the recent literature stresses the importance of institutional quality indicators and their effect on export performance, along with alternative approaches to defining structural competitiveness. After estimating a traditional export demand function, augmented to include the selected institutional quality indicators, we describe the results that support the hypothesis of the significant role of non-price competitiveness and comment on their statistical significance. It is shown that exports respond to the key composite structural competitiveness indicators for the euro area as a whole. For Greece in particular, the corresponding export dependency is higher. The recent improvement in the country's competitive position is linked to and positively affects exports, leading to increased openness of the economy.

The relevant policy recommendation refers to the proper use of the available EU funds through Next Generation EU, which is an important opportunity that should not be left

9 When using scores, the coefficient of the indicator is positive (higher score denotes more exports), while, when using rankings, the coefficient is negative (farther from the top/lower ranking implies less exports). Exceptions include the indicators of ease of doing business (WB-EDB, used in Table 3) and starting a business (WB-SB, used in Table 2), where the score is defined as the distance from the best score. Thus, a higher score value shows a deterioration in the quality of the entrepreneurial environment. In this case, the coefficient of the score (ranking) index is expected to be negative (positive) in contrast with the coefficients of the rest of the institutional quality indicators used in this study.

untapped. The use of these funds, as announced and approved by the European Commission, will be directed to the implementation of reforms. These reforms are closely related to non-price competitiveness and, to a smaller extent, also possibly to a price competitiveness improvement, while their implementation will lead to increasing Greece's score in the evaluation of structural competitiveness indicators. The pace of reforms already under way should be accelerated and this will be mirrored in the country's structural competitiveness indicators and expressed as better scores and higher rankings converging towards the performance of the other euro area countries. In addition, competitiveness depends on participation in collaborative production networks and global value chains (GVC). This requires that firms and exporters in particular focus on activities where they have comparative advantage, each specialising in what they do best. Reform efforts targeting improvements in competitiveness and the quality of institutions will lead to the complementarity of firms across borders and promote GVC participation of institutionally sensitive firms, thereby resulting in export promotion, higher export performance and import substitution, ultimately supporting investment and economic growth in the country.

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WORKING PAPERS
(AUGUST – DECEMBER 2021)

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CONTENTS

Investigating government spending multiplier for the US economy: empirical evidence using a triple lasso approach

Working Paper No. 292
Zacharias Bragoudakis and Dimitrios Panas

An essential dilemma in economics that has yielded ambiguous answers is whether governments should spend more in recessions. This paper provides an extension of the work of Ramey and Zubairy (2018) for the US economy, according to which the government spending multipliers are below unity, especially when the economy experiences severe slack. Nonetheless, their work suffered from some limitations with respect to invertibility and a weak instrument problem.

The contribution of this paper is twofold. Firstly, it provides evidence that a triple lasso approach for the lag selection is a useful tool in removing the invertibility issues and the weak instrument problem. Secondly, the main results using a triple lasso approach suggest multipliers below unity for most cases with no evidence for differences between different states of the economy. Nevertheless, re-running the code in Ramey and Zubairy (2018), the case where WWII is excluded exhibits multipliers above unity in both the military news and the Blanchard-Perotti specifications, contradicting their baseline findings and providing evidence for a more effective government spending in recessions.

Disaggregate income and wealth effects on private consumption in Greece

Working Paper No. 293
Dimitrios Sideris and Georgia Pavlou

The aim of the present paper is to identify the main determinants of private consumption in Greece for the recent period 2003:Q1-2020:Q1. The issue is of particular interest for Greece, now that the economy is trying to return to a sustainable growth path following the pandemic episode, since private consumption constitutes the main component of Greek GDP. The study analyses the determinants of private consumption, paying particular attention to the significance of income and wealth. The major novelty of the paper with respect to the Greek literature on consumption is that different types of income are assumed to play a different role in consumers' behaviour: so, disposable income is decomposed into its labour and non-labour components. To this end, four alternative measures of labour income are computed based on quarterly non-financial accounts data of the households' sector. The results indicate that decomposing disposable income is essential for analysing private consumption. Labour income turns out to be the most important determinant of private consumption in Greece in the long and the short run. Thus, labour income should primarily be monitored and targeted by policy makers, in their policies aiming at domestic demand and GDP growth.

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