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GREECE

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June 2022

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GREECE

SELECTED ISSUES

May 24, 2022

Approved By
European Department

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CONTENTS

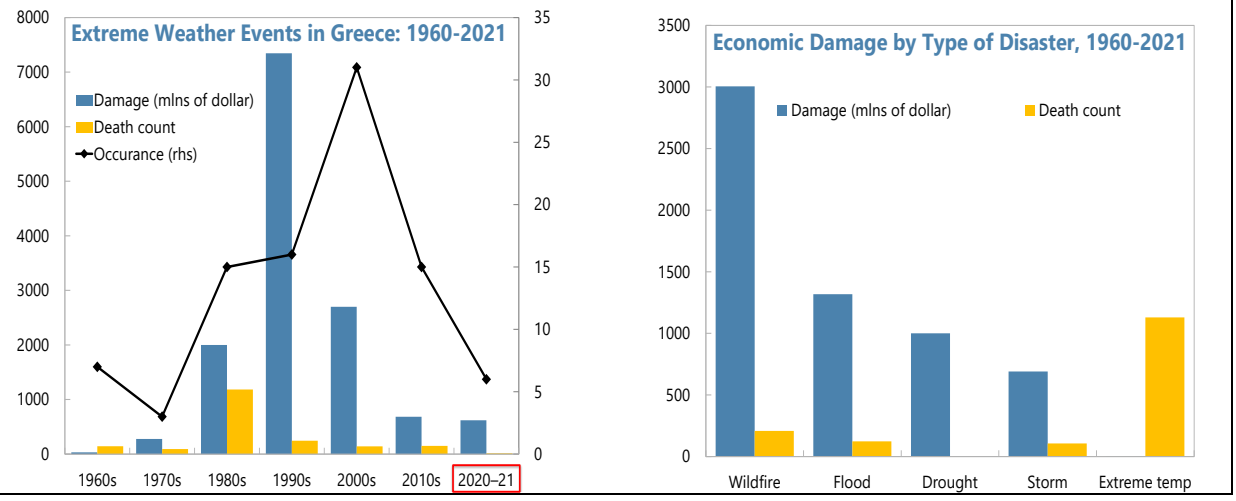
IS GREECE'S SOCIAL PROTECTION SYSTEM FIT FOR THE GREEN TRANSITION?[1]

To tackle climate change, the Greek government has adopted an ambitious policy agenda. Climate change and climate policies are expected to disproportionately affect poor households, posing challenges to the already weak social protection system. This paper assesses the state of play of social protection and examines the distributional impact of climate policies in Greece. Our analysis suggests that climate policies should be combined with social protection reforms to protect vulnerable groups during the green transition. Introducing a new carbon tax and gradually increasing it over time is recommended to finance targeted transfers and green investment while addressing social protection gaps.

A. Motivation

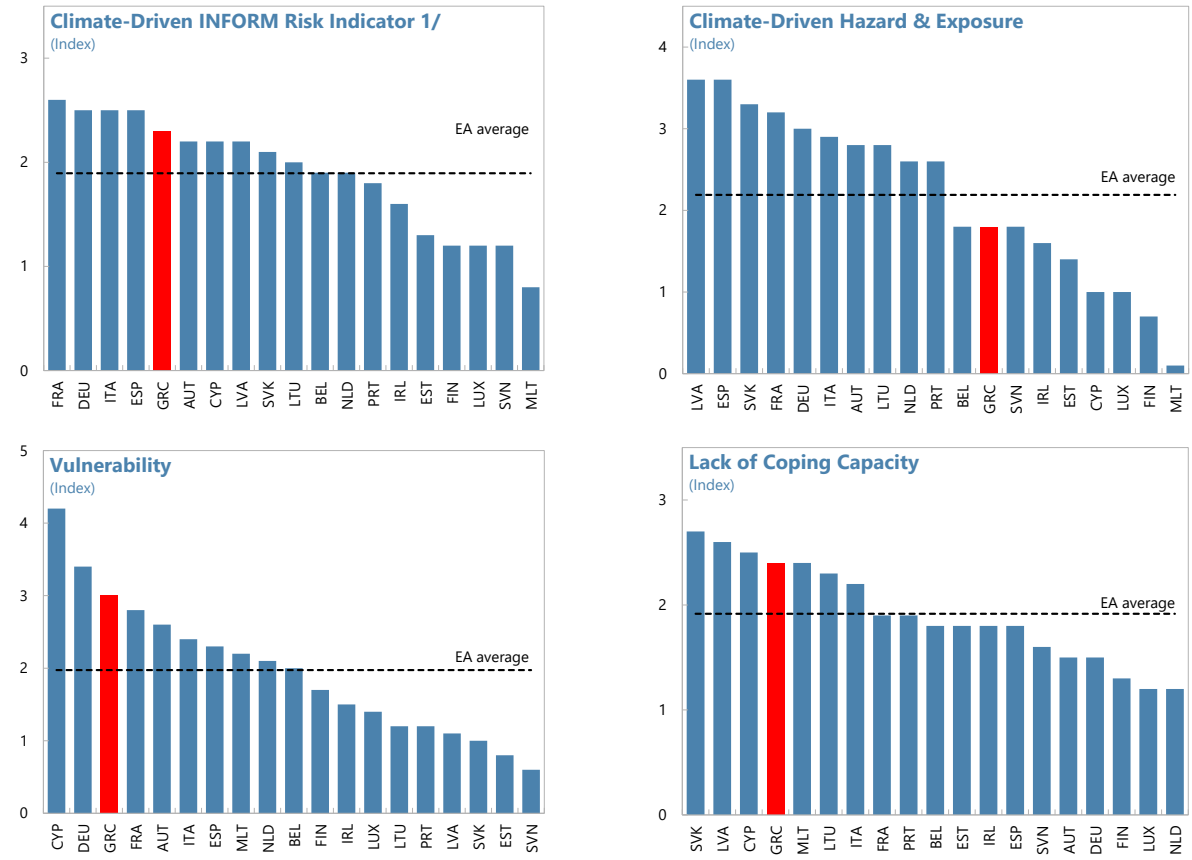
1. Greece is vulnerable to climate change (Figure 1). Extreme weather events have caused a high number of fatalities and significant economic damage in recent decades. Climate risk is higher than the eurozone average according to the IMF INFORM risk index (Figure 1), given significant physical exposures, economic and social vulnerabilities, and poor coping capacities. The cost of climate change adaptation is high, estimated at 1.5 percent of GDP annually over the period 2025–50 according to the 2016 National Climate Change Adaptation Strategy. With the third longest coastline in Europe, 80 percent of industrial activities and 90 percent of tourism infrastructure currently in coastal areas are at risk should sea levels rise. Greece's role as a shipping and tourism hub—the two industries account for about a quarter of GDP—could also be affected by climate change and climate policies.

Figure 1. Greece: Climate Risks



[1] Prepared by Shiqing Hua and Xin Cindy Xu. Victor Mylonas and Simon back provided great guidance on the CPAT tool and Daniel Murphy Pineda provided assistance. The paper benefitted from comments from the Greek authorities.

Figure 1. Greece: Climate Risks (Concluded)



Source: EM-DAT: The Emergency Events Database; IMF, Climate Change Dashboard; and IMF staff calculations.
1/ INFORM risk concept envisages three dimensions of risk: hazard & exposure, vulnerability, and lack of coping capacity. The score is calculated using 54 indicators with a multiplicative equation where each dimension is treated equally.

Figure 2. Greece: Climate Targets and Progress

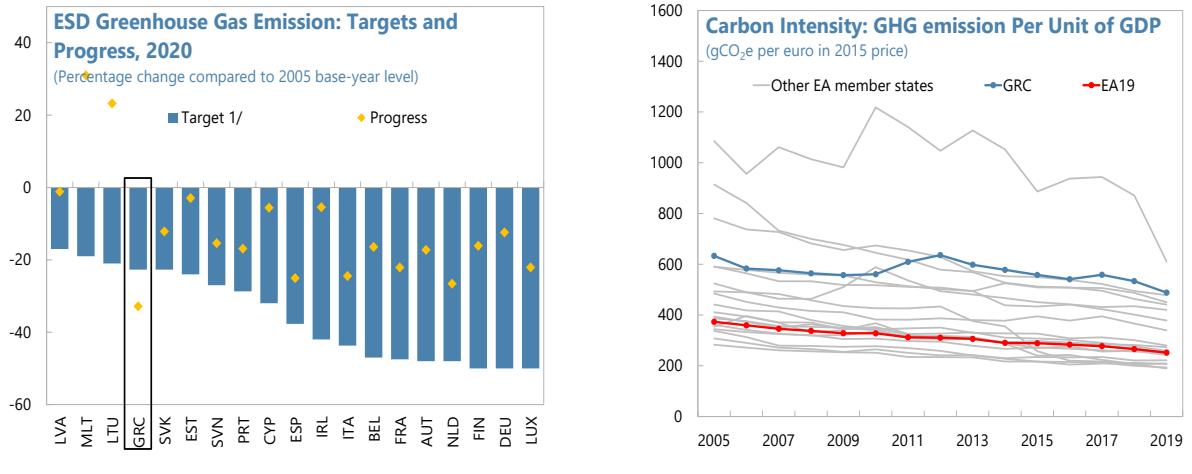
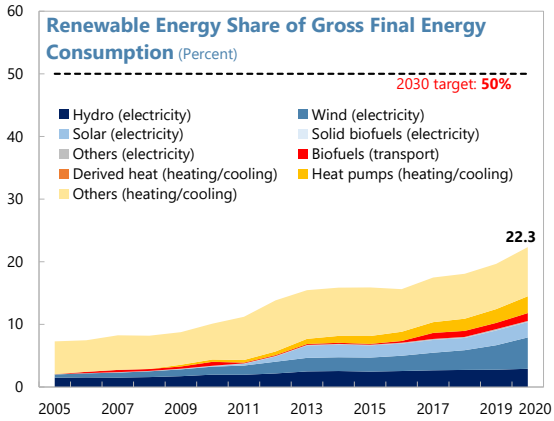


Figure 2. Greece: Climate Targets and Progress (Concluded)

Table. Climate Targets in Greece

Target year:2030	New Climate Law (in consultation)	NECP (2019)	Latest available
Total greenhouse gas emissions	55% reduction from 1990 levels	42% reduction from 1990 levels	14% reduction from 1990 levels
RES share in gross final energy consumption	50%	> 35%	19.7%
Final energy consumption	min. 50% reduction from 2007 projections	min. 38% reduction from 2007 projections	36.0%
Share of lignite in electricity generation	0 % by 2028	0 % by 2028	23.6%
Zero emissions for all new vehicles	0 By 2030	NA	NA

Sources: The Greek authorities and IMF staff calculations.



1/ Targets under the European Commission's 2021 proposal to amend the Effort Sharing Regulation (EU) 2018/842, excluding ETS sectors. These targets are currently under revisions to align with carbon-neutral by 2050.
Source: European Commission; Eurostat; Greece National Energy and Climate Plan; OECD; and IMF staff calculations.

2. The government has adopted an ambitious climate policy agenda. Greece has made progress in cutting emissions, mainly due to reductions in energy demand stemming from its economic crisis while its energy structure remains carbon intensive (Figure 2). The government has introduced a far-reaching National Energy and Climate Plan (NECP) in 2019 and an ambitious new Climate Law is currently in public consultation. Policy initiatives under the new Climate Law include phasing-out the lignite plants by 2028, zero emissions for all new vehicles by 2030, and more than doubling the share of renewables in final energy consumption (Figure 2). According to the National Energy and Climate Plan (2019), achieving these targets requires a substantial boost in green investment, estimated at € 43.8 billion (over 20 percent of 2021 GDP) during 2020-30. While the NGEU provides part of the funding, a significant financing gap remains. Policy initiatives to mobilize private green financing under the Recovery and Resilient Plan are welcome, and effective implementation will be key.

3. Climate change and climate policies have distributional impacts. It is well documented in the literature that climate change is likely to affect some communities (rural and coastal areas), sectors (tourism and agriculture) and households (low income and low skilled) more than others (OECD, 2014; IMF, 2020). Policy initiatives to mitigate climate change, including higher carbon prices and the phasing-out of lignite plants, could also have an undesirable regressive impact. In contrast, a significant boost to green investment would help lift growth with potential knock-on effects on inequality. Therefore, a comprehensive strategy is needed to achieve climate goals while also protecting vulnerable groups during the green transition.

4. The social protection system is weak. Costly pensions, the largest in the EA, has crowded out critical social assistance (hereafter refers to non-pension social spending) in Greece. The pandemic has further highlighted the importance of addressing social assistance gaps. Due to the poor social safety net, the government has relied heavily on ad hoc discretionary measures during

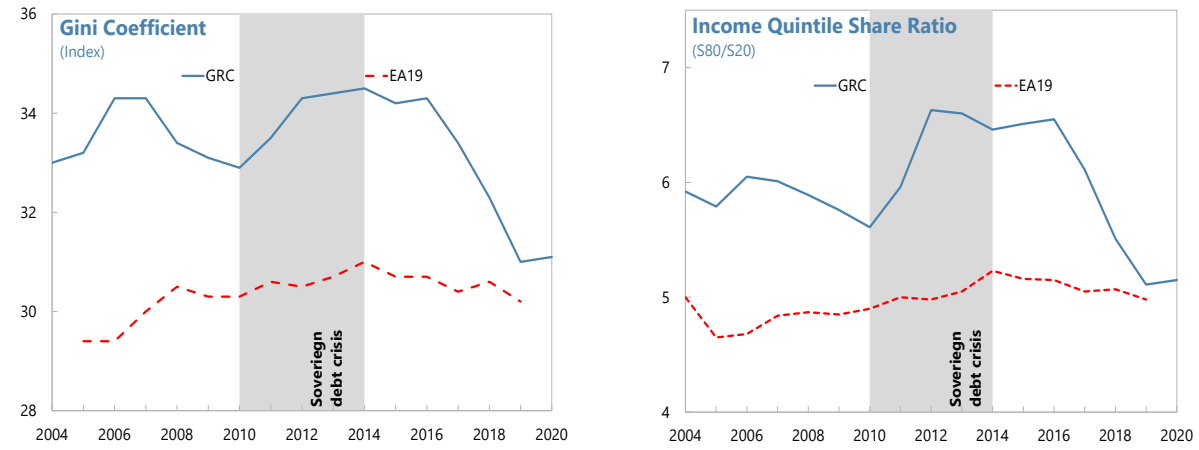
the pandemic, with the largest budgetary measures in the EA. While discretionary measures provide emergency support to firms and workers, ensuring transparency and targeting is a challenge. The government's initiative to publish Covid-19 related public procurement contracts online is a welcome step to ensure fiscal transparency. Strengthening social assistance could help form the basis for targeted support during adverse shocks.

5. This paper sheds light on crucial social protection reforms that are needed to assist the green transition. This paper aims to offer policy advice on strengthening social protection to advance the climate policy agenda. Section I takes stock of recent developments in the distribution of income; Section II assesses the state of play of social protection and identifies areas for improvements; Section III examines the distributional impact of climate policies; then Section IV concludes with policy recommendations.

B. Income Distribution: Recent Developments

6. Despite recent progress, income inequality remains higher than the eurozone average. Greece entered the sovereign debt crisis facing a significantly higher-than-average level of income inequality, as measured by both the Gini coefficient and the income quintile share ratio (S80/S20).[2] Following the surge over the crisis era, income inequality has been on a sharp declining trend since 2016 broadly converging to the euro area average, albeit interrupted by a small uptick in 2020 (based on the 2019 income data)[3] (Figure 3). The richest quintile earned over 5 times more than the poorest quintile in 2020.

Figure 3. Greece: Income Inequality vs. EA average



Source: EU-SILC; Eurostat.

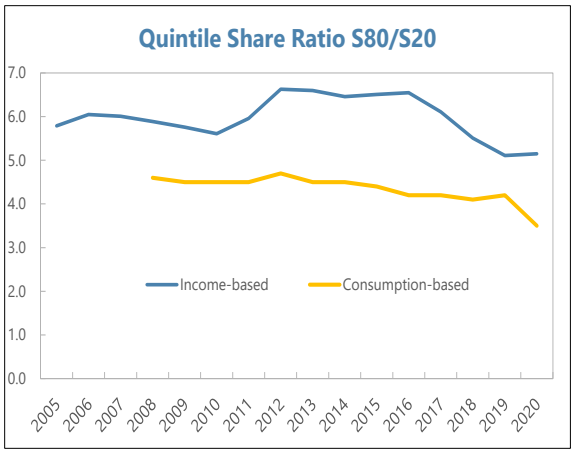
[2] The Gini coefficient measures the extent to which the distribution of income within a country deviate from a perfectly equal distribution. It ranges from 0 (perfect equality where everyone has the same income) to 100 (full inequality where one person has all the income). The income quintile share ratio is defined as the ratio of total income received by the wealthiest 20 percent of the population to that of the poorest 20 percent.

[3] The reference income data for the income survey is based on income of the previous year.

7. Preliminary data suggests a drop in consumption inequality during the pandemic. While the income survey data is lagging and faces measurement issues (notably the under-reporting of income for tax reasons), the more up-to-date Household Budget Survey data shows a significant decline in the consumption-based inequality indicator (S80/S20 ratio) in 2020.[4] This possibly reflects the impact of containment measures on consumption of contact-intensive services, notably consumption of the higher income groups was suppressed, and sizable government support measures that helped cushion private consumption, notably among the lower income groups. Moreover, disposable income increased markedly in 2021 amid a considerable decline in the unemployment rate, which could contribute to a likely further drop in inequality. However, once support measures are fully withdrawn, the full impact of the pandemic on inequality remains uncertain.

8. Sizeable income gaps persist between different socio-economic groups, most notably by educational attainments, degree of urbanization, and age.

- Greek workers with tertiary education recorded 66 percent higher median income than those with at most secondary education in 2020. However, the income premium for high education has been declining, most substantially during the crisis, and more recently has been below the EA average since 2015 (Figure 4). This possibly reflects mismatches between supply and demand for skilled labor – Greece has the highest unemployment rate of high-education population (around 12 percent) in the eurozone, which also drove emigration of the working age population during 2010-15; and income tax increases – Personal Income Tax rates in conjunction with the solidarity contribution for high income groups increased substantially after the sovereign debt crisis.[5]



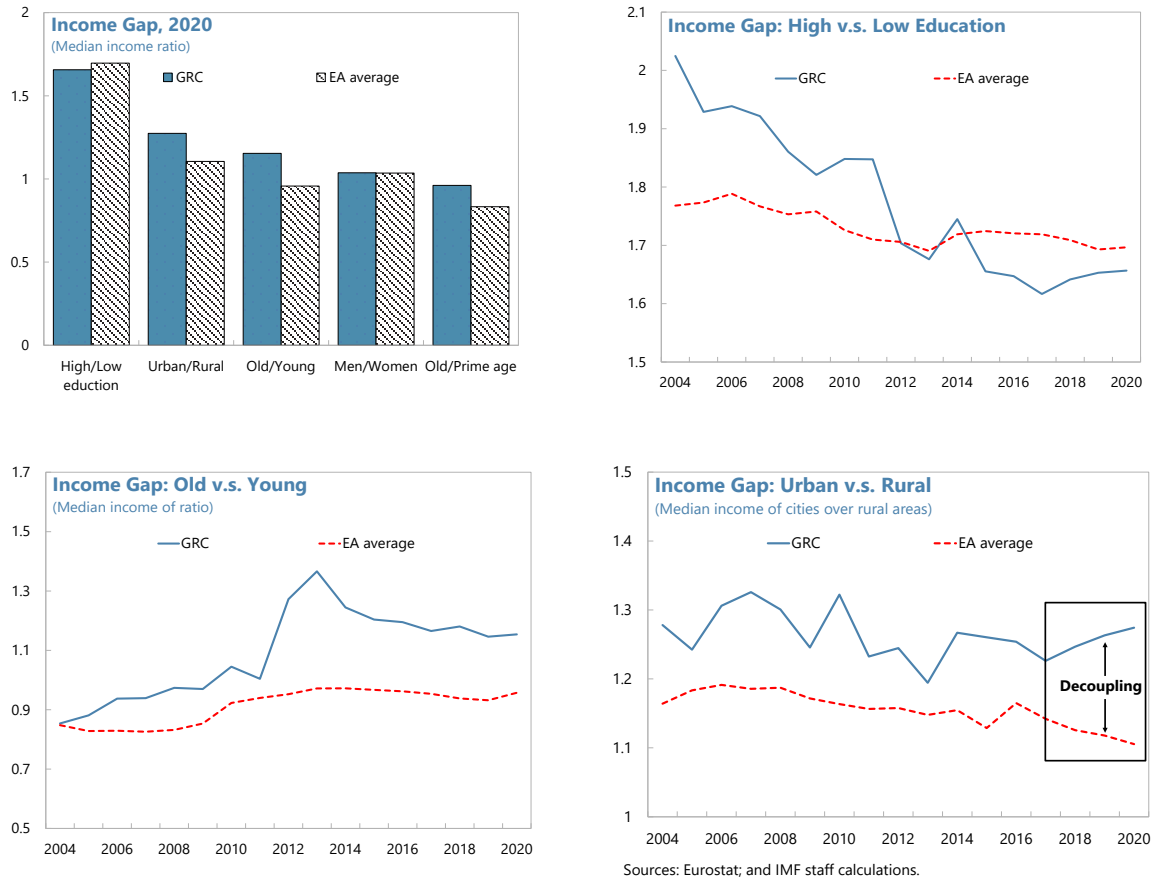
- The age income gap, although dropping from its crisis peak, is still at an elevated level, reflecting generous pensions and high youth unemployment (Figure 4). Young people have been more adversely affected by the crisis and the following economic adjustment. They also tend to be unemployed for a longer period with 40 percent of the youth unemployed being jobless for at least 12 months. Moreover, Greece has the highest share of low-wage earners, at

[4] The 2020 income survey data is based on 2019 income, hence, does not reflect the pandemic impact. The 2020 Household Budget Survey data includes household expenditure that was affected by pandemic-related measures during the second quarter of 2020.

[5] Total net emigration amounted to 252,232 during this period, of which 87 percent were working age (15-64).

47 percent, among young employees (aged under-30) within the eurozone.[6] In contrast, less than 10 percent of its elderly employees (aged over-50) are low-wage earners.

Figure 4. Greece: Income Gaps

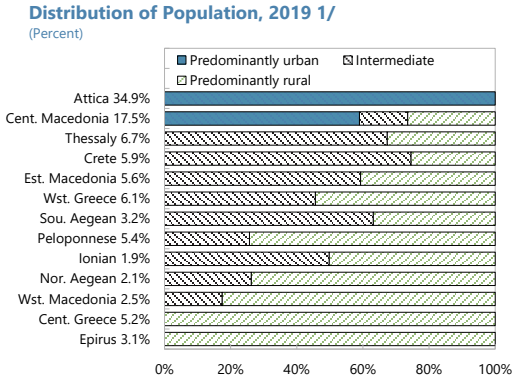


Source: Eurostat; and IMF staff calculations.

- Greece's urban/rural income gap is considerably higher than the eurozone average and has been increasing since 2017. In 2020, the median income of the urban population was 27 percent higher than that of the rural population, the largest gap since 2009. Compared to Euro Area countries, Greece has a relatively higher share of the population living in rural areas, but its economic activities are more concentrated in cities. High value-added services are largely located in urban areas, including information and communication, financial and insurance, and professional, scientific, and technical services. Rural and intermediate regions tend to specialize in natural resource-intensive industries, including agriculture and mining, or tourism-related sectors such as food and accommodation, and retail trade. (Figure 5)

[6] Low-wage earners are defined as those employees (excluding apprentices) earning less than two-thirds of the national median gross hourly earnings in that country.

Figure 5. Greece: Regional Disparity



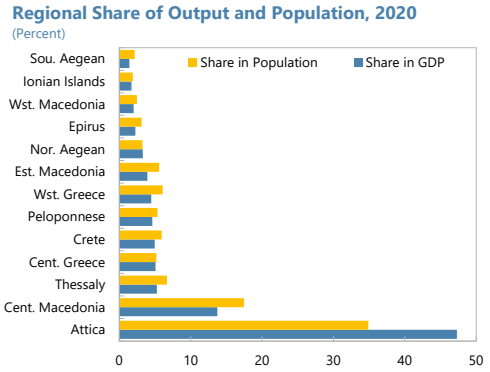
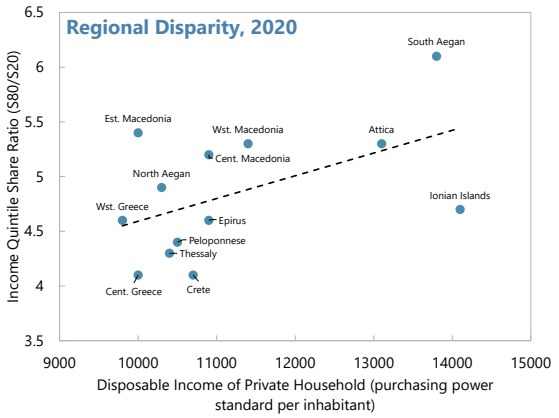


Table. Regional Specification in Industries, 2017 2/

	Agriculture, forestry and fishing	Mining, energy, electricity, water supply	Manufacturing	Construction	Distr. trade, transport, accom., food serv. activities	Information and communication	Financial and insurance activities	Professional, scientific and technical activities	Administrative and support service activities	Other services
Attica	0.09	0.62	0.84	0.79	0.98	1.57	1.43	1.39	0.94	0.92
North Aegean	1.34	0.82	0.40	1.33	0.98	0.55	0.71	0.63	1.57	0.88
South Aegean	0.63	1.05	0.23	1.54	2.04	0.28	0.50	0.72	0.69	0.94
Crete	1.71	0.92	0.59	1.40	1.45	0.55	0.70	0.87	0.88	1.11
Eastern Macedonia, Thrac	1.92	1.31	1.17	1.05	0.85	0.49	0.63	0.60	1.37	0.88
Central Macedonia	1.37	0.74	1.30	1.05	0.98	0.63	0.73	0.83	1.16	1.15
Western Macedonia	2.15	8.27	0.55	1.10	0.46	0.32	0.50	0.38	0.92	0.67
Epirus	2.06	0.71	0.87	1.80	0.91	0.44	0.69	0.64	1.27	1.06
Thessaly	2.87	0.57	1.37	1.11	0.77	0.31	0.52	0.43	1.29	1.19
Ionian Islands	1.02	0.49	0.24	1.25	1.87	0.30	0.46	0.82	0.72	1.26
Western Greece	2.65	0.75	0.92	1.24	0.88	0.71	0.60	0.53	1.13	1.20
Central Greece	1.86	2.21	2.60	0.88	0.73	0.30	0.43	0.46	0.75	0.81
Peloponnese	2.25	1.95	1.38	1.32	0.80	0.44	0.55	0.46	0.85	1.28



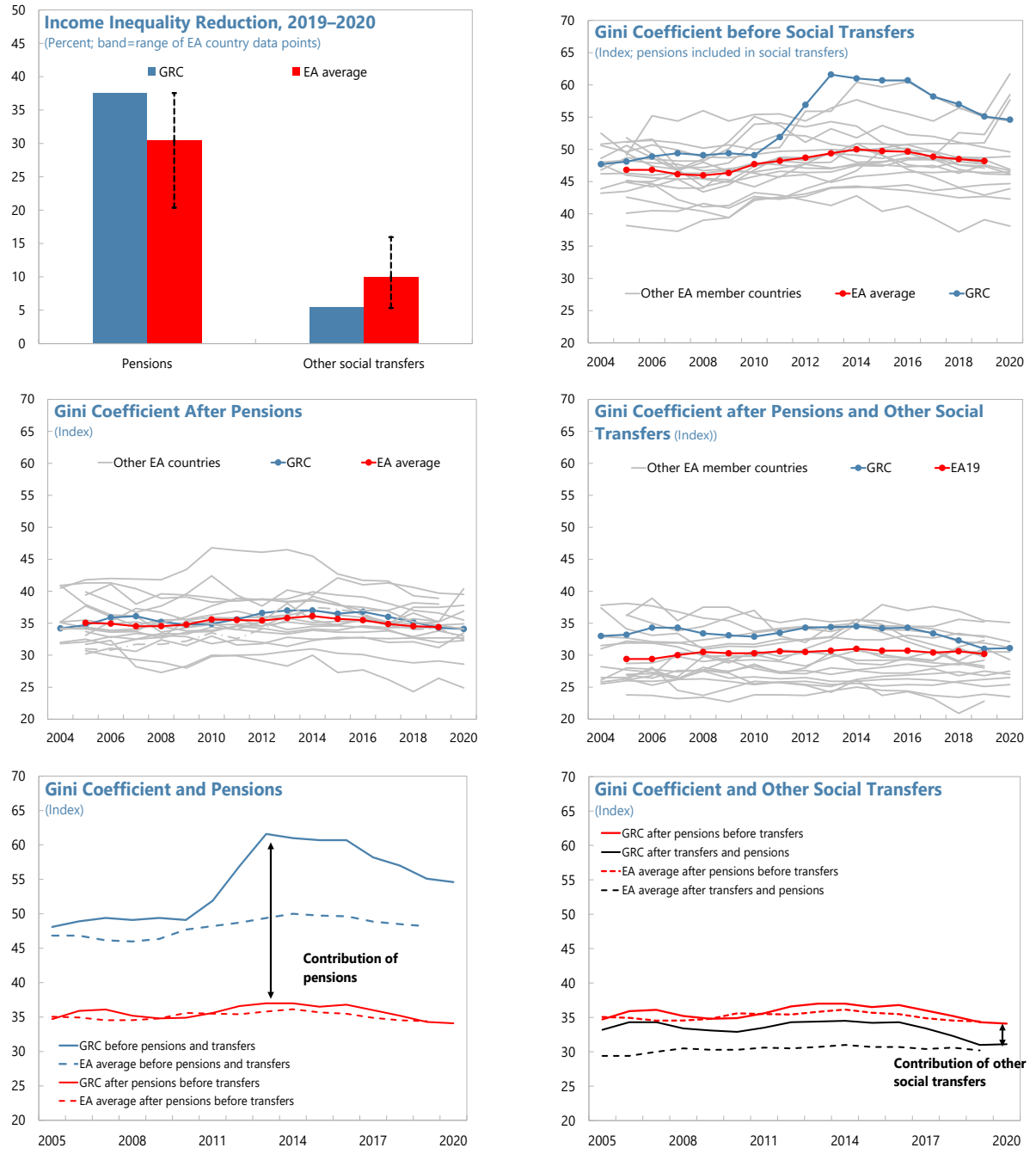
Source: Eurostat; Haver Analytics; OECD; and IMF staff calculations.
1/ Distribution of population among regions is listed next to the region's name. Bars indicate the percentage of the population living in TL3 regions classified according to OECD regional typology.
2/ The index of specialization is calculated as a share of GVA in industry within the region over the average share of this industry across all regions. A magnitude of 1 shows that the industry share of the region is equivalent to national average. If the index is smaller than 1, the industry is under-represented compared to the national average.

9. Structural transformation caused by the pandemic and climate change could further exacerbate these already large income gaps. The pandemic induced transformation from high-contact to low-contact services, combined with the green transition that requires a shift from high energy-intensive to low energy-intensive sectors, would hit workers (especially low-skilled) in affected sectors and regions (notably rural area) particularly hard. Young and low-educated workers tend to be more disadvantaged due to limited working experience and lack of professional networks, even more so during times of structural transition.

10. Social transfers reduce inequality, mainly through pensions while social assistance plays a very limited role. Greece has one of the highest Gini coefficients in the eurozone before social transfers, but it is much closer to the average after transfers. On average, social transfers reduced Greece's income inequality by 42 percent from 2011 to 2020, of which pensions alone contributed about 90 percent of the total reduction, the highest in the region, while contributions

from other social transfers are less than half of the Euro Area level (Figure 6). Although pensions help reduce inequality, they increase the age income gap and crowd out critical social assistance that is a more effective instrument for income redistribution.

Figure 6. Greece: Income Inequality and Social Transfers

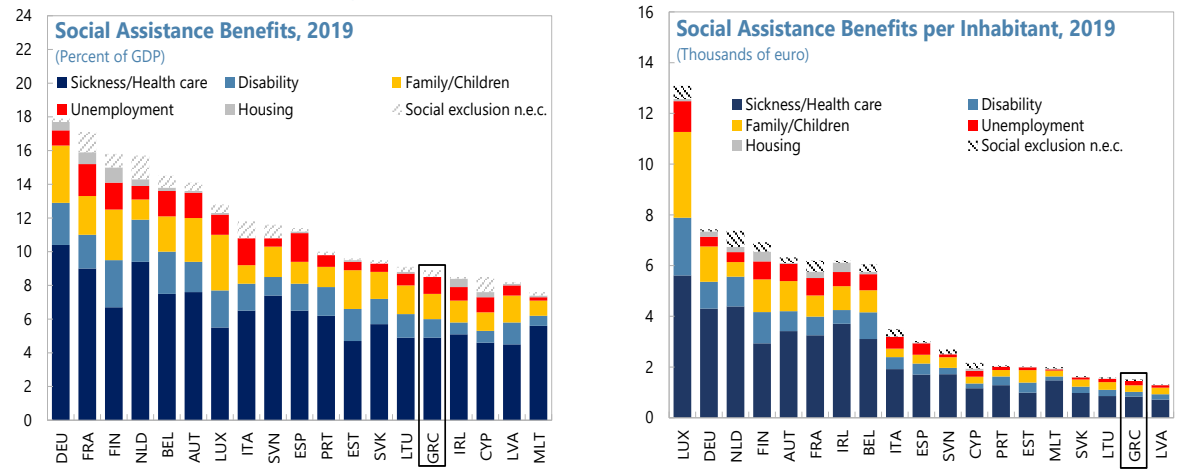


Source: EU-SILC; Eurostat; and IMF staff calculations.

C. Social Protection: State of Play

11. Spending on social assistance is one of the lowest in the eurozone (Figure 7). This is true both in percent of GDP and in per capita terms. There are considerable gaps relative to the eurozone average across major social assistance schemes, including health care (sickness), education, housing, family and childcare, unemployment benefits and the Guaranteed Minimum Income scheme (GMI, included in other programs for socially excluded groups).

Figure 7. Greece: Social Assistance Benefits

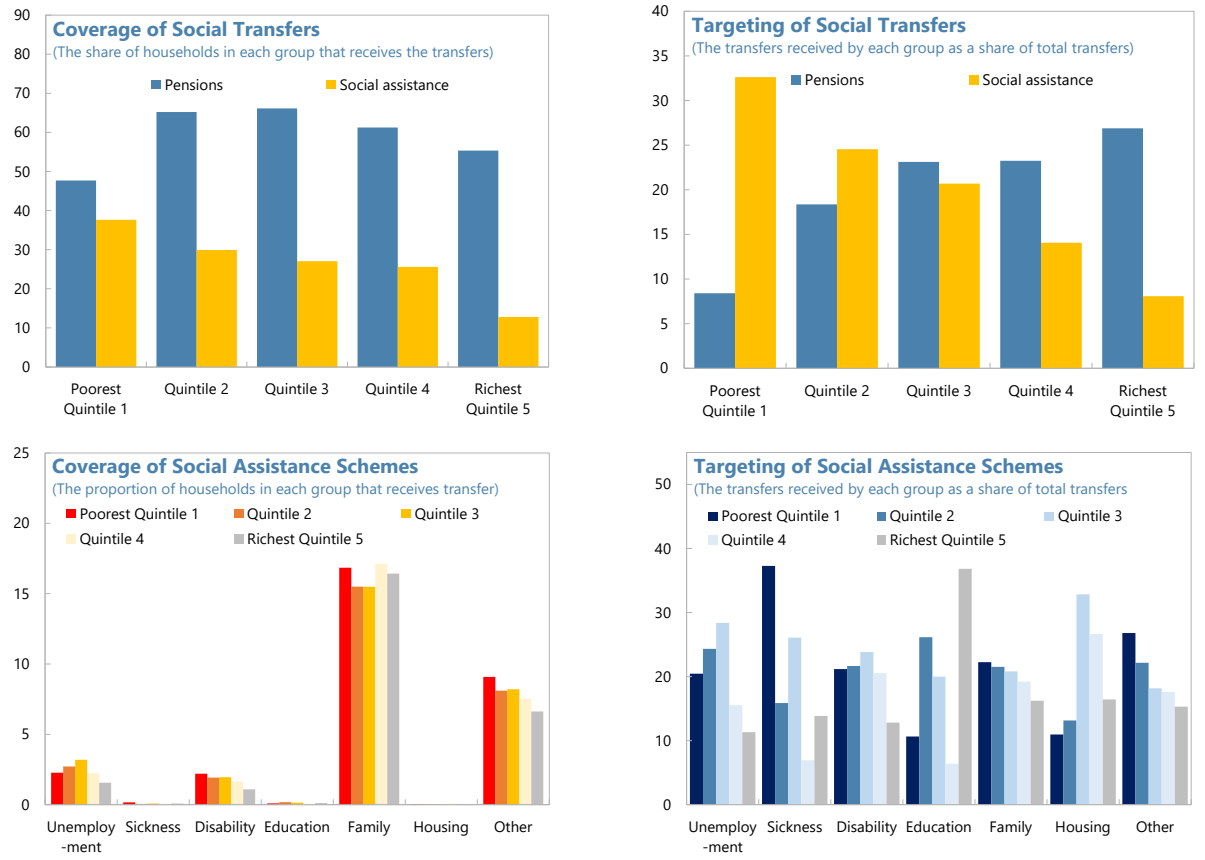


Source: Eurostat; and IMF staff calculations.

12. The coverage and targeting of social protection are relatively poor (Figure 8). On the coverage, about 37.5 percent of the poorest quintile receives social assistance in Greece, lower than the average of 40.1 percent of the 5.1 billion people represented in the World Bank ASPIRE database (WB, 2018). On the targeting of social assistance, Greece is on par with the high-income sample average in the ASPIRE database, with the poorest quintile receiving about ⅓ of total social assistance. Pensions have a higher coverage, but much worse targeting compared with social assistance, which is expected given that pensions are calculated on the basis of lifetime earnings. There is a significant heterogeneity across different social assistance schemes. In particular, housing and education benefits have poor coverage (close to zero) and targeting, followed by unemployment and disability benefits. [7]Health care benefits face low coverage but relatively good targeting. Family/child benefits and other programs for socially excluded groups (which includes GMI) have relatively better coverage and targeting.

[7] Housing benefits have recently increased due to the 2019 reform, which might not yet be captured in the chart.

Figure 8. Greece: Coverage and Targeting of Social Protection



Source: EU-SILC (2020) microdata; and IMF staff calculations.

13. Despite notable progress, the administration of social assistance needs further simplification and consolidation. According to a World Bank study in 2016, the administration of social programs was complex and fragmented, with many small and poorly targeted benefits managed by multiple agencies. Since 2016, several policy initiatives have been implemented to simplify the system and improve the administrative efficiency. Key reforms include the adoption of the means-tested GMI, consolidation of the family and child benefits, and establishment of the single public payment authority for all welfare benefits (OPEKA) (Table 1). Despite recent improvements, significant fragmentation remains, with major benefits operating under eight different payment platforms while some small benefits still operate manually. Digitization reform has greatly facilitated regular eligibility checkups across different platforms and administrative agencies, but further data integration and automation is needed. In this regard, the authorities aim to establish a single payment platform for all social benefits by 2024.

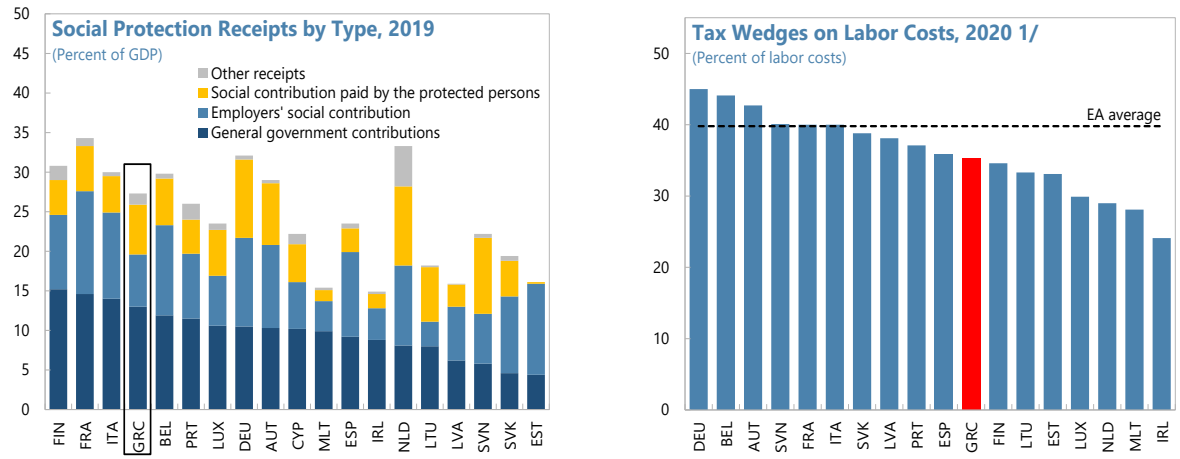
Table 1. Greece: Recent Reforms of Social Programs

Time	Reform Initiatives
Feb-2017	Social Solidarity Income (SSI or GMI) scheme
Mid-2017	Establishment and operation of community centers in most municipalities as one-stop-shop for all social programs;
May-2017	Abolishment of small family/child allowances
Jan-2018	Consolidation of the two main family benefits into a single benefit
Jan-2018	Modification of disability assessment system
Feb-2018	Establishment of the single public payment authority for all welfare benefits (OPEKA) and IT reforms
Jan-2019	Introduction of new mean-tested housing benefits

Source: EC report, "Reforming the social welfare system in Greece", 2018.

14. The social protection system heavily relies on contributions from the government. (Figure 9). Government contributions account for about half of total financing of social protection, among the highest in the eurozone, mainly reflecting large state transfers to cover pensions. Contributions from private employees and employers are in line with the regional average. Consistent with that, the labor tax wedge, which includes personal income taxes and compulsory social contributions paid by both employees and employers, is also close to the eurozone average. But the average labor tax wedge might mask varying tax burdens across different groups.

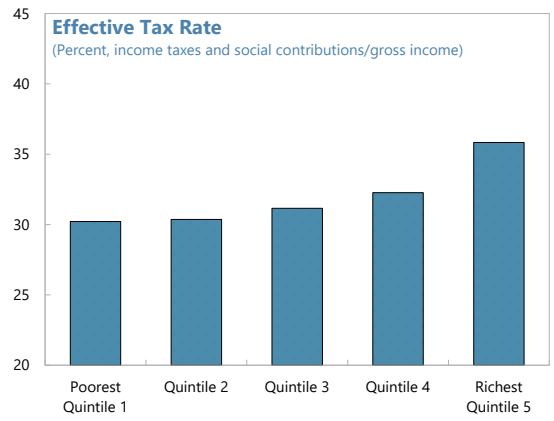
Figure 9. Greece: Social Contributions and Tax Wedges

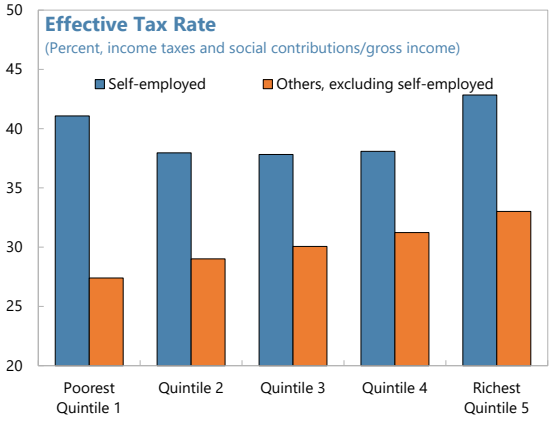


1/ Tax wedge is measured as the amount of taxes (incl. PIT, compulsory SSC paid by both employers and employees, as well as payroll taxes) as percentage of the total labor costs for firms (the sum of gross earnings, employer's SSC and payroll taxes). The most recent cut in SSC during 2021-22 is not captured in the chart.
Source: Eurostat; and IMF staff calculations.

15. Granular data analysis suggests significant tax evasion among the self-employed (Figure 10). Zooming into the distribution of effective tax rates across income and employment groups, the in-depth analysis finds that the poorest group has a relatively high effective tax rate at about 30 percent and the difference in tax rates across income groups is small. But this finding seems to be biased by measurement issues of income surveys, with significant underreporting of income by the self-employed. Excluding this group, the tax burden for the poorest income group becomes notably smaller, and tax rates become more progressive. Overall, the self-employed face higher effective tax rates compared to other employment groups, which is expected because the self-employed also pay the employer's share of social contributions. Interestingly, the self-employed exhibit U-shaped tax rates, with the poorest and richest groups bearing the same high rates. This probably reflects underreporting of income by the poorest self-employed group, which combined with tax administration efforts to compensate for this led to a higher effective tax rate relative to their reported income. Overall, these findings suggest significant compliance gaps in income taxes and social contributions by the self-employed group.

Figure 10. Greece: Effective Tax Rates



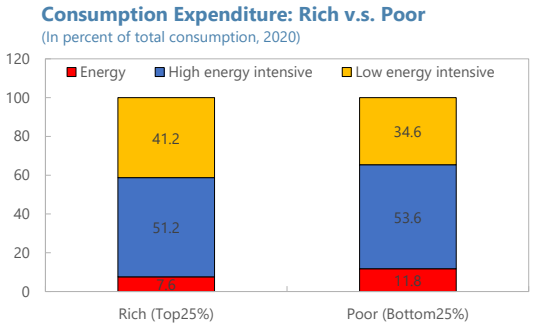


Source: EU-SILC microdata (2020); and IMF staff calculations.

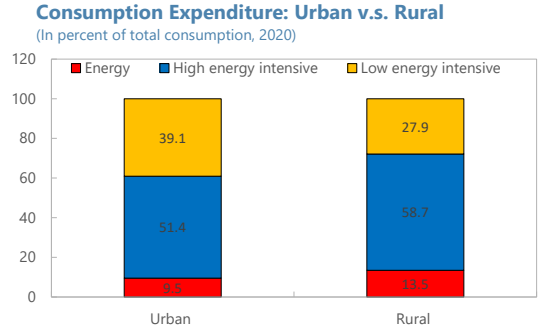
D. Climate Policies: Distributional Impact

16. Climate policies could disproportionally affect consumption of vulnerable groups. Climate friendly policies require a rise in carbon prices, which will be transmitted to price increases of fossil fuels and energy-intensive goods, affecting the direct and indirect energy consumption of households. Poor and rural households are expected to be hit harder than their rich and urban counterparts, due to a lower income and a higher consumption share on energy and energy intensive goods (Figure 11).

Figure 11. Greece: Energy Consumption of Households



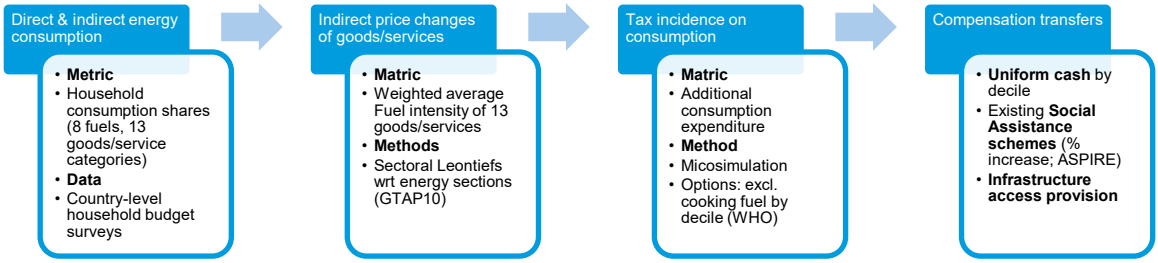
Sources: ELSTAT Household Budegt Survey 2020.
Note: High-energy intensive expenditure includes food, industrial goods and transportation; Low-energy intensive expenditure is the sum of all expenditure on services minus transportation.



Sources: ELSTAT Household Budegt Survey 2020.
Note: High-energy intensive expenditure includes food, industrial goods and transportation; Low-energy intensive expenditure is the sum of all expenditure on services minus transportation.

17. This section explores the Carbon Pricing Assessment Tool (CPAT) tool to assess the distributional impact of carbon taxes and revenue recycling. CPAT is a spreadsheet-based tool parameterized to individual countries, which projects fossil fuel use and CO2 emissions, fiscal, economic, energy price, and the distributional burden of carbon pricing and other mitigation

policies.[8] The flow chart illustrates the logic of its distribution module that is applied to Greece. First, it calculates the share of direct and indirect energy consumption of households using the 2019 Household Budget Survey (HBS) microdata from ELSTAT. Next, it estimates the price changes of goods and services in response to the assumed carbon price increases. Then, it calculates consumption effects across different income groups. Finally, the tool allows different options to recycle carbon revenues to compensate households, including through cash transfers, social assistance schemes or better infrastructure access.



18. Two illustrative reform scenarios are examined. In both scenarios, a new carbon tax is introduced to all non-ETS sectors, with the carbon price rising from the initial level of 25 to 75 real$/tonCO2 by 2030, the level recommended by the Fund to meet the 2^{o}C global climate goal.

- The first reform scenario (reform S1) assumes recycling half of the increases in carbon revenues for transfers to poor households (the bottom 40 percentile) and the other half to labor tax reductions for all taxpayers. The coverage and targeting rates of social transfers, 68 and 57 percent, respectively, are calculated using the 2019 HBS data. This would imply a significant leakage of transfers to other groups. The amount of labor tax reductions for each group depends on the size of their initial tax liability.

- The second reform scenario (reform S2) assumes more ambitious policy efforts to improve targeting. Specifically, it still assumes that half of the carbon revenue increase is directed to poor households (the bottom 40 percentile) but under improved coverage and targeted rates (100 and 90 percent, respectively) while the other half is used for scaling up public investment, notably green infrastructure.

19. Environmental benefits of the carbon tax outweigh economic costs in both scenarios. There are significant co-benefits, stemming from reduced risks of climate-related disasters, more fresh air and clean skies, and less traffic jams and accidents. These co-benefits will outweigh

[8] CPAT was developed by IMF and World Bank staff and evolved from an earlier IMF tool used, see IMF (2019a and b). For descriptions of the model and its parameterization, see IMF (2019b Appendix III, and Parry, Mylonas and Vernon 2021) and for further underlying rationale see Heine and Black (2019).

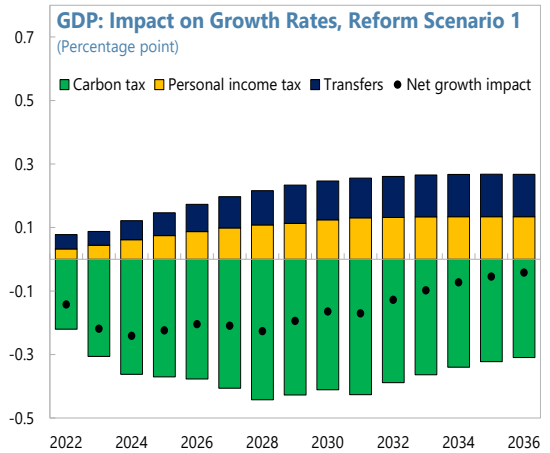
economic costs—deadweight losses from the new carbon tax before revenue recycling, implying net welfare gains for the whole society (Figure 12).

20. Effective recycling of carbon tax revenues will make the green transition more growth friendly. Before revenue recycling, the new carbon tax is estimated to reduce GDP growth by about ⅓ percentage points on average over the next 15 years (Figure 12). But the negative growth impact is partially mitigated by productive use of carbon revenues. In particular, recycling carbon revenues for public investment would have larger stimulus effects than other options, including transfers and tax cuts. In reform S2, the negative growth impact of the carbon tax is fully offset by the positive effects from public investment and transfers (Figure 12).

21. Welfare improves for low-income households, notably poor rural groups under the reform scenario with improved transfer coverage and targeting (Figure 12). For poor households, in both scenarios, their direct and indirect consumption losses, estimated at about 1–1.5 percent of total consumption, are more than offset by the positive gains from targeted transfers. These gains are more pronounced in reform S2 due to significantly improved targeting and coverage of transfers. In contrast, richer households are better off in reform S1 compared to S2 as they benefit more from labor tax reductions. In both scenarios, rural households gain more than their urban counterparts due to a higher share of low-income groups living in the rural area. Most notably, poor rural households in reform S2 record the largest net welfare gains.

22. The scenario analysis suggests that a just transition to the green economy requires more ambitious reform efforts. Overall, reform S2 stands out with less economic costs and more assistance to poor and rural groups. Under this active reform scenario, a new carbon tax combined with better-targeted social transfers and a boost in green investment, could support growth, protect vulnerable households while also reducing emissions.

Figure 12. Greece: Carbon Tax Reform Scenarios



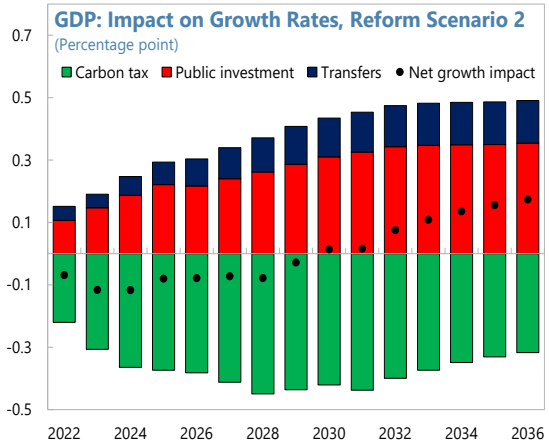
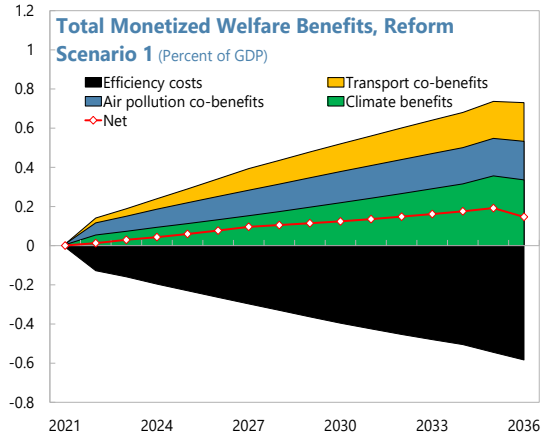
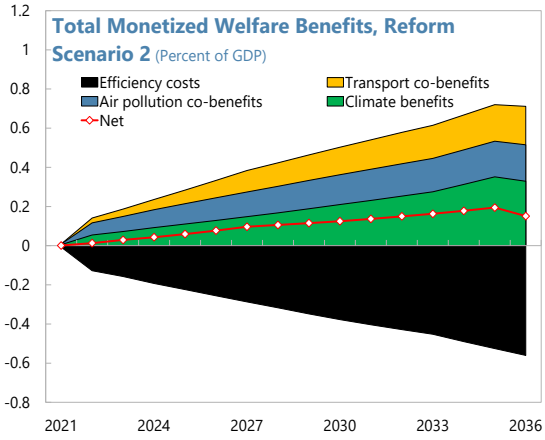
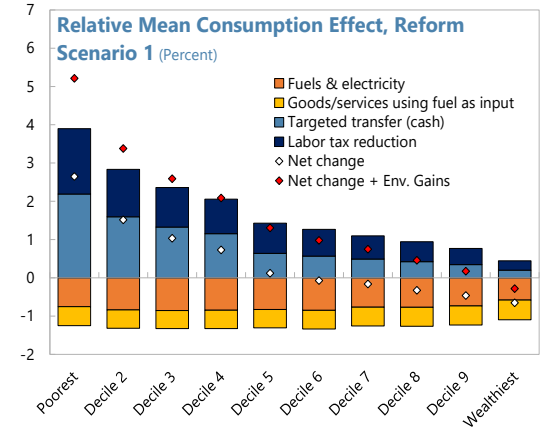
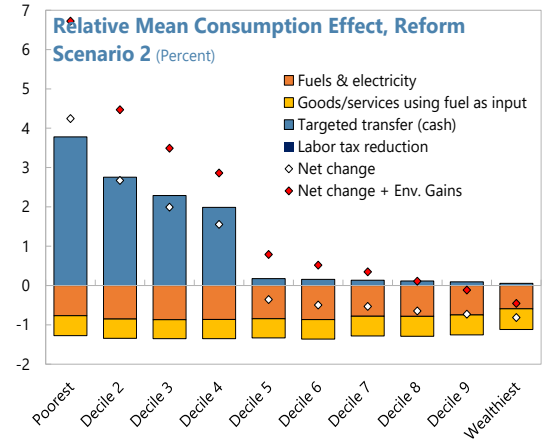


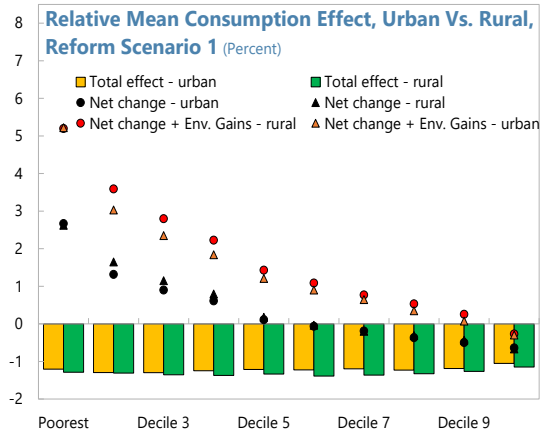
Figure 12. Greece: Carbon Tax Reform Scenarios (Concluded)

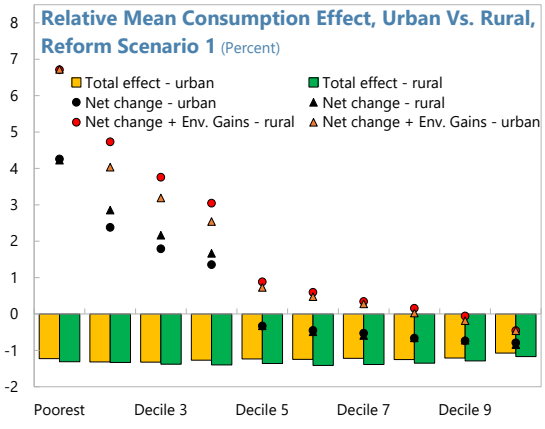












Source: IMF, Carbon Pricing Assessment Tools; and IMF staff estimates.

E. Conclusions

23. The government's commitment to climate-friendly policies is welcome but should be complemented with social protection reforms to assist the green transition. Given the disproportionate impact of climate change and climate policies on vulnerable groups, a strong social safety net is a critical part of the adaptation strategy. Improving the coverage and targeting of social assistance schemes could help protect vulnerable households against climate-related disasters and mitigate the adverse impact of higher carbon prices. Social protection reforms should focus on: (a) expanding coverage of health care and housing benefits (where coverage is low); (b) boosting spending on childcare and the GMI (where targeting accuracy is relatively higher); (c) tackling evasions by the self-employed; and (d) further simplification and consolidation of social assistance schemes. Introducing a new carbon tax and gradually increasing it over time is recommended to finance targeted transfers and green investment.

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ENHANCING MACROPRUDENTIAL CAPITAL BUFFERS IN GREECE[1]

The Greek banking system has been healing but needs stronger resilience. Following the extended period of private sector deleveraging, signals are emerging that households are releveraging and that imbalances are building up in the real estate market. Indicators reflecting structural vulnerabilities point to a dominant role played by the highly concentrated but weakly capitalized banking system. It would therefore be important to enhance the macroprudential policy toolkit that is solely composed of CCoB and O-SII buffers, with the CCyB never activated. The methodologies underpinning the CCyB and O-SII buffer rate determination should initially be revised, which would set the stage for preparing a conditions-based roadmap to guide the activation of the CCyB and possibly enhancement of the O-SII buffers over the medium term. Reflecting the build-up of vulnerabilities in the real estate market, it would also be important to prepare a conditions-based roadmap to guide the activation of borrower-based measures over the medium term. Further work should focus on calibration of the macroprudential policy toolkit.

A. Introduction

1. The Greek banking system requires enhancing its resilience. Following the long distress period, non-financial private sector balance sheets have weakened and subsequently entered into a significant deleveraging process, with banks suffering from massive losses stemming from NPLs. While non-financial private sector's indebtedness is currently relatively low and major banks comply with minimum capital regulatory requirements (ESRB, 2022a), it is essential that the banking system replenishes its capital buffers and rebuilds resilience to prepare for future stress episodes. The Greek banking system still has the weakest capital position in the EU (EBA, 2022), which is exacerbated by the low quality of capital arising from the high share of deferred tax credit in total capital (BoG, 2022).

2. The pandemic suggests a higher share of releasable macroprudential capital buffers would be desirable. Capital buffers are a key element of the EU regulatory framework aimed at enabling banks to absorb losses while maintaining the provision of key services to the economy. They include microprudential capital requirements and macroprudential buffers, with the latter comprising countercyclical and structural buffers. Although both types of these macroprudential buffers are intended to be used in a stress episode, evidence from the pandemic in the euro area has suggested that banks can be unwilling to draw the capital conservation buffer (CCoB) down as needed, with potentially adverse effects for the economy (Couaillier and others, 2021). In addition, there is evidence suggesting that having higher countercyclical capital buffers (CCyB) at the onset of the pandemic would have led to significantly improved bank lending, reducing the decline in euro area growth in 2020 without compromising banking system solvency (Darracq and others, 2020).

[1] Prepared by Shiqing Hua and Mariusz Jarmuzek. The authors would like to thank, without implicating, Michael Arghyrou, Miha Cajnko, Maximilian Fandl, Heather Gibson, Dimitris Malliaropulos, Machiko Narita, Erlend Nier, Spyros Pantelias, Nikos Stavrianou, and Ioannis Tsikripis, as well as participants of the workshop held at the Bank of Greece for useful discussions and comments.

3. The macroprudential framework in Greece has so far been limited in scope. The macroprudential toolkit could not be deployed to help absorb the pandemic shock because the CCyB was never activated, while the CCoB and O-SII structural buffers were not released by design (ESRB, 2021). Given that no other macroprudential measures are in the toolkit, this constellation may pose a challenge to instill resilience and prepare for a systemic risk materialization in the future.

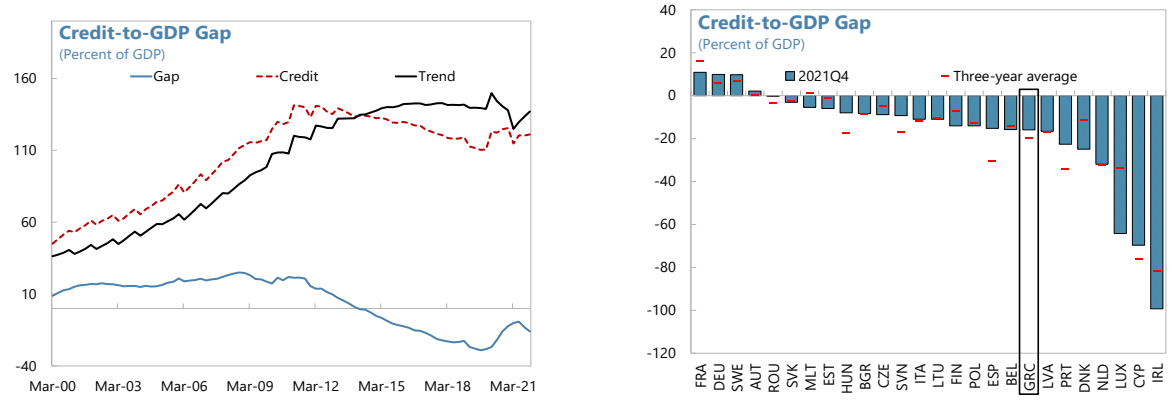
B. Systemic Vulnerabilities Assessment

4. This section assesses select cyclical and structural systemic vulnerabilities. Cyclical vulnerabilities are assessed based on multiple indicators that aim to detect broad-based credit boom risks, following the Staff Guidance Note on Macroprudential Policy (IMF, 2014). It is complemented by a set of additional analytical approaches developed at the IMF. In addition, structural vulnerabilities are also assessed, given the dominant role of banks in financial intermediation and the highly concentrated structure of the Greek banking sector, and in line with the Staff Guidance Note (IMF, 2014).

Broad-Based Credit Boom Vulnerabilities

5. The Basel credit gap has remained negative but narrowed recently and the underlying methodology is subject to significant limitations. Following a protracted period of private sector deleveraging, the gap has started to narrow since 2019, although still remains negative. The results are in line with evidence based on the same methodology for other European countries that suffered from credit boom-bust cycles (Baba and others, 2020). Of particular relevance for Greece is the susceptibility of the Hodrick-Prescott (HP) filter to large credit booms in the past. Taking the results based on the HP filer at face value, this would imply that credit should return to the levels of its previous cyclical peak, which ended in the bust of the credit boom. Other weaknesses of the HP filter are more general in nature and include the choice of the end-point of the sample, length of the time series, and uncertainly about the duration of the credit cycle.[2]

Figure 1. Greece: Basel Credit Gap Vs. Other EU Countries

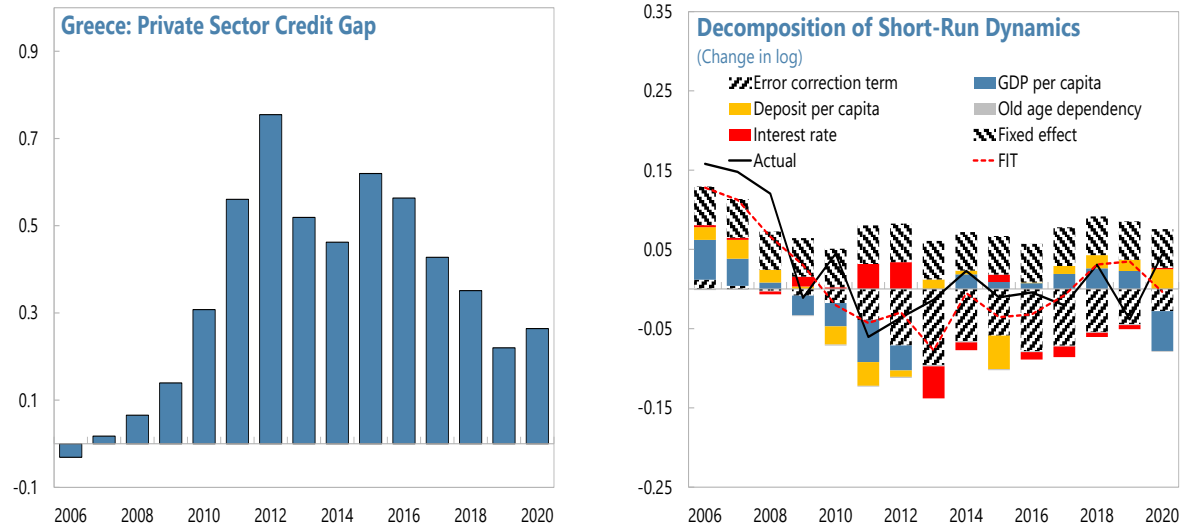


Source: European Central Bank; Haver Analytics; and IMF staff calculations.

[2] See Edge and Meisenzahl (2011), Repullo and Saurin (2012), Lang and others (2019), and Baba and others (2020) for an overview of shortcomings associated with the Basel credit gap.

6. A structural model suggests a positive credit gap, with some signs of releveraging. The structural model of the private sector credit gap is expressed in per capita terms, estimated based on the framework developed by IMF (2015) and further refined by Baba and others (2020). The key driving forces include GDP per capita, deposits, old age dependency, and the real interest rate. The results suggest the build-up of a positive gap coinciding with the credit boom followed by deleveraging, with some slight pick-up in 2020. The recent increase in the gap confirms some signs of releveraging. The results are broadly consistent with some evidence from standard credit development measures.

Figure 2. Greece: Credit Gap Based on Structural Model

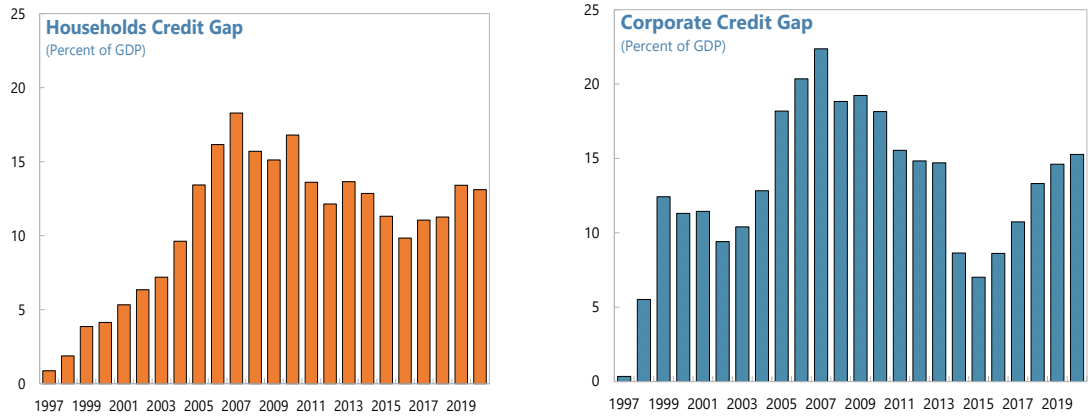


Source: IMF staff estimates.

7. Evidence from a different analytical approach confirms a positive gap for corporate and household sectors along with some releveraging. Building on the accounting framework developed by Cuerpo and others (2013) for households, which was subsequently refined and extended to corporates by IMF (2016) and Jarmuzek and Rozenov (2017, 2019), the private sector credit gap is also estimated to be positive.[3] Similarly to the structural model, but providing the breakdown for corporates and households, the results show the build-up of the gap coinciding with the credit boom and subsequent deleveraging.

[3] Jarmuzek and Rozenov (2019) report evidence from a panel of advanced economies that the build-up of the credit gap precedes banking crises as identified by Laeven and Valencia (2013).

Figure 3. Greece: Credit Gap (Accounting Approach) for Households and Corporations



Source: IMF staff estimates.

8. An additional set of indicators points to nascent signs of releveraging and emerging imbalances in the real estate sector. The debt of the non-financial sector was subject to a pronounced deleveraging process following the global financial crisis (GFC), with lower levels for both corporates and households compared to other euro area countries. Reflecting the credit boom legacy, net credit growth to households still remains subdued, but new loan growth has recently surpassed disposable income growth, suggesting some releveraging. This is particularly pronounced for new housing loans whose dynamics have accelerated considerably, although volumes are still much lower than in the run-up to the GFC. Residential real estate prices have rebounded by almost 25 percent since 2018, accompanied by a significant increase in price-to-rent and income ratios, with some moderate signs of overvaluation. Commercial real estate prices have also rebounded, albeit to a weaker extent. The exposure of banks to the real estate market is close to the EU average and less significant compared to the pre-GFC levels. The supply side indicators consistently suggest a significant increase since 2016. Bank credit standards of loans have remained stable following a temporary tightening in 2020, although lending margins on average-risk corporate loans have eased for a second consecutive quarter. Demand for corporate and housing loans has continued to increase.

Figure 4. Greece: Additional Indicators to Assess Cyclical Systemic Vulnerabilities

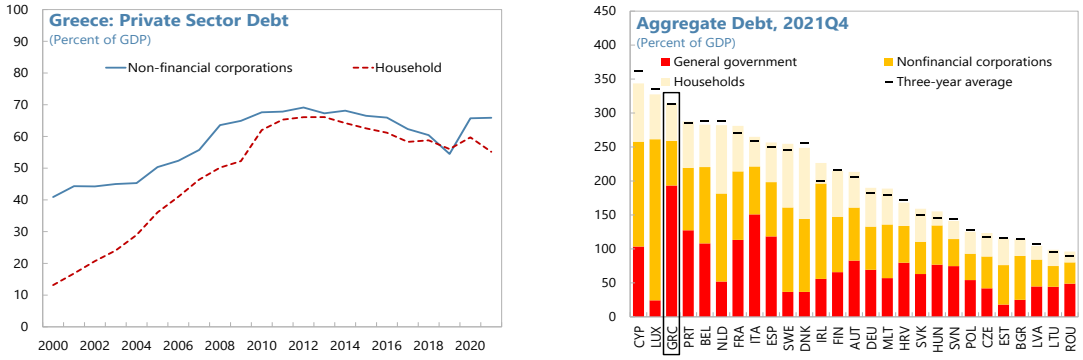


Figure 4. Greece: Additional Indicators to Assess Cyclical Systemic Vulnerabilities
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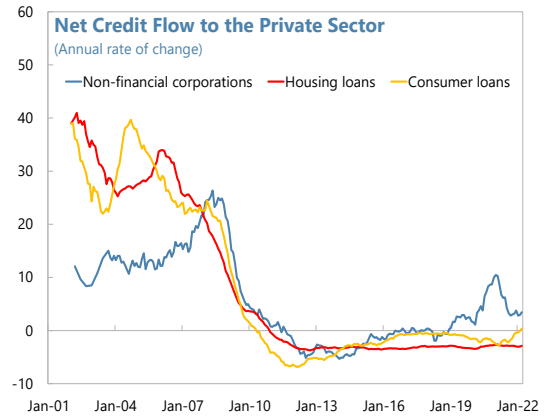

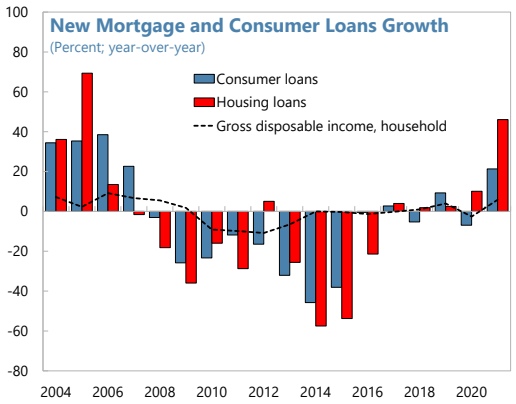

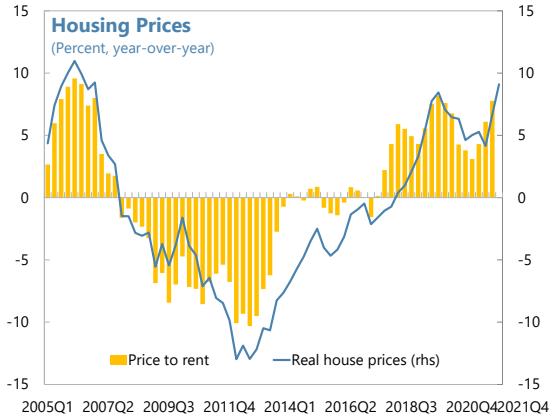

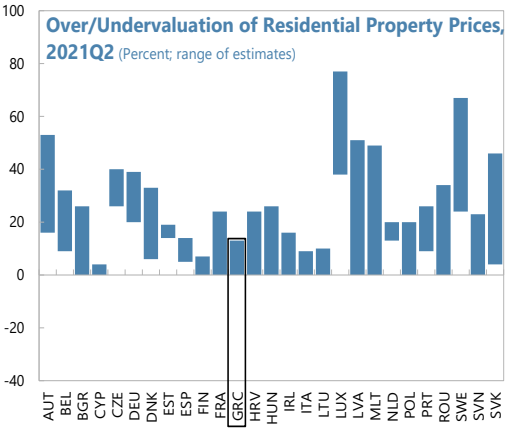

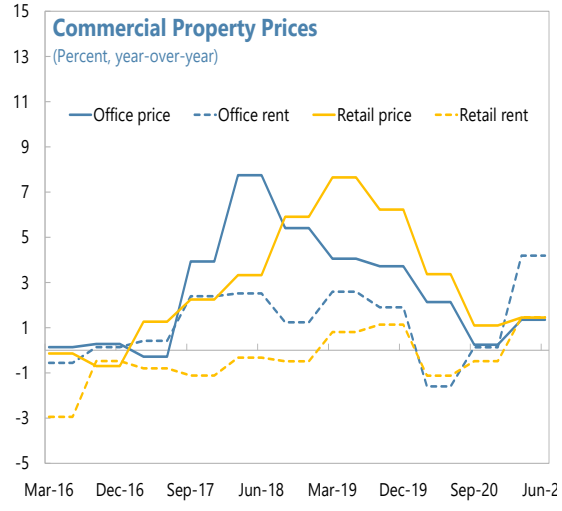

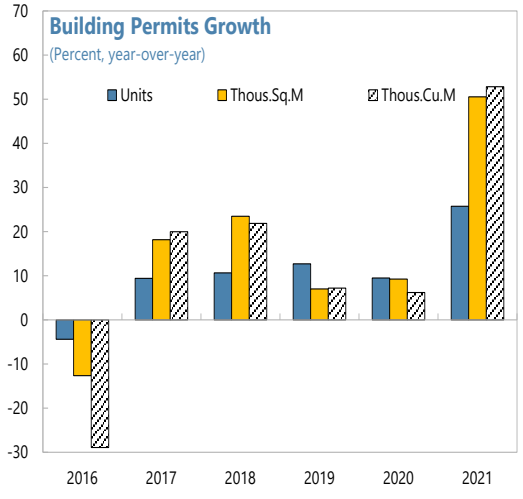

Figure 4. Greece: Additional Indicators to Assess Cyclical Systemic Vulnerabilities
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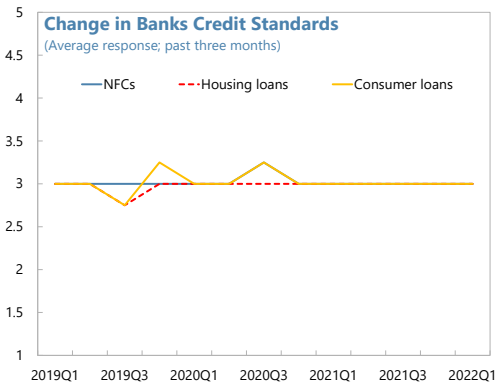
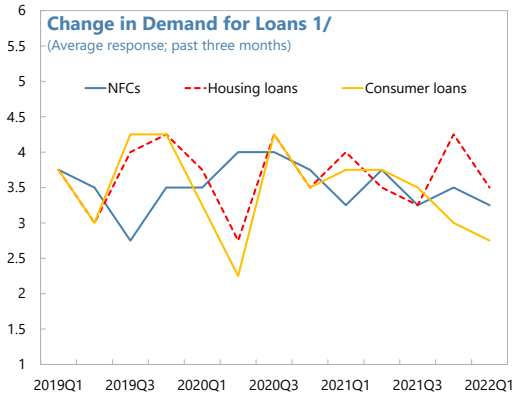
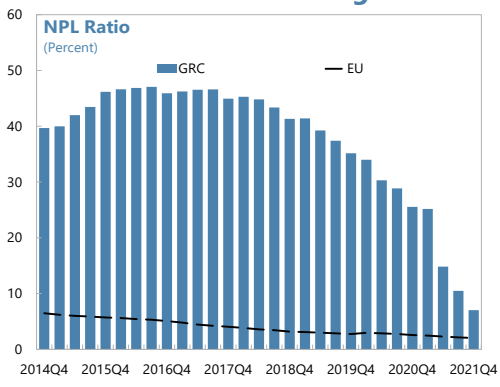


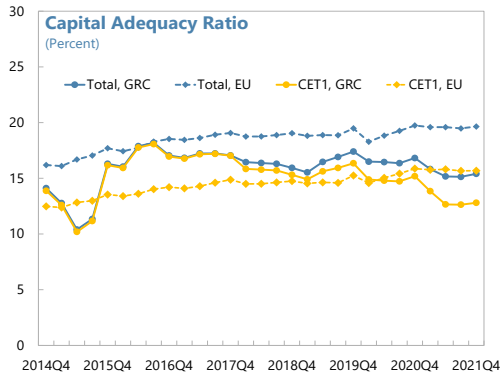


Sources: Bank of Greece; ELSTAT; European Central Bank; Eurostat; Haver Analytics; OECD; and IMF staff calculations.
1/ 1=decreased significantly; 2=decreased somewhat; 3=remained unchanged; 4=increased somewhat; 5=increased significantly.

9. Indicators capturing soundness of credit institutions provide mixed signals. The sharp NPL reduction has taken a significant toll on the already depressed profitability and capital position of banks.[4] Forward-looking bank asset quality indicators have on the other hand improved for the total portfolio of loans compared to the pre-pandemic period. While probability of default initially picked up reflecting the pandemic uncertainty, especially for housing and consumer loans, all the key portfolios have recently recorded declines. With household balance sheets supported by policy measures and rebounding residential real estate prices, loss given default for housing and consumer loans has continued to decline. Financing conditions have remained broadly favorable, although tightening somewhat recently mirroring increasing risk premia globally. Investors seem to have given a greater weight to the improving prospects leading to higher valuations of the major banks.

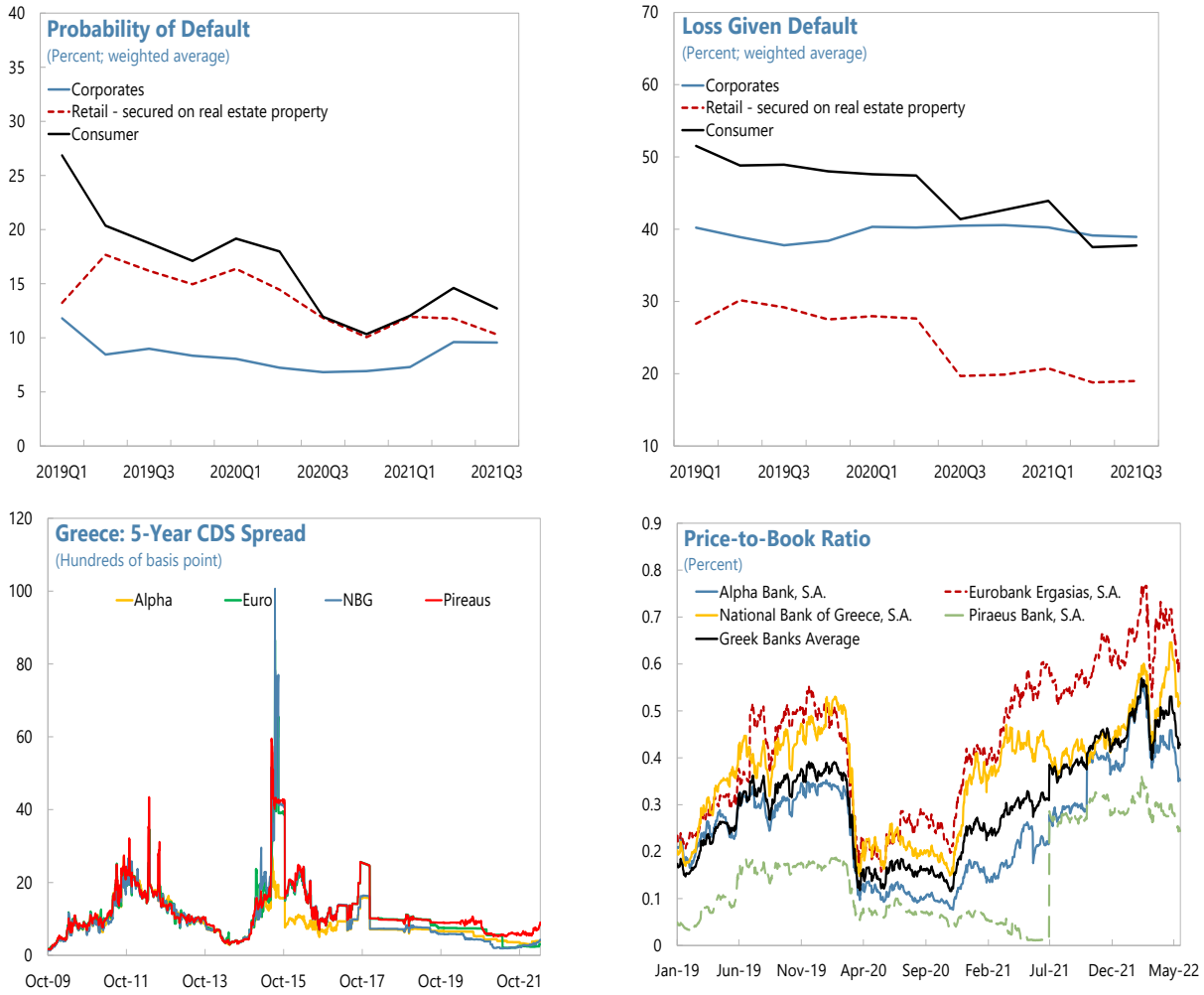
Figure 5. Greece: Soundness of Banks





[4] See Financial Sector Background Note for further details on the risks to the financial system.

Figure 5. Greece: Soundness of Banks (Concluded)

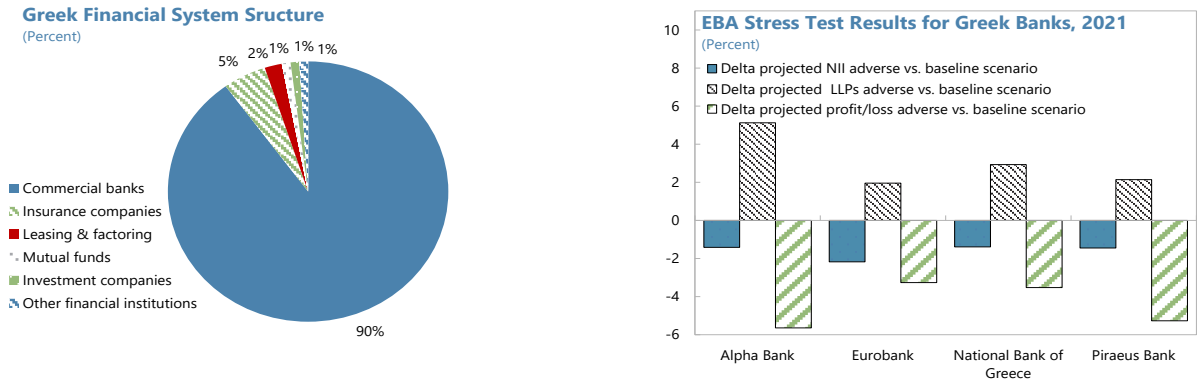


Sources: Bloomberg Finance L.P.; European Banking Authority; Moody Analytics; and IMF staff calculations.

Structural Vulnerabilities

10. Banks play a dominant role in Greece's domestic financial system, but their resilience remains weak. The main components of financial system assets in Greece are banks, which account for around 90 percent, while insurance companies contribute around 5 percent, with leasing and factoring companies, mutual funds, investment companies, and other financial institutions accounting for the remainder. The results of the 2021 EBA stress test for Greek SIs suggest considerable losses under the adverse scenario assuming a prolonged and severe impact of the pandemic (ECB, 2021), and the starting capital position is already weak because Greece has the lowest bank capital adequacy among EU countries.

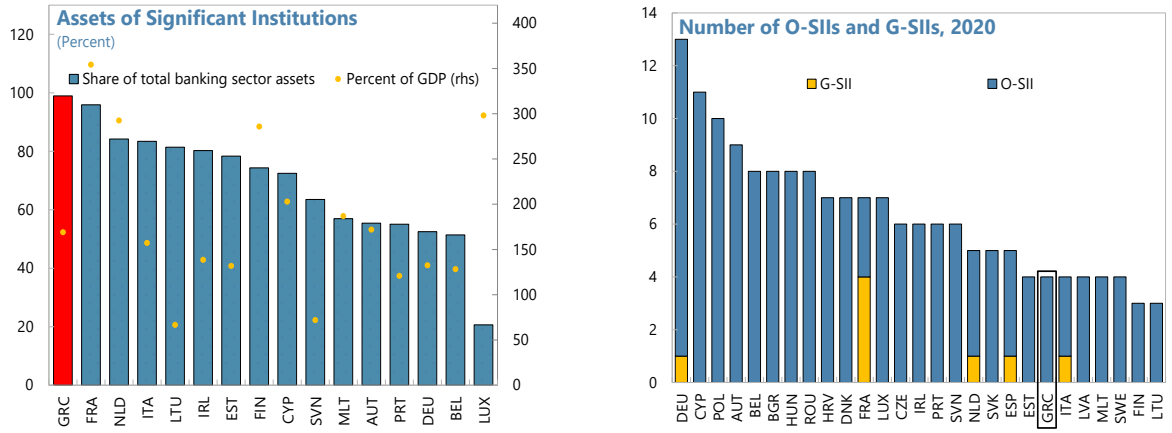
Figure 6. Greece: Financial System Structure and EBA Stress Test



Source: Bank of Greece; European Central Bank.

11. The banking system is highly concentrated, pointing to significant structural vulnerabilities. The four major banks identified as systemically important institutions account for more than 95 percent of assets of the banking system, making it the most concentrated system in the euro area. There is therefore significant structural systemic vulnerability associated with negative externalities involving the impact of the failure of a large and/or interconnected financial institution and the ensuing moral hazard costs associated with direct support and implicit government guarantees.

Figure 7. Greece: Concentration of the Banking System



Source: European Central Bank; European Systemic Risk Board; Haver Analytics; and IMF staff calculations.

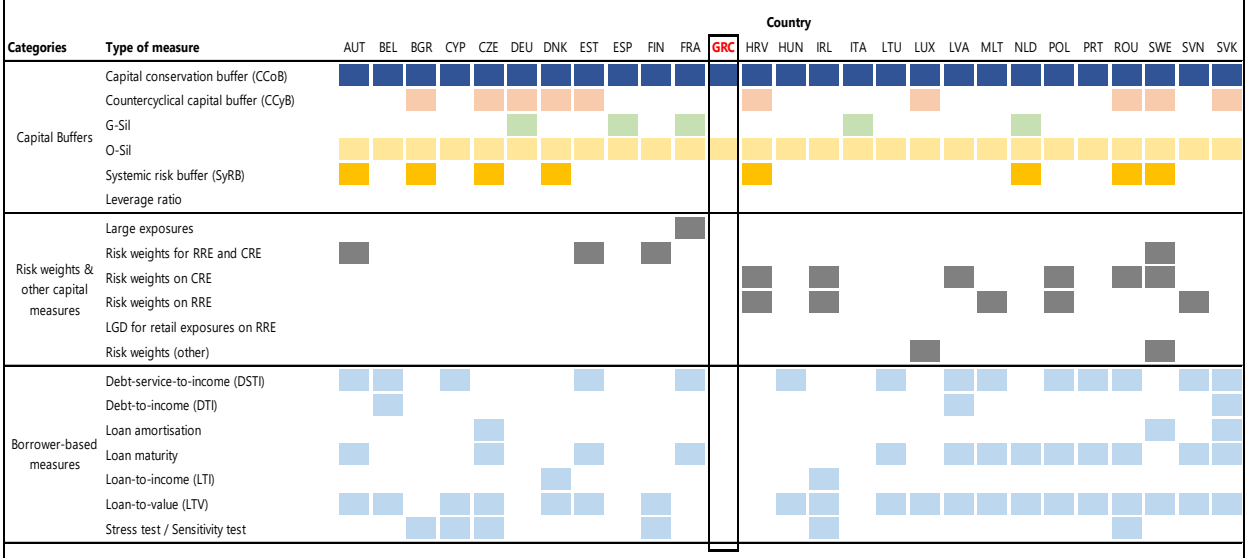
C. Macroprudential Policy Options

Macroprudential Policy Toolkit

12. The macroprudential policy toolkit is solely composed of capital buffers. Only select macroprudential measures have been used by Greece, including the CCoB, CCyB and O-SII buffers. The framework for the CCyB buffer has been implemented since 2016, but has never been activated.

The framework for the O-SII buffer was adopted in 2014 and operationalized since 2016, with the phase-in period up until 2023. There is no policy framework in place to address household and real estate market risks, neither in terms of borrower-based measures nor in terms of risk weights nor other capital measures. This contrasts with countries that were subject to similar deleveraging of the private sector such as Cyprus, Ireland and Portugal that have in place borrower-based measures. The current policy set-up makes Greece one the very few EU countries hinging only on CCoB and O-SII buffers.

Table 1. Greece: Macroprudential Measures in the EU Countries



Source: European Systematic Risk Board; and IMF staff assessment.
Note: Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Germany, Romania, and Sweden have announced the CCyB rate increases, which are subject to the phase-in period.

CCyB Buffer

13. There has been a recent paradigm shift about CCyB settings in Europe. Among European countries, Bulgaria, Croatia, the Czech Republic, Denmark, Germany, Estonia, Luxembourg, Romania, Slovakia, Sweden, Switzerland, and the UK have recently introduced or announced a positive CCyB rate (ESRB, 2022b), while Ireland hinted at conditional reactivation in 2022 (CBI, 2021, 2022). Some of these countries have moved to a positive neutral rate i.e. introduced a positive rate in a standard systemic risk environment to exercise timely and forward-looking increases in the CCyB to allow for a more preventive build-up of macroprudential space before risks become elevated. While the original design of the CCyB did not foresee an external shock feeding into the cyclical systemic risk assessment, the experience of the pandemic has shown that those countries that built up releasable buffers used them to absorb the shock, which may have helped support credit supply and contributed to resilience (Darracq and others, 2020; ESRB, 2022c). While originally the Basel credit gap served as the lead indicator to determine the CCyB rate, a broader set of indicators capturing cyclical risks now needs to be taken into consideration (ESRB, 2022c).

14. The BoG has therefore taken a broader perspective on the cyclical systemic risk assessment underpinning the CCyB rate determination. Drawing on the ongoing debate on the CCyB, the BoG has recently revised its methodology to assess the cyclical systemic risk (BoG, 2022a). While the new methodology still includes the credit gap indicator, there is now a larger set of additional indicators that underpin the assessment and ultimately the CCyB rate determination compared to its previous methodology. The additional indicators cover various credit development dimensions, such as the private sector debt burden, real estate prices, the soundness of credit institutions, and risk pricing, making the assessment a much more comprehensive exercise. The BoG has also brought up the need to create sufficient macroprudential space through implementing appropriate macroprudential measures, mainly in the form of capital buffers, over the medium term (BoG, 2022b).

15. Ireland's experience with setting the CCyB may be a useful reference point for Greece. While the Basel credit gap and alternative measures suggested no action was needed, the Irish authorities activated the CCyB in 2018, setting it at 1 percent. The main rationale was to protect the banking sector against potential losses associated with a build-up of cyclical systemic risk and thereby support a sustainable provision of credit to the real economy throughout the financial cycle. The factors that were mentioned as contributing to the build-up of cyclical systemic risk and ultimately led to the decision to tighten macroprudential policy were the recovery in real estate values along with some price overvaluation, strong new mortgage lending, and the narrowing credit gap. These factors share some degree of similarity with those identified in Section B for Greece and go beyond what is currently embedded in the BoG methodology. Activation of the CCyB in Ireland complemented the borrower-based mortgage measures already in place that included loan-to-income and loan-to-value limits (CBI, 2018). The release of the buffer in April 2020 helped to cushion the pandemic shock. More recently, as near-term risks stemming from the pandemic shock have receded and medium-term vulnerabilities were building, the authorities expect conditions in 2022 to be consistent with announcing a gradual rebuilding of the CCyB, although somewhat marred by recently increased uncertainty (CBI, 2021, 2022).

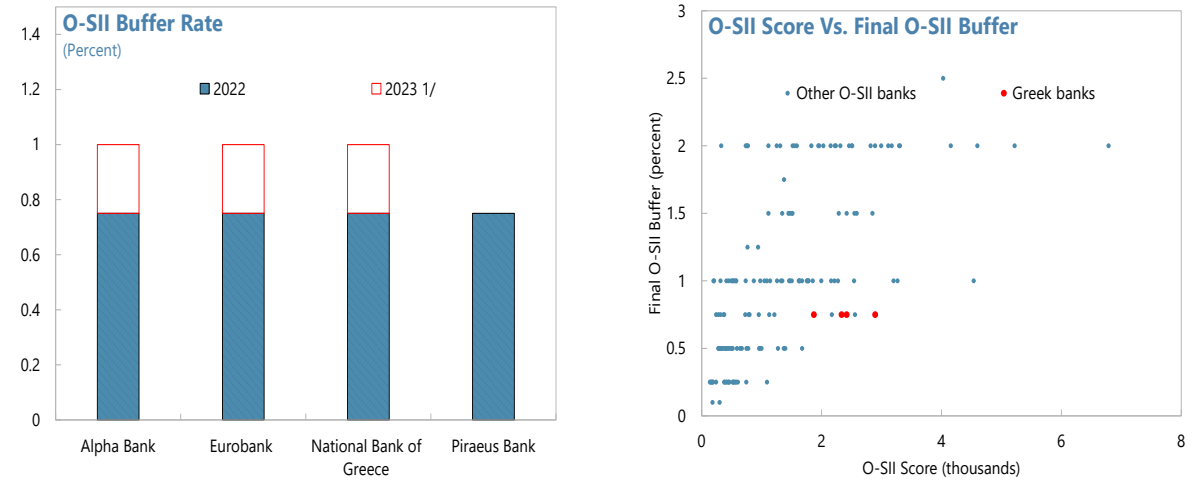
O-SII Buffer

16. The framework hinges on EU regulations and respects minimum criteria set by the ECB. Building on the Basel international standards and in line with EU regulations, the BoG's criteria for capturing structural systemic risk include size, interconnectedness, substitutability, and complexity, (EBA, 2014). These criteria are translated into a systemic significance score for each institution, which in turn allows determination of O-SII buffers. The designated institutions include Alpha Bank, Eurobank, National Bank of Greece, and Piraeus Bank. Compliant with the ECB framework, these banks are also subject to the minimum floor requirement, ensuring a minimum rate per bucket associated with the systemic significance score (ECB, 2017).

17. However, buffers are still subject to the additional phase-in period and the systemic importance scores appear relatively low compared to peers. Given the exercised relaxation of the macroprudential policy by the BoG in the context of the pandemic (ESRB, 2020), the banks are still subject to the phase-in period in terms of buffer rates. While the methodology to compute

scores is compliant with the EBA regulations and meets the ECB requirements, the buffer rates for Greek banks are relatively low relative to their systemic importance scores compared to peer O-SII banks supervised by the SSM. Even after full phase-in, some of the Greek banks will still have buffer rates lower compared to their peers.

Figure 8. Greece: O-SII Buffer Rates and Systemic Importance Scores



Source: European Systemic Risk Board; and IMF staff calculations.
1/ 2023 is subject to announced phase-in.

Enhancing the Capital-Based Framework

18. When considering increasing capital requirements, it is vital to consider trade-offs. The short-run impact of capital increases on lending and output can be meaningful, given that banks may not be able to adjust to higher capital requirements without cutting their exposures. The long-run impact on lending and output is however estimated to be modest (BCBS, 2010 and 2021).[5] There are also some benefits associated with addressing structural systemic vulnerabilities through capital charges for systemically important institutions. Grodzicki and Jarmuzek (2021) provide evidence that capital charges introduced for systemically important banks in the euro area have contributed to reducing systemic risk across such dimensions as balance sheet size and structure, risk taking strategies, and the funding cost advantage. The perceived costs for systemically important institutions include reduced profitability, deleveraging, and substitution to non-bank financial institutions (FSB, 2021).

[5] The main transmission channel is the impact of capital increases on the probability of bank failure and by extension on the cost of bank failure, with the central role played by private cost captured by the bank lending rate The pass-through from capital increases to lending rates is estimated to be relatively small for euro area countries (BCBS, 2021)

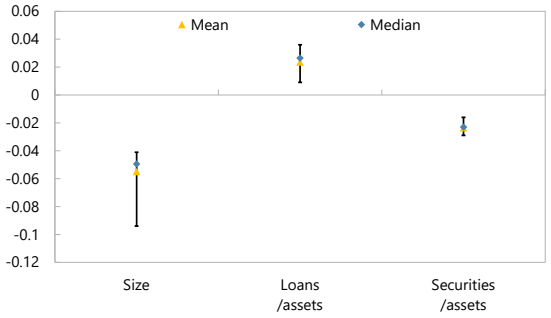
Figure 9. Estimated Impact of Capital-Based Buffers

Long-run Impact of a 5% Increase in Capital Requirements

	Expected benefits of regulation		Cost of regulation	Macro	Financial macro
	Bank profitability of default	Bank debt funding cost spread over risk-free rate	Lending spread over bank debt fund cost	GDP	Total lending
Unit	% pts dev	% pts dev	% pts dev	% pts dev	% pts dev
Euro Area (with 3D)	-7.5	-0.59	0.34	1.2	2.55
Euro Area (with de Bandt and Chahad)	-0.29	0.08	0.02	0.2	1.26
Euro Area (cost approach)	NaN	0.17	0.11	-0.4	-5.85

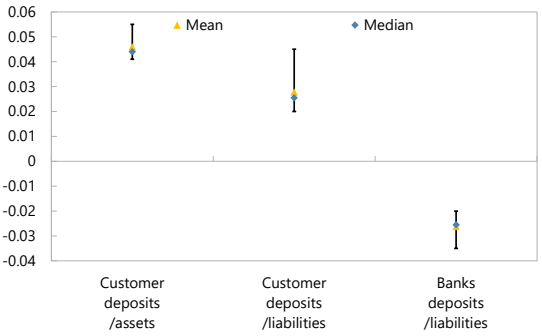
Source:

Impact of O-SII Buffers over Balance Sheet Size and Structure



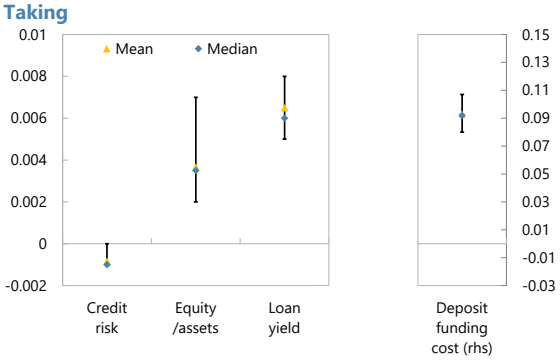
Sources: IMF staff estimates.

Impact of O-SII Buffers over Funding



Sources: IMF staff estimates.

Impact of O-SII Buffers over Pricing Power and Risk-Taking



Sources: IMF staff estimates.

Source: BCBS (2021) and Grodzicki and Jarmuzek (2021)

19. For the O-SII buffer, the Greek authorities should in the short term proceed with the envisaged phase-in period and consider reviewing the framework over the medium term. With the highly concentrated Greek banking system that exhibits relatively high structural systemic vulnerabilities, the current buffer rates appear to be on the low side and may not fully reflect the associated risk. The priority would be to ensure phasing-in fully the remaining buffer increase in 2023. Beyond phasing-in, more efforts may be needed to ensure full adequacy of the buffer for the identified vulnerabilities, building on the ongoing work to harmonize the methodologies for calibrating buffers across EU countries by the EBA (EBA, 2020).

20. For the CCyB buffer, the Greek authorities should consider to further extend the framework to guide the activation of this buffer over the medium term. Given the relatively low level of private sector indebtedness and the ongoing rapid clean-up of bank balance sheets, immediate activation of this macroprudential tool would be suboptimal. However, the identified emerging signs of systemic risk build-up warrant close monitoring and point to the need to rebuild resilience over time. Staff recommend that the authorities consider enhancing the methodology for the cyclical systemic risk assessment and introducing a positive neutral CCyB rate gradually over the medium term. Revision of the methodology could include such additional indicators as (i) new

lending flows, (ii) real estate price valuations and supply-side constraints, and (iii) alternative measures of credit gaps. These additional indicators would allow better detection of the build-up of systemic vulnerabilities and allow cross checking the signals coming from the existing monitoring framework. Introduction of the positive neutral CCyB rate should be underpinned by the revised risk identification methodology and exercised under the following preconditions: (a) a firm economic recovery; (b) advanced clean-up of bank NPLs; and (c) favorable financing conditions. This would allow enhancing resilience in advance of the realization of systemic risk stress and support credit supply through the release of the buffer during a downturn.

D. Conclusions and Policy Implications

21. Greece may be experiencing nascent signs of emerging systemic vulnerabilities. Following the extended period of private sector deleveraging, indicators capturing broad-based credit boom vulnerabilities suggest some releveraging. While the Basel credit gap measure is still estimated to be negative, alternative measures suggest positive gaps, with all the measures pointing to releveraging. Additional indicators show that new lending to households has surpassed disposable income growth and there are some imbalances building up in the real estate markets. In particular, residential real estate prices and, to a lesser extent, commercial real estate prices have gone up markedly since 2018, accompanied by a significant increase in the price-to-rent ratio amid some overvaluation for the residential segment and no discernible signs of supply constraints in the sector. Indicators capturing structural vulnerabilities point to a dominant role played by the highly concentrated and weakly capitalized banking system.

22. The macroprudential framework may therefore need to be revised to cover adequately the identified vulnerabilities and rebuild resilience. The current toolkit is solely composed of CCoB and O-SII buffers, with the CCyB never activated. The methodologies underpinning CCyB and O-SII buffer rate determination should be reviewed and revised in the short term. This would set the stage for preparing a conditions-based roadmap to guide the activation of the CCyB and possibly further enhancement of the O-SII buffers over the medium term. The activation of the CCyB would allow creating releasable buffers for times of stress to ensure credit provision and reduce output losses. In addition, reflecting the build-up of vulnerabilities in the real estate market, it would be important to prepare a conditions-based roadmap to guide the activation of borrower-based measures over the medium term, in case of further sectoral systemic risk build-up.

23. Further work should focus on calibration of the macroprudential policy toolkit. Once the underlying methodologies for the extended macroprudential toolkit are revised, a critical element of the roadmaps would be to ensure adequate calibration. For the CCyB, the tools that can be considered for calibration include early warning models of banking crises, general equilibrium models with an explicit role for bank capital, regulatory and market-based stress tests. For the borrower-based measures, building on the already initiated work by the BoG in line with the ESRB Recommendation, it would be important to further advance granular data gathering before proceeding to calibration.

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BANK PROFITABILITY DRIVERS AND CHALLENGES IN GREECE[1]

While the Greek banking sector has been healing, raising profitability in a sustained manner will be key to further strengthen its resilience. The two key profit sources include net interest income and net fee and commission income, which are found to be shaped by banking and especially macroeconomic factors. While profitability is expected to rebound in the near term, managing interest rate risk and exploring options to sustain income from fees and commissions require attention. Evidence from loan pricing along with profitability not entirely covering the cost of capital suggest the need for the banks to enhance their risk management frameworks and adapt their business models. Addressing these challenges would prepare the ground to increase profitability sustainably and face strategic challenges associated with increasing competition from non-banks.

A. Introduction

1. Greece's bank profitability has sharply deteriorated recently. The aggregated measure of bank profitability, return on equity (RoE), has slipped into negative territory over the last two years, culminating in an almost 20 percent drop at end-2021 (EBA, 2022).[2] The drop reflected primarily NPL disposal and the impact of the pandemic shock, although the net interest margin that constitutes the key income stream deteriorated earlier (BoG, 2021). While this has been partially offset by some increase in net fee and commission income (BoG, 2022), it remains significantly below the average for euro area banks.

2. Low profitability can pose significant financial stability risks. With weak profitability, building buffers against unexpected shocks becomes more challenging, reducing resilience (ECB, 2019). There might also be an adverse impact from excessive risk taking to compensate for lower underlying profitability (Babihuga and Spaltro, 2014), as well as lower attractiveness for investors to inject capital (Gopinath and others, 2017). In addition, lower profitability can limit bank capacity to fund loan growth. Of particular relevance for Greece, bank losses could trigger Deferred Tax Credit conversion and ensuing capital dilution.

3. Prudential authorities have therefore taken a keen interest in bank profitability. Two important elements of the framework for the supervisory review and evaluation process (SREP) are the internal capital adequacy assessment process (ICAAP) and the business model analysis (BMA), which involve inter alia an assessment of banks' historical profitability performance, as well as their forward-looking risk analyses exercised through stress testing (EBA 2010; 2018b). In addition to ICAAP and BMA, the ECB supervisory priorities provide important input for SREP and have focused

[1] Prepared by Shiqing Hua and Mariusz Jarmuzek. The authors would like to thank, without implicating, Michael Arghyrou, Miha Cajnko, Maximilian Fandl, Heather Gibson, Dimitris Malliaropulos, Spyros Pantelias, and Ioannis Tsikripis, as well as participants of the workshop held at the Bank of Greece for useful discussions and comments.

[2] While two out of four systemic institutions have recorded a small profit already in 2021, the whole system recorded a significant loss.

on profitability drivers in the broader context of assessing banks' business models (ECB 2018; 2019a; 2021). This is of particular importance for Greece where banks have displayed structurally weak profitability and are subject to a weak capital position combined with low quality of capital (BoG, 2022).

B. Bank Profitability Drivers

4. There is an established framework for analyzing bank profitability drivers. It embeds the bank dealership model linking profitability to bank characteristics developed by Ho and Saunders (1981) and its extensions, as well as the models linking profitability to the macroeconomic environment developed by Gerali and others (2009; 2010). The empirical framework combining banking and macroeconomic variables in the euro area banking system context has been proposed by Coffinet and others (2009) and implemented in the policy context by Henri and Kok (2013) and Dees and others (2017), focusing on key profitability items and modeling them separately.[3]

5. Banking variables affect profitability through various mechanisms. The basic model was developed by Ho and Saunders (1981) and subsequently extended by Angbazo (1997) and Maudos and Fernandez de Guevara (2004). It typically includes the impact of cost efficiency, capitalization, and size on bank margins. Banks that have a higher risk aversion are likely to be better capitalized and are perceived as more solvent, which should in principle reduce their funding costs and increase their margins. Banks tend to pass-on operating costs to their clients because these costs tend to increase as a result of new transactions or additional services, which banks recuperate through charging higher margins (Maudos and Fernandez de Guevara 2004). The higher the volume of loans, for a given total amount, the greater administrative overhead, and ultimately the lower margins. (Angbazo 1997 and Maudos and Fernandez de Guevara 2004). But it can be offset by a positive effect, as greater loan size may give rise to returns to scale, in line with the findings of Engle and others (2014) and Borio and others (2017). Concentration may be subject to opposing forces at play (Saunders and Schumacher, 2000; Berger, 1995).

6. The macroeconomic environment matters for profitability as well. Building on Gerali and others (2010), Alessandri and Nelson (2015) have developed a model for analyzing the impact of macroeconomic factors that hinges on the strength of market power in the banking system. For the interest rate level, thanks to their market power, banks can pass-on increases in their funding cost to borrowers and shrink their lending quantities in response to higher funding costs. With higher long-term rates, banks reprice loans, raising the loan rate and moving along the loan demand curve. With lower long-term government bond rates, Albertazzi and Gambacorta (2009) suggest that savers need more professional services provided by banks to manage their own portfolios and/or interest margins are squeezed, so banks tend to focus more on fee-earning activities. An improvement in economic conditions increases lending demand by households and firms and improves the financial conditions of borrowers, with positive effects on the profitability of traditional financial intermediation activities (DeYoung and Rice 2004, Coffinet and others 2009,

[3] Borio and others (2015, 2017) model key profitability items for a sample of global banks separately.

Albertazzi and Gambacorta 2009). Banks tend to generate higher income when stock markets perform better (Lehmann and Manz 2006, Kok and others 2019, Gross and others, 2021).

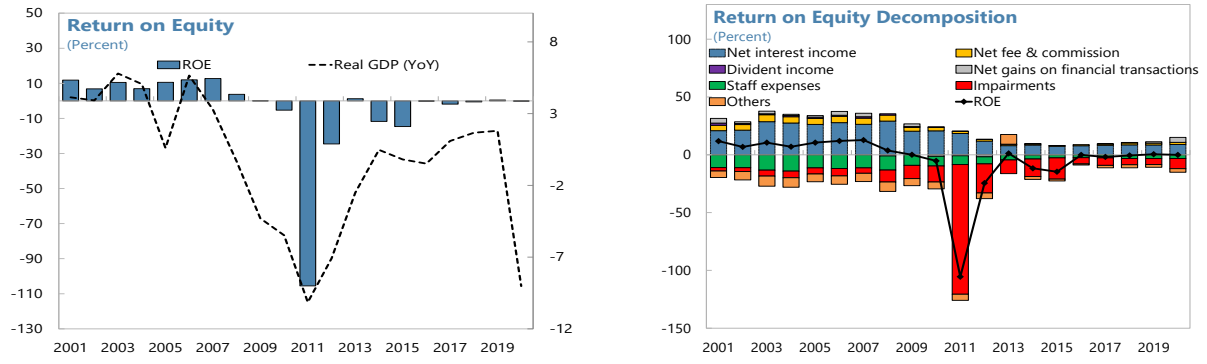
7. While there have been numerous studies of Greece's bank profitability, all of them date back to earlier periods. One of the first attempts is the study by Staikouras and Steliaros (1999) that found that a combination of select banking and macroeconomic variables were the key determinants of RoE for a panel of banks during the 1990s. Expanding the set of explanatory variables, Eichengreen and Gibson (2001) and Mamatzakis and Remoundos (2003) examined factors driving RoE and found that banking variables were primarily shaping profitability. Athanasolou et al (2008) and Kosmidou (2008) account explicitly for the impact of macroeconomic and banking variables, finding the importance of capital and the business cycle for RoE. Alexiou and Sofoklis (2009) go beyond the pre-eurozone period, identifying banking variables as drivers of RoE. The first study that zooms in on profitability is by Drakos (2002) who analyzes the determinants of the net interest margin. The first and so far only comprehensive study of the two key profitability income streams is by Louzis and Vouldis (2015) who examine a large set of banking and macroeconomic variables, but their analysis covers only the period 2004-2011, which was followed by significant structural changes in the banking system.[4]

C. Empirical Analysis of Profitability Drivers

Descriptive Analysis

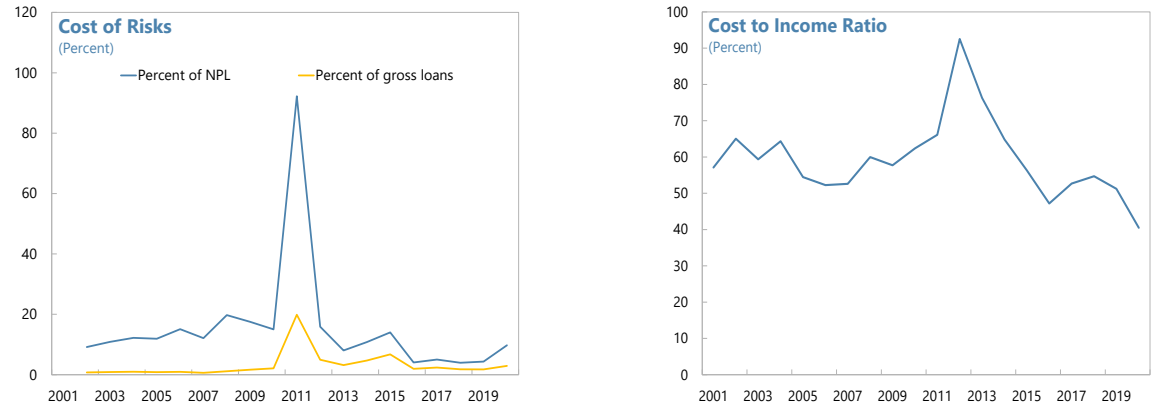
8. Bank profitability has suffered from a series of substantial shocks over the last decade. While prior to the Global Financial Crises (GFC) the Greek banking system was quite profitable, banks inherited in the aftermath of the GFC an unprecedented amount of NPLs and recorded massive losses. The pandemic has added further pressure to bank balance sheets. Given the magnitude of the shocks and ensuing NPL disposal costs, banks have not yet been able to return to the pre-GFC profitability levels. The contribution of impairments, from loan loss provisions for NPLs on RoE has often exceeded net interest income. The cost of risk has therefore spiked, while expenses have remained supportive reflecting staff and branch reductions.

Figure 1. Greece: Aggregate Profitability and Its Decomposition



[4] There were many mergers and acquisitions that led to a significant reduction in the number of banks in Greece.

Figure 1. Greece: Aggregate Profitability and Its Decomposition (Concluded)



Source: Bank of Greece; Eurostat; Haver Analytics; and IMF staff calculations.

9. The income has been predominantly generated by traditional banking intermediation influenced by the interest rate environment. The share of net interest income in operating income, which represents traditional banking intermediation, has been by far the dominant source of income for Greek banks. The net interest margin, defined as net interest income scaled by assets, has shown a generally declining trend, reflecting the low-rate environment partially offset by yield curve steepening. Given the subsequent yield curve flattening coupled with the adverse impact of the pandemic and NPL sales on loan volumes, margins have further declined. The net fee and commission income has a much lower significance compared to the EA average, although this item has shown a better performance for Greece when expressed in earning assets terms. The net interest income along with the net fee and commission income have historically accounted for 70 to 90 percent of operating income, making them the main source of profitability.

Figure 2. Greece: Key Sources of Bank Income

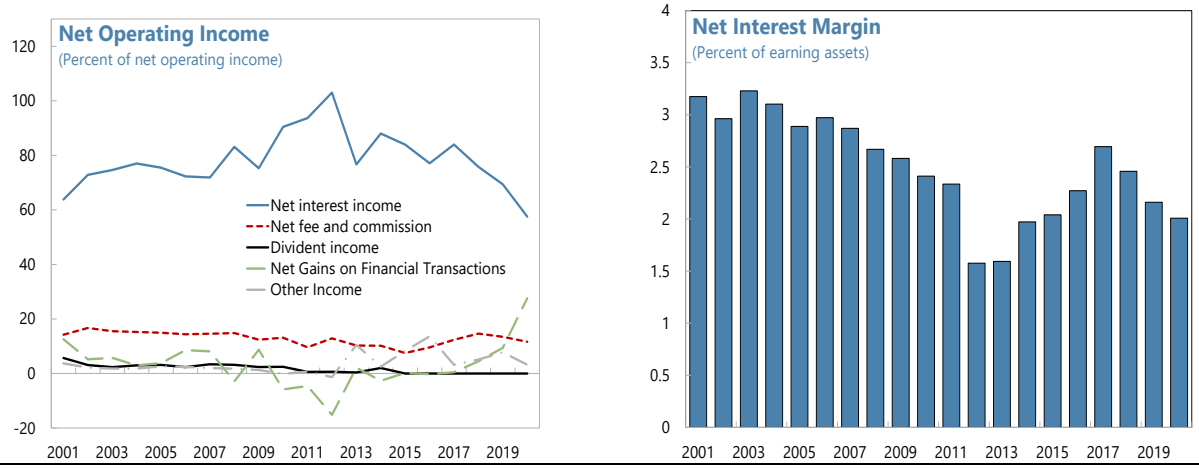
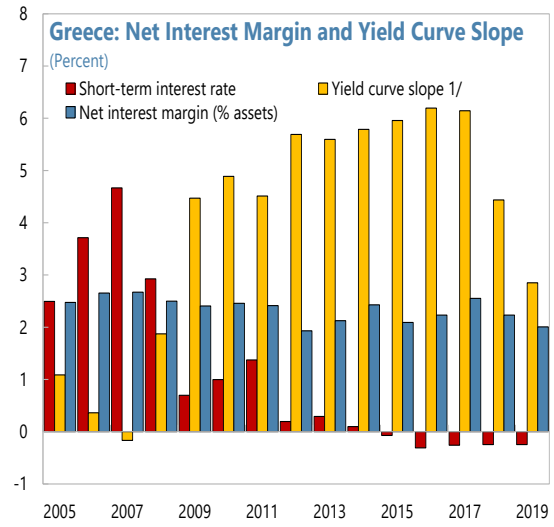
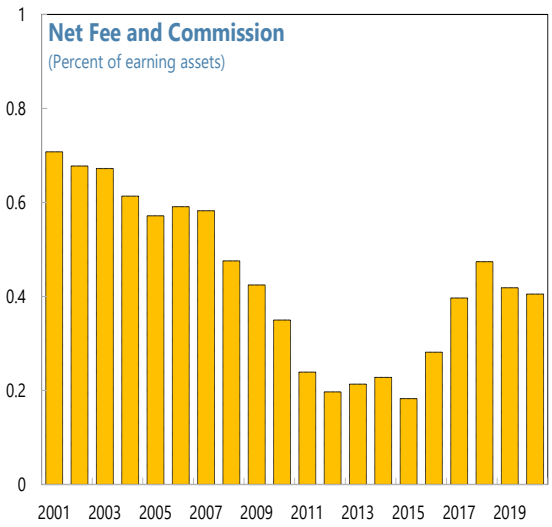


Figure 2. Greece: Key Sources of Bank Income (Concluded)





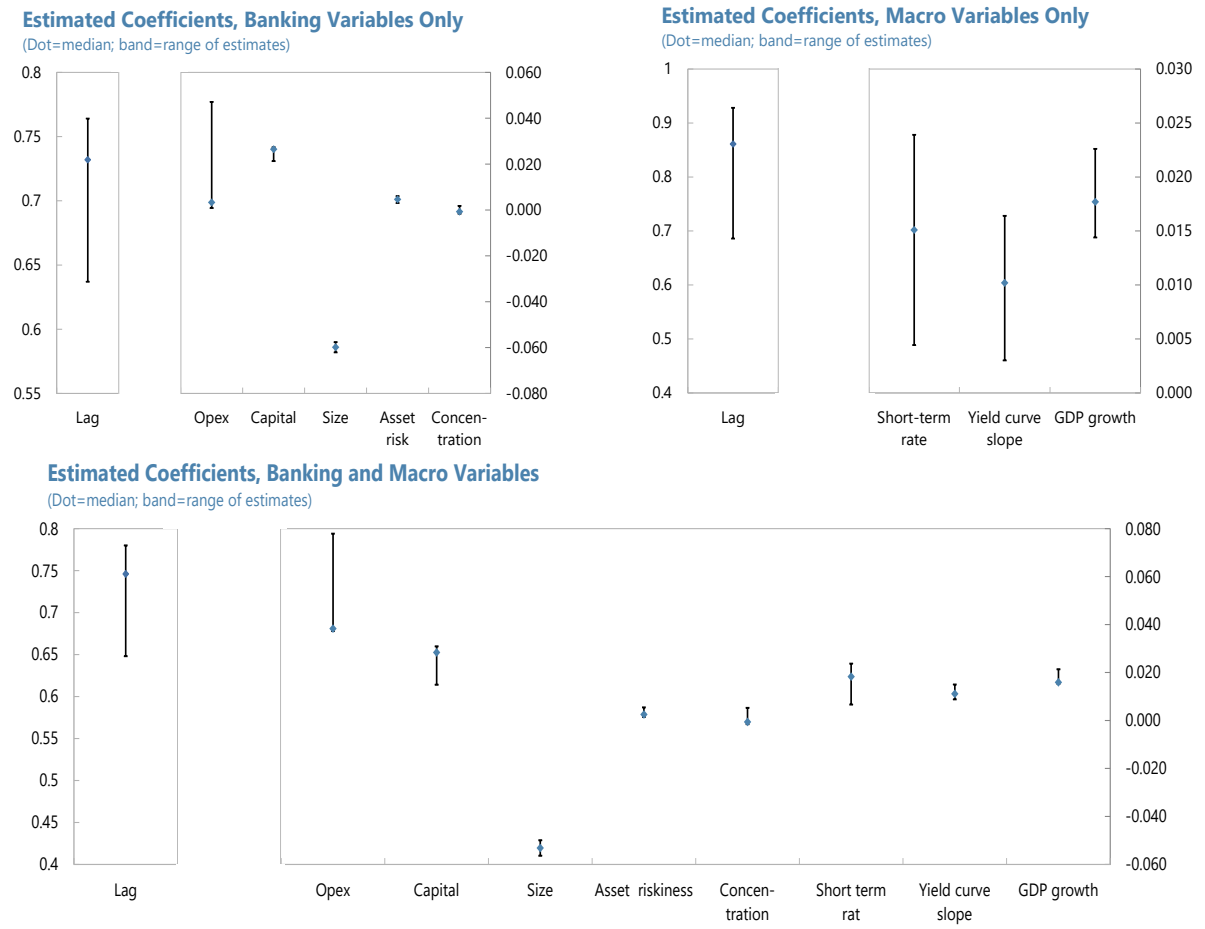
Source: Bank of Greece; European Central Bank; and IMF staff calculations.
1/ defined as the difference between long-term and short-term interest rate.

Econometric Analysis

10. Additional insights on profitability drivers can be derived from panel regressions. Using an unbalanced panel of banks for the period from 2007 to 2019 allows us to test the significance of banking and macroeconomic factors, as well as their relative economic importance. The two key profitability items, net interest income and net fee and commission income, are analyzed separately. The data and methodology are described in the Annex.

11. Both banking and macroeconomic variables explain net interest income. For banking variables, consistent with the bank-dealership model presented in Borio and others (2017) and Jarmuzek and Lybek (2020), banks with higher operating costs, risk aversion, and credit risk tend to have higher margins, while those with higher transaction size tend to have lower margins. The evidence for concentration is inconclusive, confirming the ambiguity suggested by theory and earlier results, but it is vital to control for this variable. For macroeconomic variables, in line with the findings of Claessens and others (2018), there is solid evidence that interest rates, both in terms of level and term spread, as well as economic growth have some bearing on net interest income. The analysis of relative strength of banking and macroeconomic variables suggests that macroeconomic variables are substantially more significant in terms of their impact than banking variables (Annex).

Figure 3. Drivers of Net Interest Income



Source: IMF staff estimates.

12. Banking and macroeconomic variables are also found to shape the net fee and commission income. For banking variables, banks with higher capitalization and cost efficiency tend to have higher net fee and commission income, corroborating the results obtained by Hahm (2008) and Tennant and Sutherland (2014). In line with evidence form Engle et al. (2014), those banks with higher transaction size tend to have lower net fee and commission income. For macroeconomic variables, the results confirm the relevance of economic growth and stock market performance as factors conducive to higher fee and commission income. Consistent with evidence by Albertazzi and Gambacorta (2009) and Kok and others (2019), the adverse impact of interest rates on this income item is confirmed. Similarly to the net interest income, the analysis of relative strength of banking and macroeconomic variables points to macroeconomic variables being more important in terms of their impact than banking variables, although the contrast is less stark for the net fee and commission income (Annex).

Figure 4. Drivers of Net Fee and Commission Income

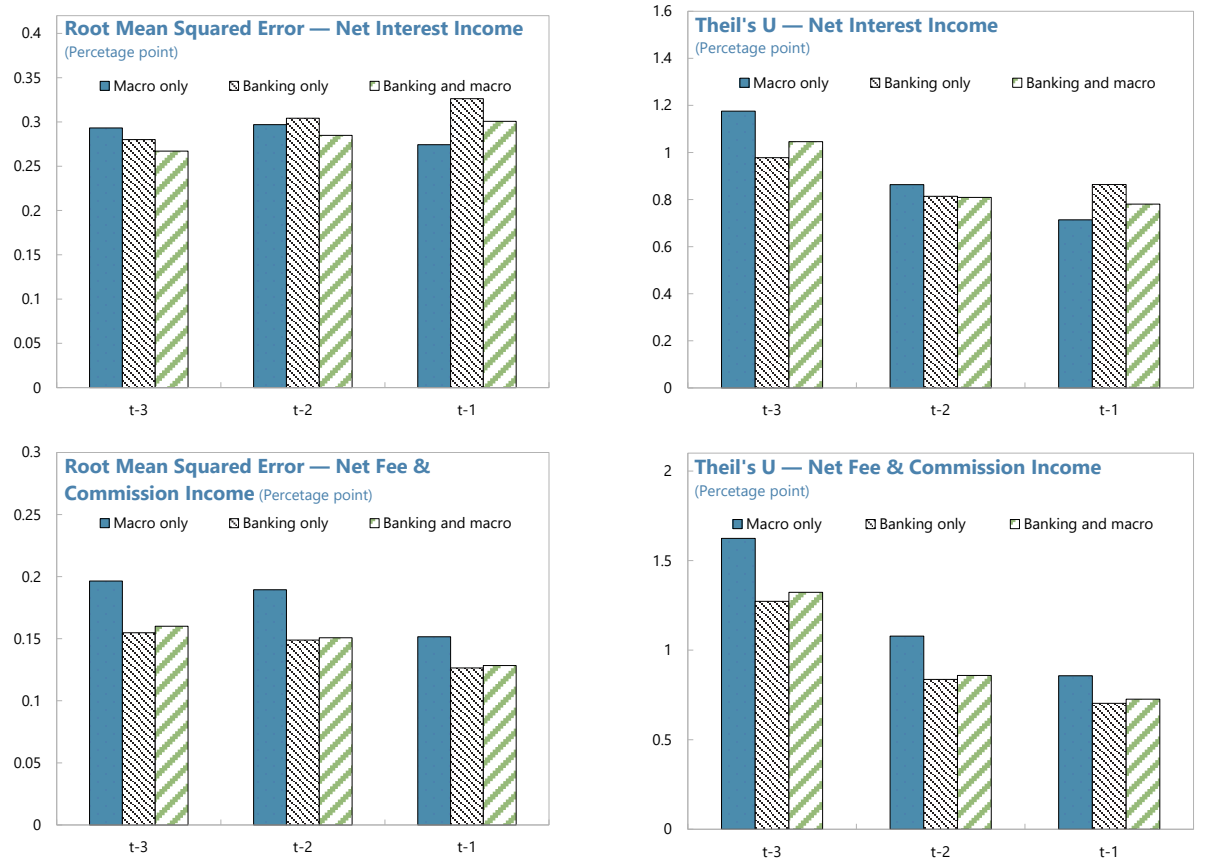
Source: IMF staff estimates.

D. Scenario Analysis

13. The scenario analysis hinges on models embedding only macroeconomic variables. The analysis of relative strength of variables has shown that macroeconomic variables dominate. But it is also important to establish if the models relying solely on macroeconomic variables perform well in terms of out-of-sample forecasting. Following Diebold (2017), the models including only macroeconomic variables are compared to the models including both macroeconomic and banking variables using the root mean squared error (RMSE) and the U-Theil ratio over different horizons. In addition, drawing on Timmermann and Zhu (2019), all the models are compared to the basic autoregressive model, AR(1), also in terms of RMSE and the U-Theil ratio over different horizons. The results show that models accounting for banking variables certainly provide valuable insights about the underlying drivers of profitability, which is in line with the established theoretical and empirical literature, but their forecasting performance does not systematically appear to be superior and there

are significant costs associated with those models.[5] This finding lends some credence to employing models of profitability including only macroeconomic variables.

Figure 5. Forecasting Accuracy Results



Source: IMF staff estimates.

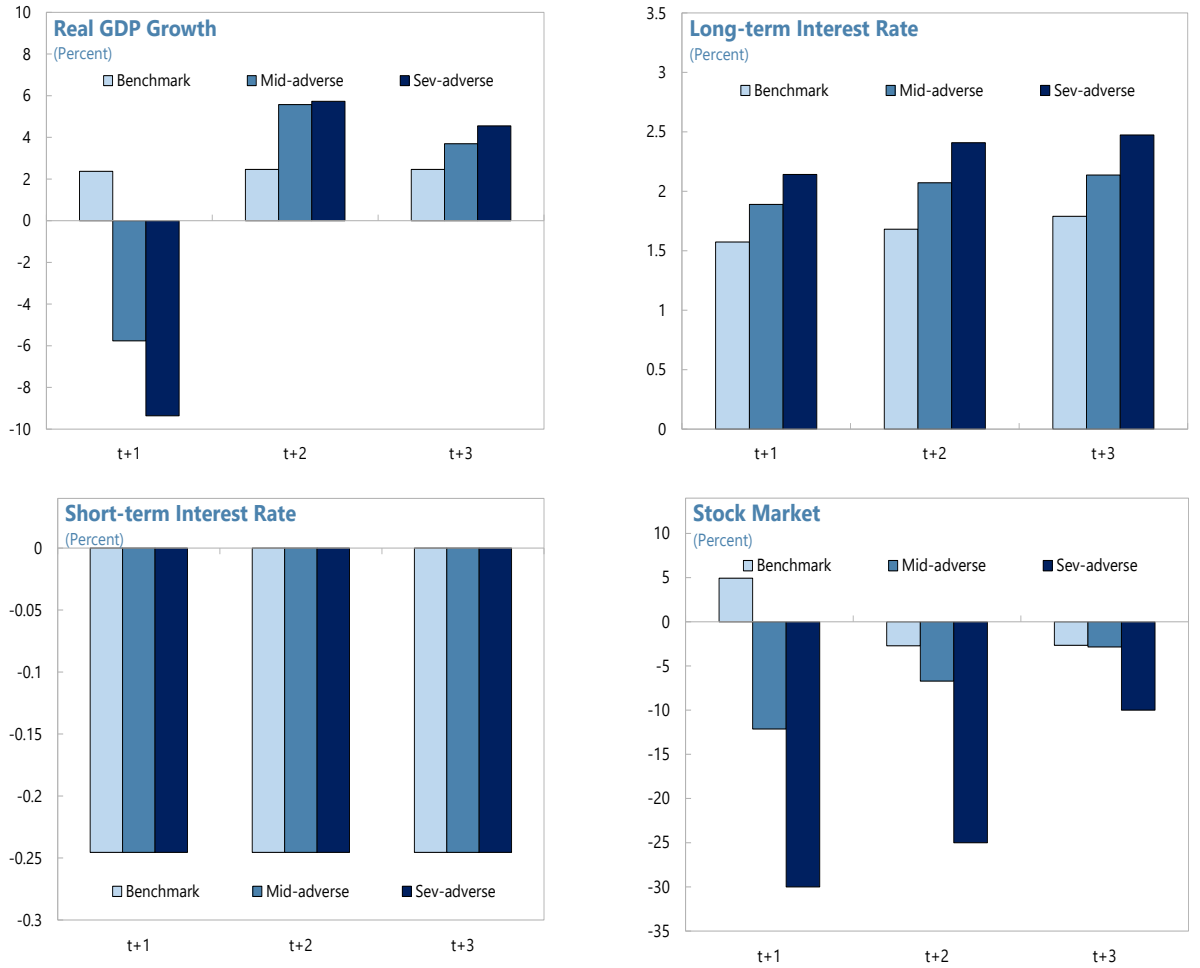
Macroeconomic Assumptions

14. Illustrative scenarios are based on a consistent set of macroeconomic and financial projections. The scenarios are meant to shed light on the sensitivity of bank profitability to macroeconomic developments and are mainly illustrative. Following the approach taken by Kok and others (2017, 2019) and Gross and others (2021), the macroeconomic and financial scenarios prepared by the ECB for Greece in the context of the 2020 Vulnerability Analysis, described in European Central Bank (2020b), are fed into the estimated benchmark models. The baseline scenario from the EU 2020 stress test (European Systemic Risk Board 2020; European Central Bank 2019b) is set as the benchmark. The two adverse scenarios developed by the Eurosystem staff (European

[5] The costs involve the need to make assumptions for banking variables across all the banks over the projection horizon. This may look feasible at first glance, but in practice would require detailed information on bank management policy, with the challenge that there might be different management policies undertaken in response to different macroeconomic scenarios.

Central Bank 2020a) capture a different degree of severity associated with the Covid-19 shock and are labelled the mid-adverse and severe-adverse scenarios, respectively.

Figure 6. Greece: Macroeconomic Assumptions for Greece

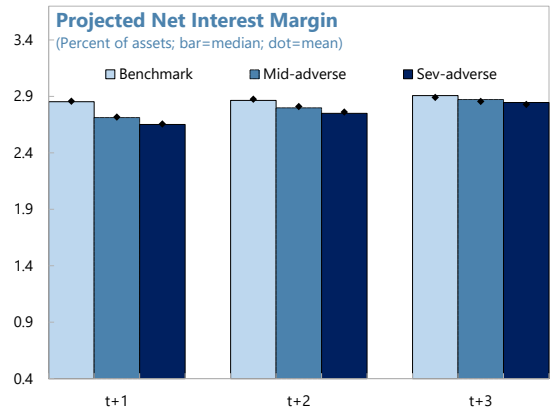


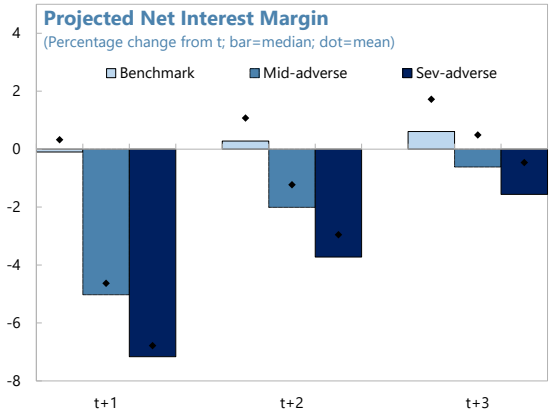
Source: European Banking Authority.

Results for Key Income Sources

15. The benchmark scenario suggests a steady net interest income stream, but there is significant sensitivity to adverse macroeconomic conditions. The benchmark scenario generates on average a steady improvement in the net interest margin over the projection horizon. This is in sharp contrast with the adverse scenarios, under which net interest income declines significantly, especially in year 1 mirroring the projected V-shaped recovery profile, notwithstanding the assumed yield curve slope steepening.

Figure 7. Greece: Net Interest Income Under Scenarios

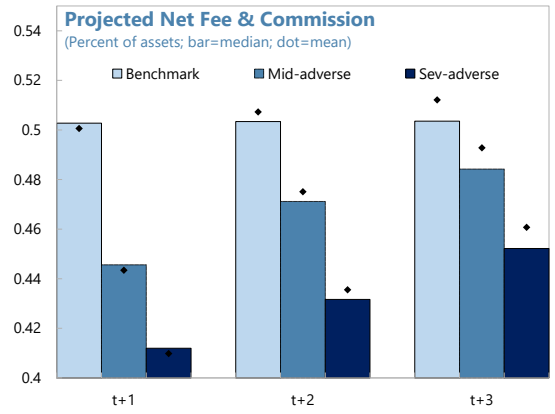


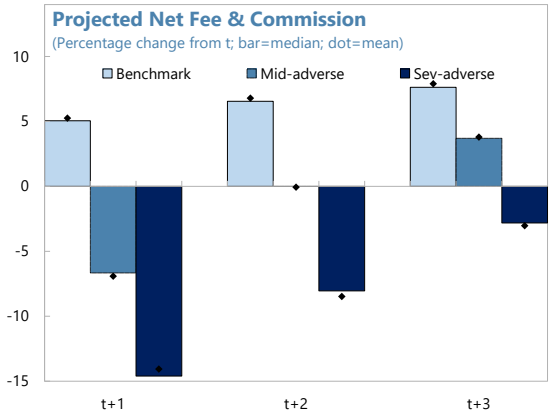


Source: IMF staff projections.

16. Similarly, banks are projected to generate stable net fee and commission income under the benchmark scenario, with marked downturn under the adverse scenarios. The results for the benchmark scenario exhibit, on average, a mild trend upwards, which is, however, in stark contrast to the severe adverse scenario that envisages net interest income plummeting not only in year 1, but also remaining depressed in year 2 and 3. Compared to net interest income, the different profile for rebound in this income source and the difference between the severe and mildly-adverse scenarios are likely to be driven by the stock market variables for which only a limited recovery is assumed.

Figure 8. Greece: Net Fee and Commission Income Under Scenarios





Source: IMF staff projections.

Aggregated Profitability

17. The simulation for the overall profitability suggests some rebound over the medium term. Since RoE is employed as the metric capturing aggregated profitability, it requires additional

assumptions for impairments and provisions and operating expenses, as well as other items.[6] Building on these assumptions and using the results of the baseline scenario for the two key profitability items suggests a gradual recovery of the aggregated profitability over the next three years. In terms of RoE, the simulation suggests a return to the range of 7-9 percent, which is broadly in line with results recorded between 2001 and 2004, but well short of the boom years spanning the period 2005-2008. The simulated range is in line with market analysts' forecasts of RoE for the major Greek banks (Figure 9).[7]

E. Cost of Equity

18. The cost of equity (CoE) for banks is an important consideration in assessing business model sustainability. CoE for banks is equivalent to the compensation that market participants demand for investing and holding banks' equity (Altavilla and others, 2021). A high cost of equity and the ensuing limitations for raising new capital may prevent banks from enhancing their buffers against negative shocks (Altavilla and others, 2021). When assessing business model sustainability, banking supervisors may compare CoE to past and projected RoE, with the underlying principle that RoE should not be persistently below CoE (ECB, 2019; KPMG, 2021). The importance of RoE exceeding CoE has been reiterated in the ECB's recent assessment of bank business model sustainability in the context of the SREP for 2021 (ECB, 2022). While CoE is not directly observable, it can be estimated based on models and surveys. CoE estimated based on bank fundamentals suggests that riskier profiles are associated with higher CoE, with particular importance of NPLs (Altavilla and others, 2021).

19. Despite the projected rebound of Greece's bank profitability, it may not fully cover investors' expectations. The latest available estimates of CoE reported by EBA (2021) suggest that around 40 percent of the EU banks estimated their CoE between 8 and 10 percent and another 30 percent between 10 and 12 percent, with the latter rising significantly. Reflecting the generally riskier profile of Greek banks, the market-implied CoE has been estimated within the range of 12-17 percent.[8] This is broadly consistent with investors' valuations of the Greek banks in terms of the price-to-book ratio, which is significantly below one for the four major banks. Comparing the RoE simulated for the major Greek banks in Section D to the estimated range for CoE of 12-17 percent points to some gap between investors' expectations and projected bank profitability performance.[9]

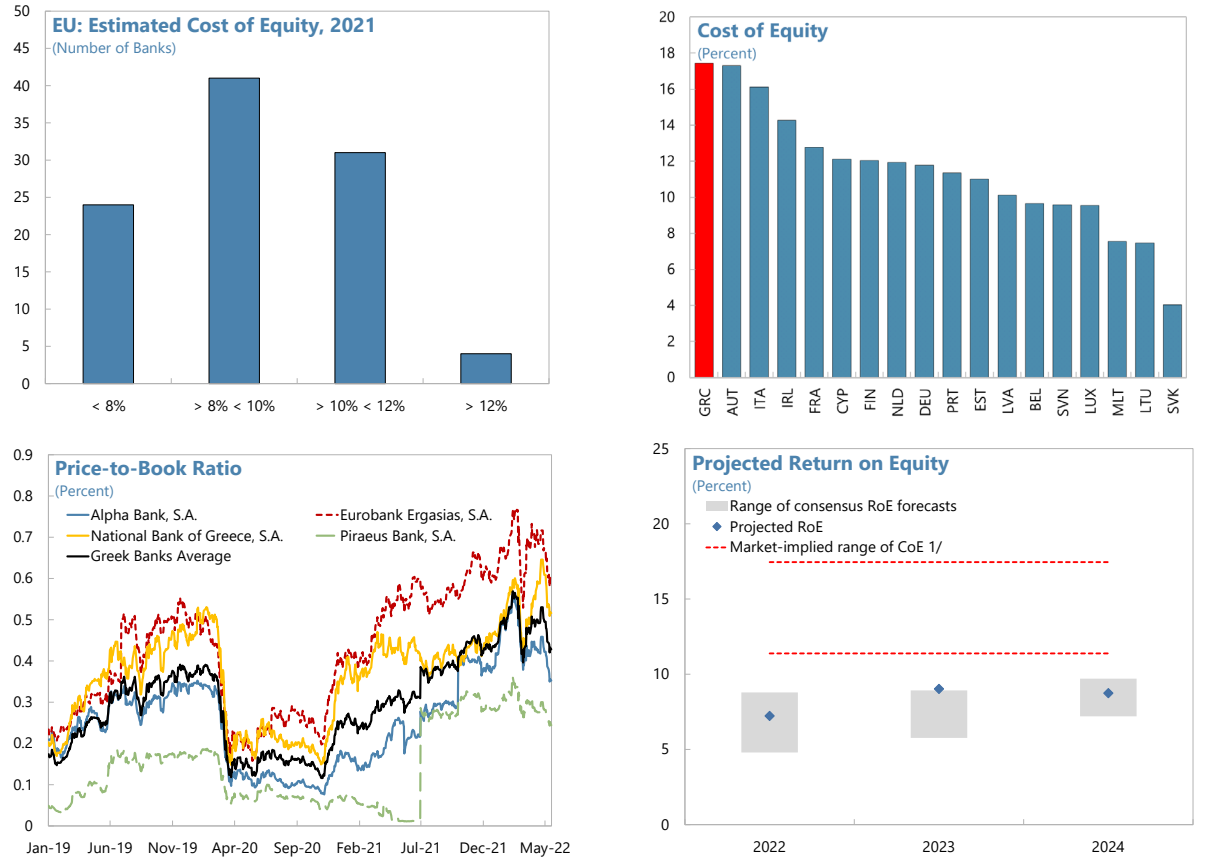
[6] Given that inorganic actions to reduce NPLs through the Hercules program with state guarantees is expected to come to an end soon, one can expect only a moderate contribution from securitizations going forward. For operating expenses, an average based on the last five years is assumed, while assets are assumed to grow with GDP.

[7] RoE forecasts for the major Greek banks were extracted from Bloomberg

[8] CoE was extracted from Bloomberg computed based on the standard CAPM model.

[9] Some of the Greek banks were nevertheless able to raise capital in 2021 (BoG, 2021). In addition, some rating agencies upgraded select Greek banks. For example, Moody's upgraded five banks and maintained a positive outlook citing inter alia improved asset quality and recurring profitability, as well as strengthened institutional and governance conditions, with the latter underpinned by an increase in "Macro Profile" for Greece from "Weak" to "Weak+" (Moody's, 2022).

Figure 9. Greece: Cost of Equity and Profitability



Source: Bloomberg Finance L.P.; European Banking Authority; and IMF staff calculations.
1/ 25th and 75th percentile of data from 2019 to 2022.

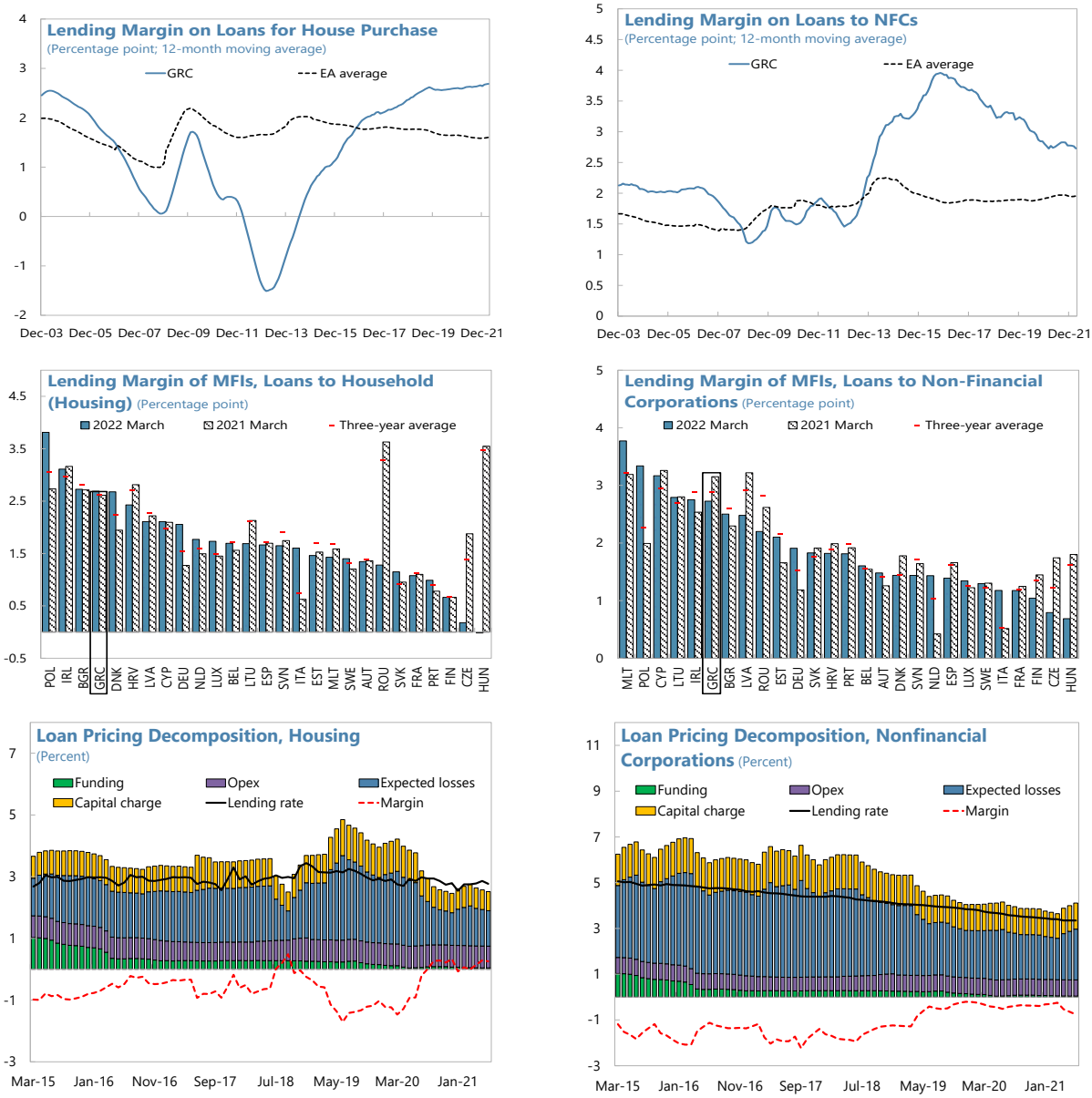
F. Loan Pricing

20. Adequate loan pricing is another indispensable element in assessing bank business model sustainability. With high reliance on interest income in most of banking systems, including Greece, lending margins need to be closely monitored. For example, FED (1996) provides guidance for its bank examiners that interest rates on loans must be sufficient to cover the cost of the funds loaned, the bank's loan services, and probable losses, ensuring a reasonable profit margin. In the European context, ECB (2018) identified weaknesses in loan pricing and called on euro area banks to develop a comprehensive pricing framework and apply it consistently, with minimum floors for pricing decisions. Responding to the high level of NPLs in the EU, the EBA has recently issued guidelines on banks' loan origination and monitoring to ensure that newly granted loans are of high credit quality (EBA, 2020). One of the key elements of these guidelines is loan pricing, which should include cost of funding, credit risk cost, cost of capital, operating expenses, and considerations related to competition and market conditions.

21. While lending margins in Greece are high, they appear not to fully cover risks. Lending margins in Greece have generally been well above the EA average, except for Ireland and Cyprus. But these margins do not seem to have covered the relevant risks that Greek banks have faced when

originating loans. Following the EBA guidelines and the ECB methodology for loan pricing adequacy, it appears that Greek banks may not have covered sufficiently all the involved risks.[10] In particular, expected losses associated with credit risk are estimated to weigh heavily on margins, in addition to capital charges and other costs. The calculations suggest that the underlying loan pricing may have not entirely covered all the relevant costs and risks for both corporate and mortgage loans, with the former likely reflecting a particularly high degree of competition among banks.

Figure 10. Greece: Lending Margins and Loan Pricing



Source: European Central Bank; Haver Analytics; and IMF staff calculations.

[10] ECB (2017) presents the methodology for loan pricing decomposition for the euro area as a whole, while Oliveira and Elliot (2012) use a similar formula for estimating changes to lending rates. More details on the approach in the Annex.

G. Conclusions and Policy Implications

22. The main bank income sources are determined by both macroeconomic and banking variables, with the former dominating. The two key items of profitability include net interest income and net fee and commission income, which both depend on banking characteristics and macroeconomic variables. The identified macroeconomic drivers include the interest rate level and slope and economic activity, while relevant banking drivers include the capital position, operating expenses, size, and asset riskiness. In terms of economic significance, the dominant role has nevertheless been played by macroeconomic variables. Testing for forecasting accuracy suggests that those models composed of macroeconomic variables do not generally perform worse compared to the models composed of only banking variables or banking and macroeconomic variables. This suggests significant sensitivity to the macroeconomic environment and lends credence to employing models for the scenario analysis that rely solely on macroeconomic variables.

23. While profitability is expected to rebound in near term, bank business models may need to be adapted to strengthen resilience. Assuming a benchmark economic performance scenario, the analysis suggests a recovery of aggregate profitability over the next three years. While this would be a welcome development for the major Greek banks, the sensitivity to macroeconomic performance suggests some caution. In addition, even if the benchmark scenario materializes, the estimated margins underpinning the simulated RoE may fall short of the market-implied COE and may not fully reflect the risk profile of Greece, suggesting the need to swiftly adapt bank business models.

24. These findings may potentially be useful for banking supervisors. Given the heavy reliance of profitability on the macroeconomic environment, attention may need to be paid to managing interest rate risk by Greek banks, which can be exercised by supervisors in the context of the ICAAP component focused on interest rate risk of the banking book and stress testing. In addition, with the identified relevance of the weak capital position and significant credit risk, additional efforts may be needed to monitor these factors and require Greek banks to take extra actions on this front, especially in the context of the EBA guidance on loan pricing. Moreover, there may be a need to investigate avenues to sustain the recently increased income of Greek banks from fees and commissions, which could be done in the context of the BMA. More generally, supervisors may utilize their prerogatives under the SREP framework to exert some influence on banks, so that they adapt their business models to face strategic challenges and restore sustainable profitability drivers, as suggested by the most recent strategic supervisory priorities (ECB, 2021).

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Annex I. Technical Aspects

Methodology

Building on Maudos and Fernández de Guevara (2004), Alessandri and Nelson (2015) and Kok and others (2019), we merge the existing literature encompassing banking variables with the literature capturing the role of macroeconomic variables. To test empirically the relevance of those two strands of the literature, variants of the following equation are estimated:

$$Y_{it} = \alpha_0 + \sum_{j=1}^{p} \alpha_1 Y_{it-j} + \sum_{j=0}^{q} \sum_{k=1}^{l} \alpha_{2,k} BV_{k,it-j} + \sum_{j=0}^{r} \sum_{k=1}^{m} \alpha_{3,k} MACV_{k,it-j} + \varepsilon_{it}$$

where Y denotes bank profitability in bank i at time t, which is explained by banking variables (BV) and macroeconomic and financial variables (MACV). The estimated models also include the lagged dependent variable.

A preliminary analysis involves testing for slope homogeneity and multicollinearity. While the sample of analyzed banks can be considered relatively homogenous, formal testing is applied to confirm it. Specifically, the underlying data are composed of banks that are subject to direct supervision by the SSM, so despite differences in business models can be considered relatively homogenous. To test it formally, we follow Pesaran and Yamagata (2008) and Blomquist and others (2013) who provide a framework to examine slope homogeneity. In addition, since multicollinearity can be an issue, which could lead to estimating incorrectly regression coefficients, it is also tested formally using the standard method of variance inflation factors.

Fixed-effect (FE) estimators are employed as benchmarks, with robustness check provided by the General Method of Moments (GMM) estimators. The starting point for estimation involves a standard FE model, but since the specification includes a lagged dependent variable, the results may suffer from estimator inconsistency, as pointed out by Nickel (1981). To remedy this, the bias-corrected FE estimator developed by Kiviet (1995) and advanced by Bruno (2005) is employed in our study. This estimator is assessed to perform better than instrumental variable and GMM estimators in the presence of unobserved heterogeneity and residual serial correlation, which are prevalent in empirical finance literature. Specifically, Dang and others (2015) drawing on earlier research by Bruno (2005) and Kiviet (1995) demonstrate that the bias-corrected FE estimators outperform instrumental variable and GMM estimators across many dimensions, concluding that the use of the latter should be exercised with caution in the empirical finance context. In addition, implementing the GMM estimator involves some arbitrary choices about the instrument's specific structure and the number of lags (Beutler and others, 2020). The use of the GMM estimators developed by Arellano and Bond (1991) and Blundell and Bond (1998) can however still be justified to account for potential endogeneity. Reflecting these findings, recent empirical studies of bank profitability use bias-corrected FE estimators along with standard FE and GMM estimators reported as robustness checks, as evidenced for example by Kok and others (2019) and Gross and others (2021).

An analysis of relative strength of factors underpinning bank profitability is also conducted. Drawing on Maudos and Fernandez de Guevara (2004) and Ashraf and others (2016), the analysis involves

computing implicit elasticities for the explanatory variables evaluated at sample means, which allows estimating the impact of one standard deviation change in the explanatory variables on respective measures of profitability.

Data

The analysis is based on annual bank-level data complemented by macroeconomic variables. Bank-specific variables are sourced from Fitch. The dataset covers 100 banks located in euro area countries, which are subject to the direct supervision of the SSM, spanning the period of 2005-2019. Drawing on the literature, the dependent variables representing the key income item are the net interest income over assets and the net fee and commission income over assets. The data are not available for all jurisdictions. Macroeconomic variables are sourced from the ECB statistical data warehouse (SDW), with the scenarios taken from the vulnerability assessment exercise of ECB (European Central Bank 2020b). The considered variables were winsorized to limit the effect of outliers on the estimation results.

Table 1: Variable Definitions and Sources

Abbreviation	Variable	Definition	Source
nim	net interest income	net interest income over asset	Fitch
nfc	net fees and commission income	net fees and commission income over assets	Fitch
opex	operating expenses	administrative expenses over assets	Fitch
capital	capital adequacy	common equity over assets	Fitch
size	size	log of assets	Fitch
riskiness	asset riskiness	risk-weighted assets over total assets	Fitch
concentration	concentration	share of three largest banks in total assets	Fitch
short-term rate	money market rate	money market rate	ECB SDW
yield curve slope	yield curve slope	long-term rate minus short-term rate	ECB SDW
GDP growth	GDP growth rate	annual growth rate of gross domestic product	ECB SDW
stock market	stock market return	national stock market index change	ECB SDW

Results

Table 2: Slope Homogeneity Test

	Net interest income		Net fees and commission income	
	Delta	p-value	Delta	p-value
Persaran-Yamagata	-1.208	0.227	-1.209	0.227
Blomquist-Westerlund	-1.904	0.057	-0.862	0.389

Table 3: Regression Results for the Net Interest Income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		corrected			corrected			corrected	
	FE	FE	GMM	FE	FE	GMM	FE	FE	GMM
Lagged	0.637***	0.764***	0.732***	0.686***	0.861***	0.928***	0.648***	0.780***	0.746***
	(0.0254)	(0.00582)	(0.00385)	(0.0222)	(0.0113)	(0.00186)	(0.026)	(0.0231)	(0.00399)
Opex	0.0033	0.000866	0.0471***				0.0383**	0.0373***	0.0779***
	(0.014)	(0.0136)	(0.00107)				(0.0153)	(0.0124)	(0.00188)
Capital	0.0274***	0.0265***	0.0213***				0.0309***	0.0284***	0.0149***
	(0.00527	(0.000978)	(0.000669)				(0.00581)	(0.00578)	(0.00113)
Size	-0.0621*	-0.0576***	-0.0118***				-0.0564	-0.0499**	-0.0147***
	(0.0378)	(0.0156)	(0.00155)				(0.0396)	(0.0229)	(0.00241)
Asset riskiness	0.00461***	0.00303***	0.00607***				0.00251*	0.00152*	0.00545***
	(0.00106)	(0.00103)	(0.000102)				(0.0013)	(0.000819)	(0.000256)
Concentration	-0.00164	-0.000752	0.00178***				-0.00152	-0.000581	0.00524***
	(0.00147)	(0.00182)	(0.000098)				(0.0015)	(0.000575)	(0.000262)
Short-term rate				0.0151***	0.00444***	0.0239***	0.0237***	0.0183***	0.00667***
				(0.00569)	(0.000239)	(0.00055)	(0.00767	(0.00689)	(0.00144)
Yield curve slope				0.0164*	0.0102	0.00301***	0.015	0.0111***	0.00883***
				(0.0103)	(0.00975)	(0.000585)	(0.0106)	(0.00293)	(0.0012)
GDP growth				0.0144*	0.0177***	0.0226***	0.0153***	0.0159***	0.0214***
				(0.00439)	(0.00281)	(0.000407)	(0.00489)	(0.00183)	(0.000646)
AR(1)			0.070			0.000			0.046
AR(2)			0.874			0.584			0.989
Overidentifying restriction test			0.465			0.470			0.895
N of groups	93	93	93	93	93	93	93	93	93
Observation	968	968	968	968	968	968	968	968	968

Source: IMF staff estimates.

Table 4: Regression Results for the Net Fee and Commission Income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	FE	corrected FE	GMM	FE	corrected FE	GMM	FE	corrected FE	GMM
Lagged	0.546***	0.673***	0.786***	0.587***	0.767***	0.869***	0.519***	0.643***	0.768***
	(0.0224)	(0.0355)	(0.000274)	(0.0237)	(0.0244)	(0.000359)	(0.0232)	(0.0359)	(0.0013)
Opex	0.0477***	0.0465***	0.0545***				0.0618***	0.0610***	0.0688***
	(0.00543)	(0.0076)	(0.0000717)				(0.00602)	(0.0061)	(0.000515)
Capital	0.0134***	0.0125***	0.00627***				0.0103***	0.00918***	0.00340***
	(0.00202)	(0.00549)	(0.0000638)				(0.0023)	(0.00332)	(0.000256)
Size	-0.0409***	-0.0319*	-0.00567***				-0.0479***	-0.0375***	-0.00700***
	(0.0128)	(0.0193)	(0.000214)				(0.0136)	(0.0144)	(0.000864)
Concentration	0.000447	0.000837	-0.00142***				0.00016	0.000571	-0.00165***
	(0.000547)	(0.00082)	(0.0000108)				(0.000558)	(0.000424)	(0.0000373)
Long-term rate				-0.00455*	-0.00324	0.00391***	-0.00448*	-0.00274	-0.00899***
				(0.0027)	(0.00306)	(0.0000752)	(0.00275)	(0.0033)	(0.000233)
Δlong-term rate				-0.00205	-0.00559	-0.0172***	-0.00364	-0.00658	-0.00313***
				(0.00645)	(0.00615)	(0.000149)	(0.00603)	(0.0054)	(0.000514)
GDP growth				0.00555***	0.00519***	0.00439***	0.00932***	0.00860***	0.00679***
				(0.00176)	(0.00123)	(0.0000573)	(0.00172)	(0.00121)	(0.00115)
Stock Market				0.000653***	0.000712***	0.000853***	0.000547***	0.000594***	0.000539***
				(0.000198)	(0.000225)	(0.00000658)	(0.000185)	(0.000194)	(0.0000127)
AR(1)			0.003			0.026			0.007
AR(2)			0.320			0.157			0.279
Overidentifying restriction test			0.354			0.571			0.325
N of groups	106	106	106	106	106	106	106	106	106
Observation	1263	1263	1263	1263	1263	1263	1263	1263	1263

Source: IMF staff estimates.

Table 5: Testing Homogeneity of Greek Banks

	(1)	(2)
	NIM	NFC
Opex * Greek banks dummy	0.0834	-0.0409
	(0.152)	(0.0424)
Capital * Greek banks dummy	0.0180	-0.00815
	(0.0372)	(0.00581)
Size * Greek banks dummy	0.211	-0.0203
	(0.315)	(0.0806)
Concentration * Greek banks dummy	-0.00877	-0.00339*
	(0.0243)	(0.00208)
Asset riskiness * Greek banks dummy	0.0136	
	(0.0190)	
Short-term rate * Greek banks dummy	0.0117	
	(0.0892)	
Yield curve slope * Greek banks dummy	-0.0344*	
	(0.0190)	
GDP growth * Greek banks dummy	-0.00402	
	(0.0187)	
Long-term rate * Greek banks dummy		-0.00158
		(0.0323)
Δlong-term rate * Greek banks dummy		-0.0102
		(0.0278)
GDP growth * Greek banks dummy		0.00199
		(0.00740)
Stock market return * Greek banks dummy		0.0000991
		(0.000666)
Observation	968	1199

Table 6: Relative Strength of Explanatory Variables

	NIM	NFC
Operating expenses	1.5	2.4
Capital adequacy	1.7	0.5
Size	-0.4	-0.2
Concentration	0.0	0.0
Asset riskiness	0.1	
Short-term rate	3.4	
Yield curve slope	1.2	
GDP growth	2.5	
Long-term rate		-0.2
Long-term rate change		1.7
GDP growth		1.4
Stock market return		0.4

Source: IMF staff estimates.

Table 7: Forecasting Performance of Models–The Net Interest Income

Horizon	Model	Benchmark AR(1)	UTheil	Model	Benchmark AR(1)	UTheil	Model	Benchmark AR(1)	UTheil
		Macro			*Banking*			*Banking and macro*	
					FE				
1	0.3399	0.2498	1.6325	0.3192	0.2864	1.1147	0.2980	0.2553	1.1672
2	0.3442	0.3439	1.0007	0.3375	0.3738	0.9030	0.3062	0.3521	0.8697
3	0.3389	0.3842	0.8820	0.3411	0.3777	0.9033	0.3177	0.3853	0.8246
					corrected FE				
1	0.2932	0.2495	1.1755	0.2801	0.2864	0.9781	0.2670	0.2553	1.0459
2	0.2970	0.3439	0.8635	0.3042	0.3738	0.8138	0.2849	0.3521	0.8092
3	0.2743	0.3842	0.7139	0.3263	0.3777	0.864	0.3008	0.3853	0.7807
					GMM				
1	0.7535	0.2495	3.0207	0.5301	0.2864	1.8512	0.5921	0.2553	2.3189
2	0.8447	0.3439	2.4559	0.6191	0.3738	1.6562	0.6618	0.3521	1.8799
3	0.8447	0.3842	2.1984	0.6145	0.3777	1.6271	0.6670	0.3853	1.7314

Source: IMF staff estimates.

Table 8: Forecasting Performance of Models–The Net Fee and Commission Income

Horizon	Model	Benchmark AR(1)	UTheil	Model	Benchmark AR(1)	UTheil	Model	Benchmark AR(1)	UTheil
		Macro			*Banking*			*Banking and macro*	
					FE				
1	0.2196	0.1210	1.8158	0.2053	0.1216	1.6885	0.2077	0.1210	1.7172
2	0.2181	0.1756	1.2417	0.2034	0.1780	1.1424	0.2035	0.1756	1.1589
3	0.2001	0.1768	1.1314	0.1869	0.1799	1.0389	0.1824	0.1768	1.0315
					corrected FE				
1	0.1964	0.1210	1.6239	0.1548	0.1216	1.2727	0.1600	0.1210	1.3229
2	0.1894	0.1756	1.0786	0.1489	0.1780	0.8366	0.1508	0.1756	0.8584
3	0.1515	0.1768	0.8570	0.1264	0.1799	0.7031	0.1284	0.1768	0.7261
					GMM				
1	0.5098	0.1210	4.2147	0.4387	0.1216	3.6080	0.4524	0.1210	3.7401
2	0.4418	0.1756	2.5158	0.4184	0.1780	2.3508	0.4017	0.1756	2.2873
3	0.4401	0.1768	2.4890	0.4066	0.1799	2.2610	0.3914	0.1768	2.2133

Source: IMF staff estimates.

Loan Pricing

Adequacy of loan pricing can be assesed based on the standard methodology developed by central banks and banking regulators. Building on FED (1996), Elliot and others (2012), ECB (2017), and EBA (2020), bank lending rates should be set to cover such components as (i) funding cost; (ii) expected credit losses; (iii) capital charge associated with regulatory capital needed to hold loans, and (iv) operational cost; with the residual approximating excess margin obtained by banks.

Componenet	Description	Source
Funding cost	While risk-free interest rates are common to all euro area countries, funding spreads are country-specific. They depend both on maturity and rates paid on individual funding instruments, and on the funding mix of specific institutions.	ECB
Expected credit losses	Models are designed to estimate the expected and unexpected losses on a portfolio of exposures, in principle on a through-the-cycle basis. It is calculated as a multiplication of probablity of default and loss given default parameters.	EBA
Capital charge	Basel formulae yields the risk weights on corporate and housing loans, conditional on regulatory credit risk parameters reported by banks. These risk weights, together with the observed CET1 capital ratio, determine the amount of capital attributed to a specific exposure. The assumed cost of equity is the lower bound of CoE extracted from Bloomberg and equals 12 percent	BCBS, Bloomberg
Operating cost	The cost intensity of lending is estimated by assuming that the cost-to-income ratio is uniformly distributed across income streams of the bank.	ECB

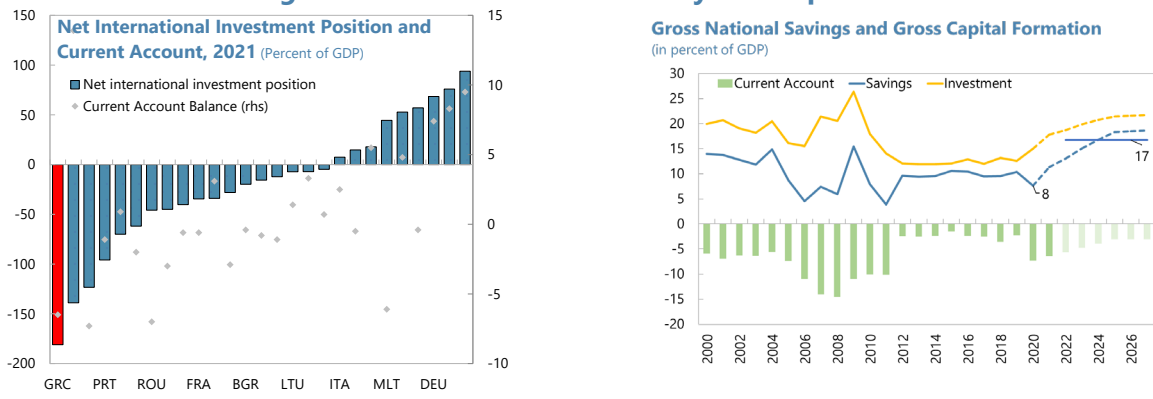
CAN GREECE'S SAVINGS BE SAVED? TRENDS, DRIVERS, AND POLICY IMPLICATIONS[1]

Greece needs to boost its savings in order to maintain external and debt sustainability while closing its significant investment gap. In this regard, household savings stands out, which has been strikingly low over the last two decades, despite some increase during the pandemic, which we find to be at least partially temporary. To achieve a more sustainable increase in household savings, structural constraints need to be permanently addressed, in particular high unemployment and wide-spread informality.

A. Motivation

1. Savings will need to increase significantly to simultaneously support external sustainability and a strong investment recovery. At -180 percent of GDP, Greece's net international investment position (NIIP) remains the lowest amongst peers (Figure 1).[2] Notwithstanding mitigating factors, including favorable maturity and interest rate structures, the current account deficit will need to decline from its pandemic levels to ensure convergence of Greece's NIIP to a more sustainable pre-crises level.[3] At the same time, Greece has been underinvesting since the Sovereign Debt Crisis (SDC), accumulating a sizable investment gap (IMF WP/22/13). Thus, going forward, it will be imperative to leverage the Next Generation EU funding and raise investment to improve potential growth and living standards. To support both objectives, national savings will need to increase significantly—from 8 percent of GDP in 2020 to an average of around 17 percent of GDP in the medium-term.

Figure 1. Greece: External Stability Developments



Sources: Eurostat; Haver Analytics; IMF, WEO database; and IMF staff calculations and projections.

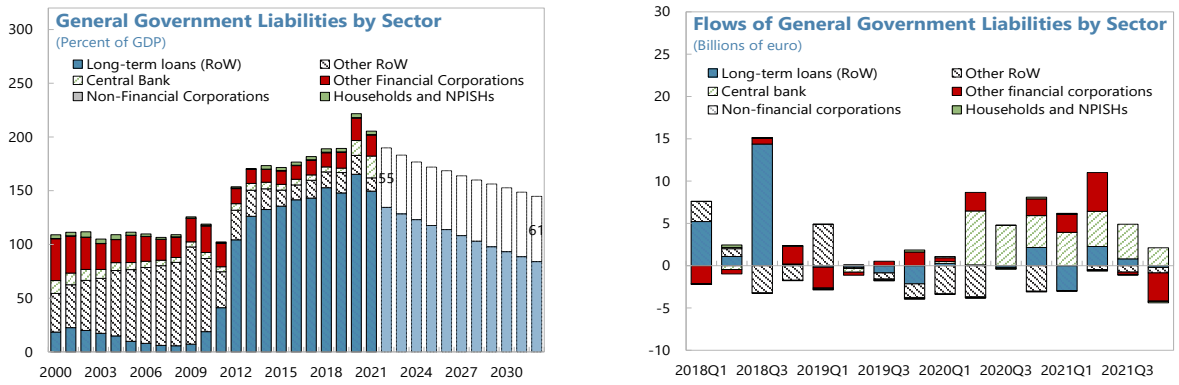
[1] Prepared By Shiqing Hua, Johanna Schauer and Wei Shi.

[2] This includes the stock of deferred interest payments on EFSF loans.

[3] Applying the IMF's external sustainability approach (IMF WP/19/65) a current account of about -3 percent of GDP is needed for the NIIP to stabilize around -70 percent of GDP (its 2000-2010 average).

2. Higher savings could also help secure a smooth rolling over of the large stock of official external loans. At the time of the SDC a large share of Greece's outstanding public debt was transformed into official external loans with ultra-long maturities and favorable interest rates (Figure 2). As these loans start maturing over the medium- to long-term, they will need to be rolled over to private holders. Part of this could be covered by foreign investors, but flow of funds data suggests that since the second quarter of 2019 they have been selling their holdings of government bonds as debt securities held by the rest of world have consistently been declining over this period. Instead, purchases shifted to the central bank and other domestic financial corporations in the context of the ECB's pandemic emergency purchase program (PEPP) that ran from March 2020 to March 2022. Despite the announcement that the proceeds from PEPP could be reinvested into Greek government bonds if needed, the ECB already holds €38.5 billion and is highly exposed to Greek securities (around 65% of available eligible securities). A recovery to investment grade will help widen the investor base. In addition, higher domestic savings could allow the domestic non-financial private sector to hold more public debt, thereby further diversifying the investor base and supporting favorable and stable financing conditions.[4]

Figure 2. Greece: General Government Liabilities



Sources: Bank of Greece; Eurostat; PDMA; IMF, WEO database; and IMF staff calculations and projections.
Note: General government liabilities excludes monetary gold and SDRs, liabilities towards general government, Insurance, pension and standardized guarantees, financial derivatives and employee stock options and others accounts payable.

B. Stylized Facts

3. For the last decade Greece's savings as a share of GDP has remained at the bottom of the Euro Area (Figure 3). Despite some notable rebound following the SDC, from 4.7 percent of GDP in 2011 to 10.6 percent of GDP in 2016, savings in Greece has edged downward in recent years. Driven by considerably lower private saving compared to peers, gross saving in Greece in 2020 is estimated to be 7.1 percent of GDP, less than a third of the Euro Area average.

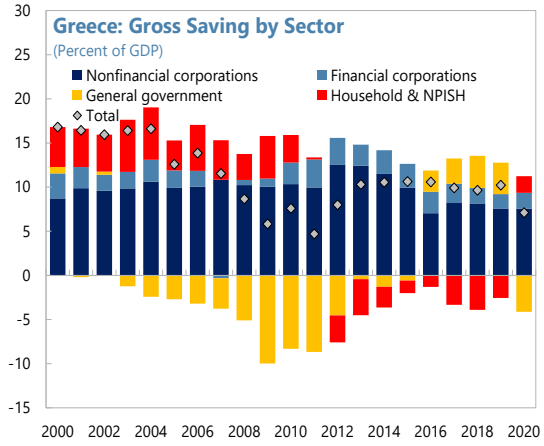
[4] See Reinhart and Trebesch (2015) for a detailed discussion on the benefits and costs of external borrowing. Empirical studies of the relationship between the investor base and sovereign bond yields have been mixed as summarized by Andritzky (2012) and Arslanalp and Poghosyan (2016).

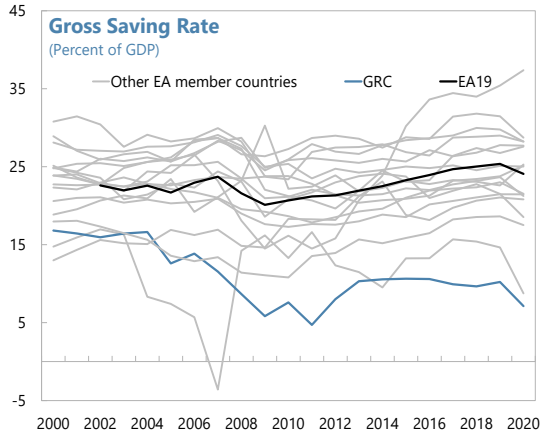
4. The public sector was historically the main driver of Greece's low savings rate, but more recently, households savings have deviated the most from the regional level. (Figure 3).

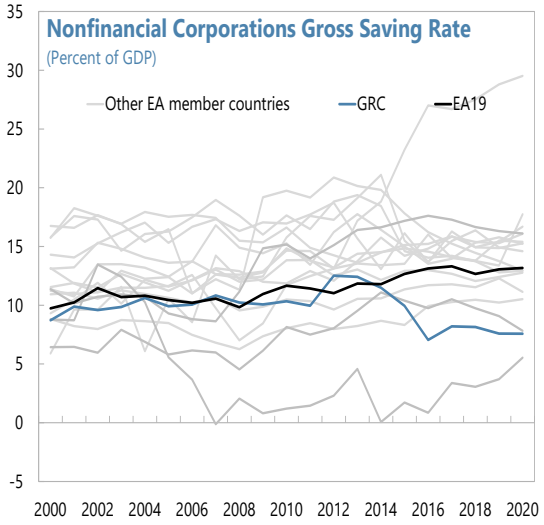
- *Public saving* in Greece had been mostly negative, bottoming in 2009. However, from 2016 onwards the improved fiscal position turned Greece's public saving positive, before falling again in 2020 amid the pandemic. In contrast, *financial corporations' savings* in Greece has been relatively stable, remaining above the regional level for most of the last two decades. Similarly, *non-financial corporation savings* was also close to the EA average until 2014 but declined thereafter in tandem with rising debt levels.

- In this analysis, *household savings* stands out as having the widest and most persistent gap (around 10.6 percentage point lower) compared to the EA average. Given its significant share in national savings and the substantial gap compared with peers, the remainder of the paper will be mainly focused on trends and drivers of household savings.

Figure 3. Greece: Gross Saving by Economic Sectors







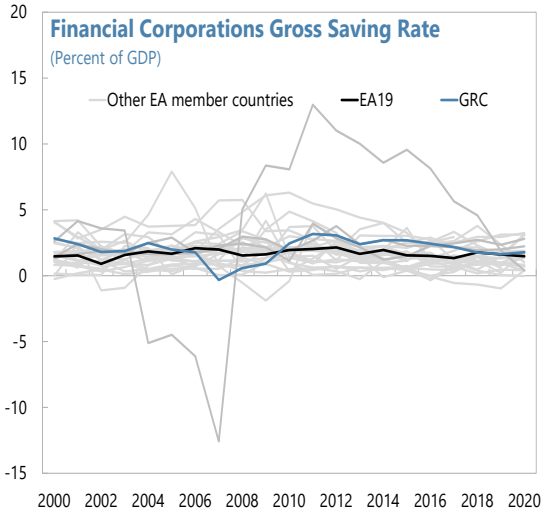
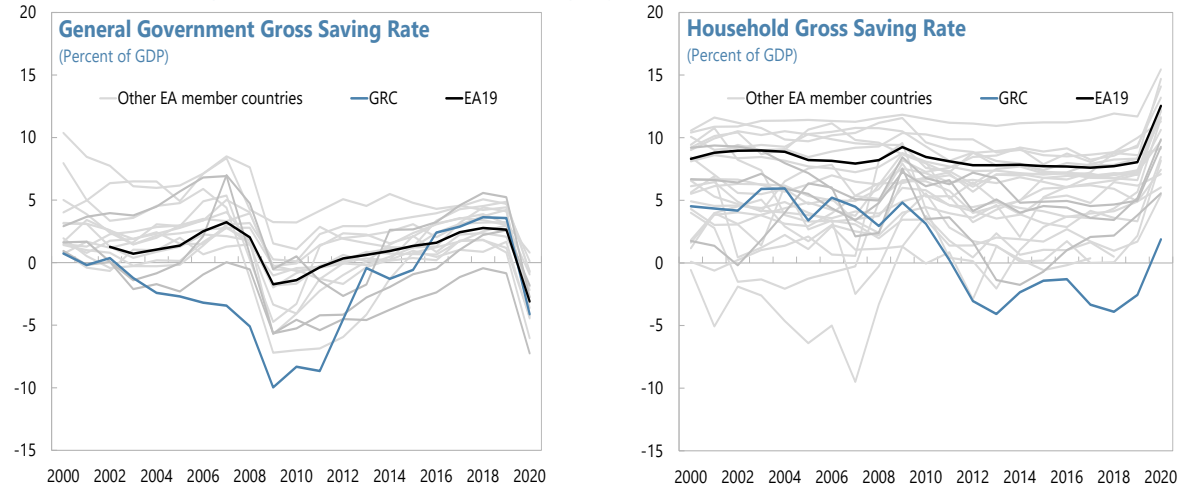
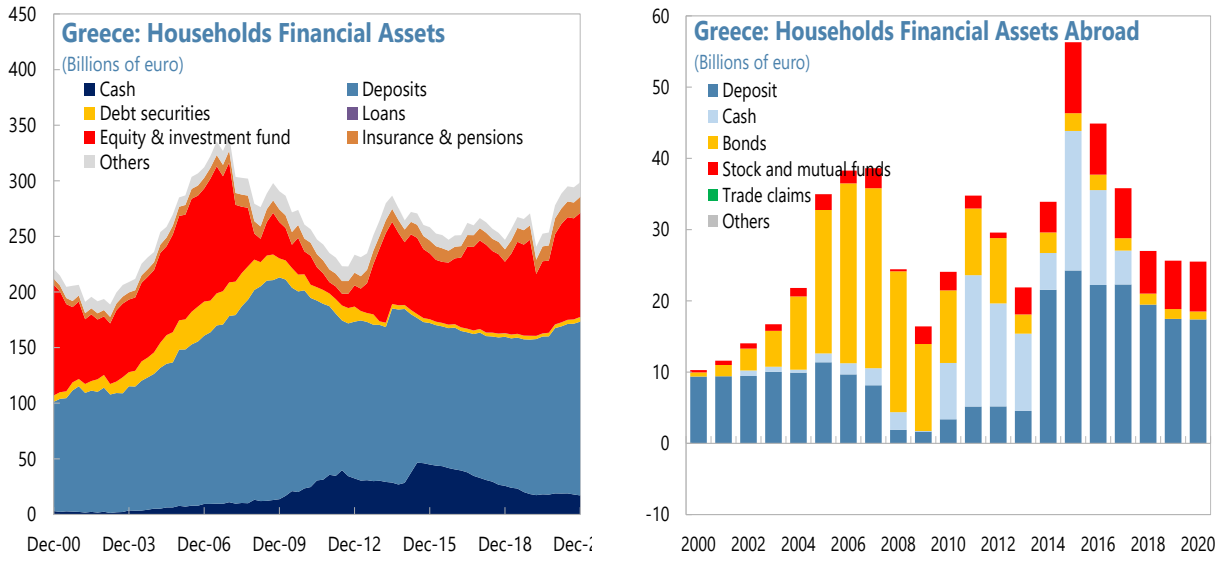


Figure 3. Greece: Gross Saving by Economic Sectors (Concluded)



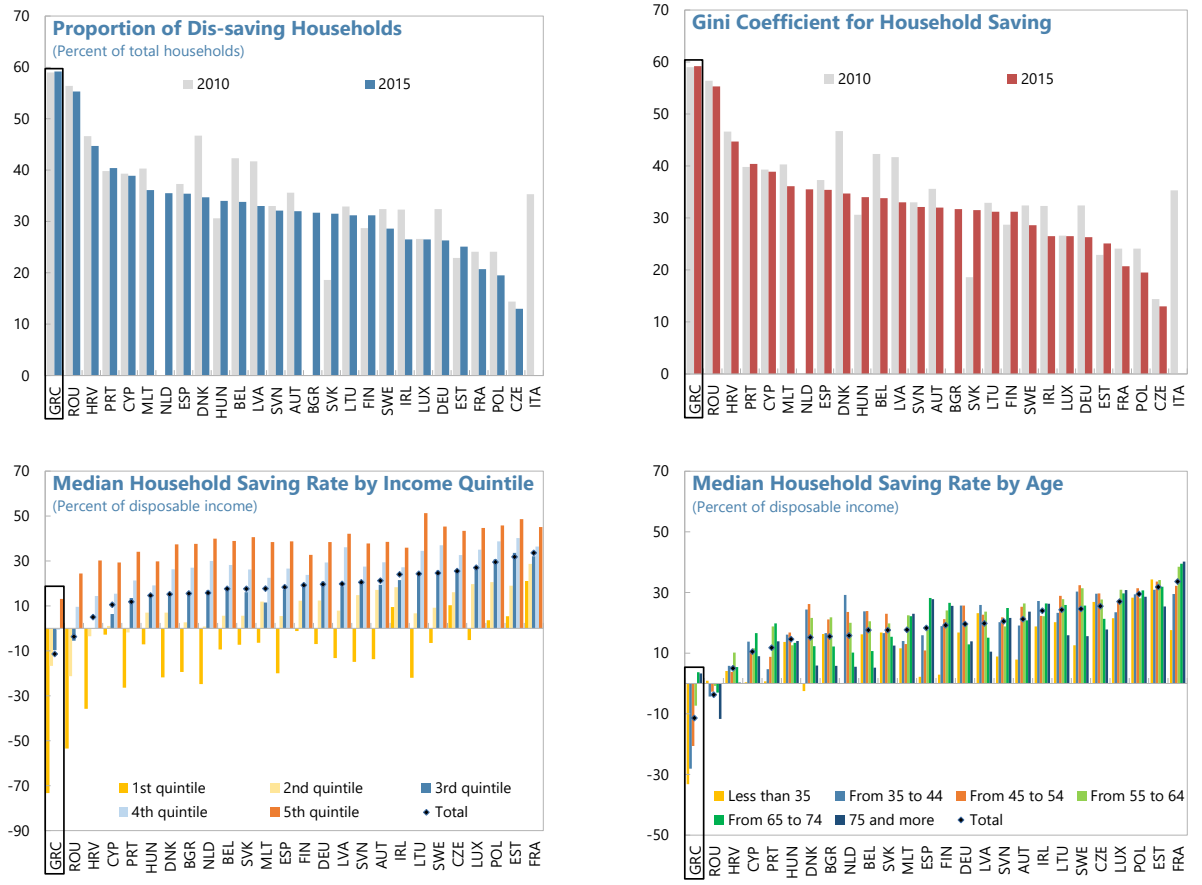
Sources: Eurostat; Haver Analytics; and IMF staff calculations.

Figure 4. Greece: Household Financial Assets



Source: Eurostat; Haver Analytics; and IMF staff calculations.

Figure 5. Greece: Household Savings Profile, 2010 and 2015



Sources: Eurostat (EU statistics on income and living conditions and Household Budget Survey).

5. The decline of household savings is in tandem with lower household financial assets (Figure 4). Over €106 billion (31 percent) worth of household's financial assets vanished from 2007 to 2012. Equity, investment fund shares and debt securities experienced rapid declines, while cash increased reflecting the shift to safer and more liquid assets. Similarly, household financial assets abroad dropped initially, but then soared as Greece's SDC deepened, with households moving their savings abroad and storing them in cash, deposits and stocks.

6. Experimental data suggests that the poor and young cohorts drove the decline in household savings (Figure 5, Annex I Figure 1).[5,6] Close to 60 percent of Greek households were

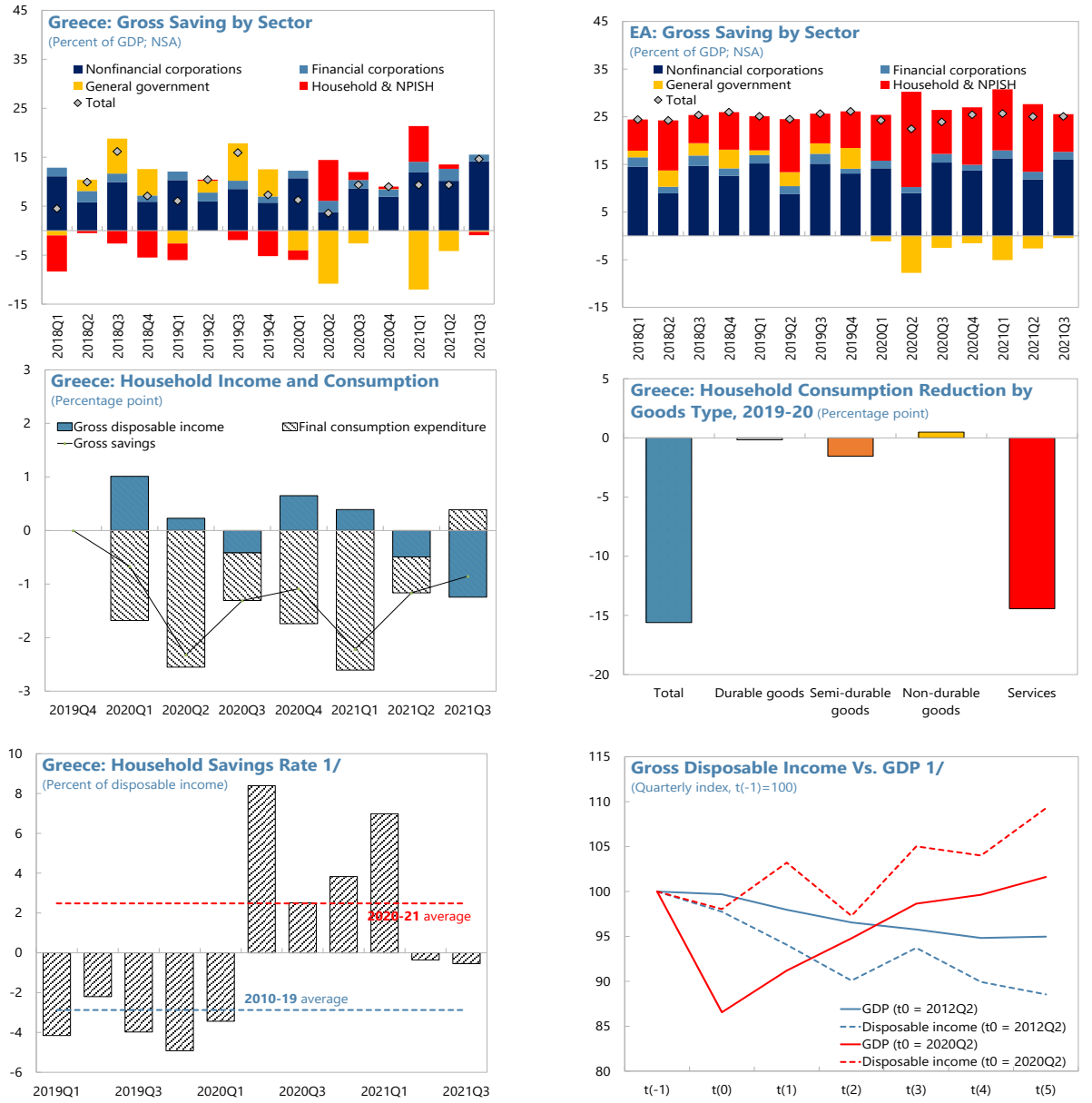
[5] Figure 5 is based on Eurostat (2020) which presents experimental results drawn from the joint distribution of household income, consumption and wealth. The joint dataset relies on the statistical matching of various surveys and is therefore based on strong assumptions. See Eurostat (2020) for a detailed description of the methodology. When interpreting these results, it is important to consider Greece's particular household structure with many adult children living with their parents, as well as its high level of informality and thus undeclared income.

[6] An updated household savings profile for Greece is provided in Annex I Figure 1 based on the 2019 Household Budget Survey. One caveat with the Household Budget Survey data is that household income could be under -

(continued)

dis-saving in 2015, almost twice the average level in other EU countries. In particular, poorer and younger households were dissaving the most. Greece also featured high inequality, having the highest Gini coefficient for household savings in the Euro Area. Household savings underwent a broad-based rise during the COVID-19 pandemic (Annex I Figure 2). The next section looks into this recent surge and analyzes whether it may indicate permanent behavior changes by households.

Figure 6. Greece: Savings Behavior During COVID-19



Sources: Eurostat; Haver Analytics; and IMF staff calculations.
1/ All data are seasonally adjusted.

reported, leading to an under-estimation of household savings. Alternative sources such as the European Central Bank's Household Finance and Consumption Survey will be used to complement the current analysis in the future.

C. Household Savings During the Covid-19 Pandemic

7. Since the onset of the COVID-19 pandemic, household savings rose, in line with developments across the Euro Area (Figures 6, 7). Greek households accumulated over €7 billion worth of savings from 2020:Q2 to 2021:Q2, with the increase observed across a broad range of households (Annex I, Figure 2). The surge partially reflected the authorities' more proactive policy support to sustain household disposable income despite the fall in output, which was in sharp contrast to the previous recession following the SDC. The surge in household savings also reflected lower consumption, notably the drastic drop in services expenditures following mobility restrictions and social distancing measures. Though households again started to dissave in mid-2021, savings remained significantly above the pre-pandemic level.

8. We empirically evaluate the observed surge in household savings. The baseline specification follows the framework in Mody and others (2012) which relates the increase in the aggregate household savings rate—defined as the ratio of household gross savings to gross disposable income—to various idiosyncratic and aggregate factors influencing households' precautionary savings motive, including risks of income loss (unemployment and/or a slowdown in disposable income growth), household wealth, the relative price of savings (proxied by the short-term deposit rate), the fiscal stance, and aggregate income uncertainty (aggregate output volatility). Given the fast-evolving pandemic situation, this section utilizes quarterly data to capture short-term changes in households' behavior. The limited availability of indicators on household wealth at quarterly frequency prevents their inclusion.[7] The residual savings unaccounted for by the above precautionary savings framework is then contrasted with the stringency of mobility restrictions to gauge the extent of forced savings. The sample covers eleven eurozone countries during 2000:Q1-2021:Q3 with the country selection determined by the availability of quarterly aggregate household savings in national accounts.[8]

9. Supportive fiscal policy and the elevated aggregate output volatility drove up household savings during the pandemic. Combined, they account for over half of the increased savings in 2020 relative to end-2019 (Figure 7). The expected employment has a significant negative coefficient, suggesting intuitively that people tend to increase precautionary savings when they anticipate worsening employment prospects.[9] The real short-term deposit rate, i.e., the nominal rate for deposits maturing within one year deflated by the HICP inflation rate, also has a negative coefficient, implying that the income effect inducing more consumption during the current period

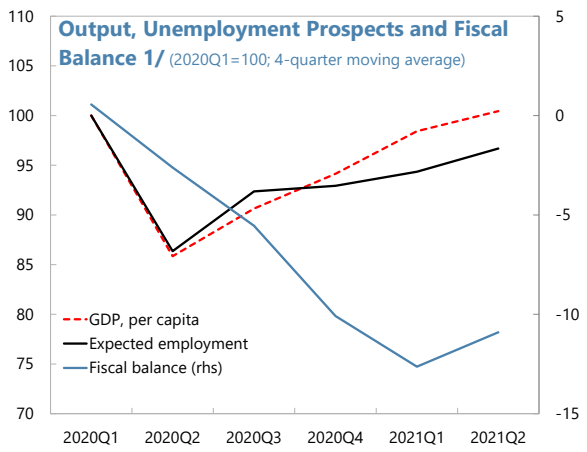
[7] House prices are used as a proxy of household wealth. See Annex I.

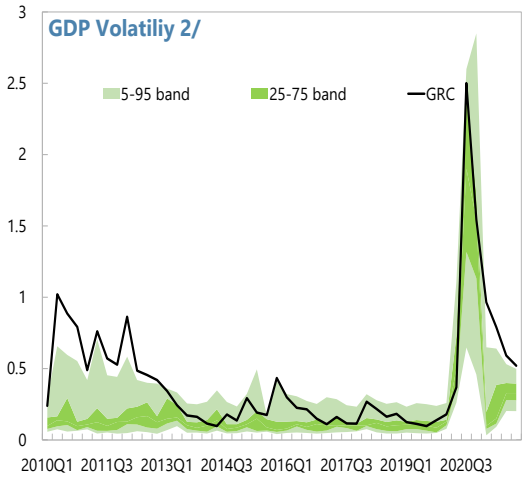
[8] See Annex I for a more detailed data description and robust checks. The validity of the panel specification requires that the assumption that the slope coefficients are identical across the countries in the sample is met. This is supported by data as the slope-homogeneity test proposed by Pesaran and Yamagata fails to reject the null hypothesis of homogeneity at 5 percent, after accounting for autocorrelation including the small-sample bias correction. A Greece-specific analysis with a slightly different regression specification can be found in Box IV.2 of Governor's Annual Report 2021.

[9] The literature also uses the unemployment rate to proxy the labor income risk facing individuals. However, strong government support prevented the measured unemployment rate from falling during the pandemic, therefore it may not be a good indication of risks that household took into consideration when they made their savings decision.

associated with a higher real deposit rate outweighed the substitution effect. Yet, compared with aggregate factors such as the fiscal stance and output volatility, the employment risks and deposit rates explain only a small share of the cumulated savings during the pandemic.

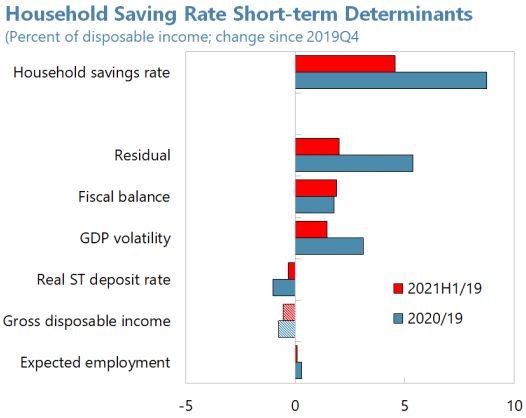
Figure 7. Short-Term Determinants of Household Savings Rate





VARIABLES	Household Savings Rate
Expected employment	-4.6599***
	(0.0004)
Gross disposable income, q/q, lead	-0.0800
	(0.1481)
Real short-term deposit rate	-0.4148***
	(0.0000)
GDP volatility	2.2137***
	(0.0000)
Fiscal balance (% of GDP), 4-quarter rolling average	-0.1569***
	(0.0000)
Observations	884
Country fixed effect	Yes
Number of countries	11

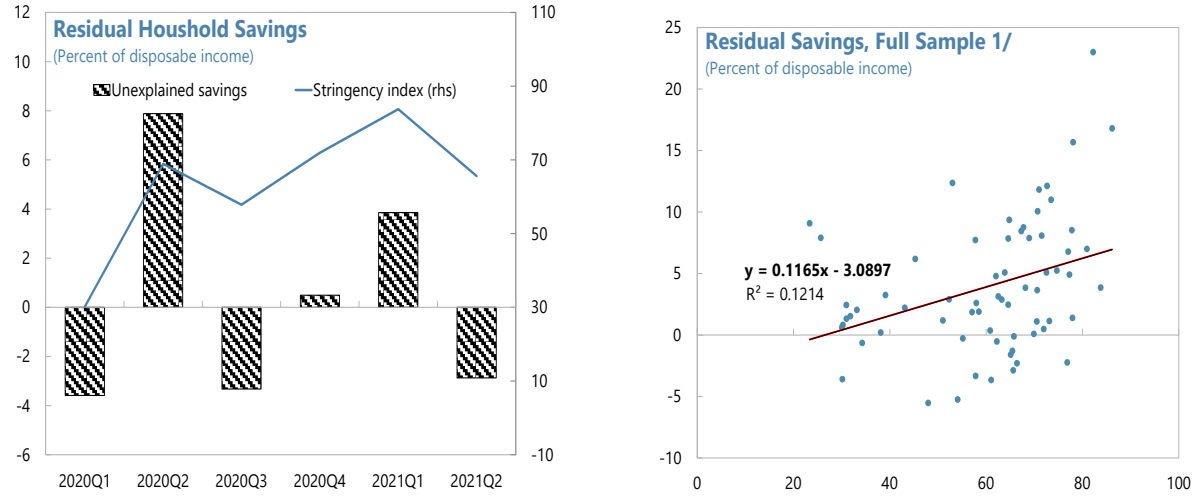
Note: *, **, and *** indicate statistical significance at 10, 5, and 1 percent, respectively. P-values in parenthese. All series are seasonally adjusted.



Sources: ELSTAT; Eurostat; Haver Analytics; EU Business and Consumer surveys; and IMF staff estimates.
1/ The per capita GDP and expected employment are seasonally adjusted. The fiscal balance is the four-quarter moving average of the general government balance-to-GDP ratio, scaled up by 100.
2/ Following Mody and others (2012), the GDP volatility is the time-varying standard deviation of per capita real GDP growth estimated from a Garch (1,1) model. The shaded areas indicate the inter-quartile range and the 5-th and 95-th percentiles for all countries in the sample.

10. In addition, households seemed to have accumulated savings due to disruptions in their consumption activities imposed by COVID-19 restrictions. Around half of the increase in household savings rate in 2020-21 cannot be accounted for by the precautionary savings model. The quarterly residual savings is positively correlated with the stringency of COVID-19 restrictions (Figure 8), suggesting that at least some of the increased savings was forced.[10] The amount of residual savings was lower in 2021 despite similar intensities of COVID-19 restrictions as measured by the stringency index, an indication that households managed to adapt their consumption behavior as the pandemic continued.

Figure 8. Unexplained Savings Rate versus COVID-19 Mobility Restrictions



Sources: National authorities; Haver Analytics; Oxford COVID-19 Government Response Tracker, and IMF staff estimates.
1/ The scatterplot pools residuals from all countries in the sample since 2020. The slope of the trend line is significant at 1 percent.

11. The analysis suggests that the high level of household savings during the pandemic is likely to be temporary. As the economy further recovers from the COVID-19 shock, output volatility is expected to subside, so will employment and income uncertainty, and the government would eventually phase out the extraordinary policy support and revert to a tighter fiscal stance. These would reduce households' incentive to accumulate precautionary savings. Moreover, there will also be less forced savings as the government gradually loosens the COVID-19 restrictions while households continue to adapt their consumption behavior. The next section will discuss structural factors that could contribute to a more persistent increase in household savings to support external sustainability and fill the investment gap.

[10] Thus-constructed forced savings will be uncorrelated ("orthogonal") to the precautionary savings estimated in the first stage.

D. Determinants of Household Savings in the Longer Term

12. A cross-country regression model aims to identify key savings determinants in the longer term. Using a panel of 16 European Union countries between 2005 and 2019, we look at five potential factors to explain the household savings rate, i.e., aggregate household savings expressed as a share of GDP: general macro variables, demographic factors, and fiscal, financial and structural policy variables. No fixed effects are included to allow for projections over the medium-term and to better capture underlying determinants of cross-country differences including slow-moving structural factors. The main specification is selected based on explanatory power and consistency of variables as well as the fit for Greece (see annex II for details and robustness checks).[11]

13. Regression results are broadly in line with economic theories. The relationship between explanatory variables and the savings rate reflects varying strengths of income, substitution and precautionary effects (see Figure 9).

- *Macro factors*. The real interest rate has a negative (albeit insignificant) impact on savings, in line with the previous section. Similarly, inflation reduces savings in our sample, which can be explained by households frontloading consumption as they expect further price increases. We also find that higher expected employment lowers savings in line with lower precautionary saving needs. However, higher GDP volatility does not have the positive relationship as usually expected (and found in section C). This seems to be driven by the absence of country fixed effects in our model, thus likely reflecting those countries with higher GDP volatility tend to be poorer and have lower saving rates. A dummy to reflect the persistent impact of the global financial crisis is found to have a strongly negative and significant coefficient, suggesting that the crisis has shifted households' behavior towards lower savings.

Table 1. Greece: Regression Results and Fit

Macro	
Real short-term interest rate (%)	-0.133
Inflation (%)	-0.180**
Expected Employment	-0.0551***
Persistent crisis dummy (2008 onwards=1)	-0.898***
GDP Volatility	-1.875
Demographic	
65+ employment (% 15+ employment)	0.486***
Fiscal	
General Government Balance to GDP (%)	-0.201***
Pension spending (% GDP)	0.845***
Pension spending (squared)	-0.0321***
Other social spending (% GDP)	-0.297***
Financial	
Private sector credit (% GDP)	-0.00980*
Structural	
Unemployment rate (%)	-0.212***
Self-employment (% 15+ employment)	-0.312***
Gini index	0.00674
Reer (2010=100)	0.0785**
Overall inflow restriction index	-12.34***
Overall outflow restriction index	1.988***
Constant	9.688**
Overall R-squared	0.756
Number of Observations	240

* p<0.10 ** p<0.05 ***p<0.01
Source: IMF staff estimates.

- *Demographic factors*. We find that a higher share of old age employment raises household savings, reflecting that longer working lives can lengthen the period in which households save.

- *Fiscal factors*. Several fiscal variables are found to be strongly associated with household savings. The fiscal balance in percent of GDP has a negative and significant coefficient, consistent with

[11] The methodology may be subject to endogeneity. The baseline regression though seems largely robust to lagging independent variables (see annex II).

some Ricardian offset. For pension spending we find an inverse-u-shaped relationship, suggesting that initially higher pension spending raises savings (likely through raising income) but once it is above 13 percent of GDP, the substitution effect takes over as precautionary saving needs decline. Government spending on social protection benefits, excluding pensions, are found to have a negative and significant impact, suggesting that higher social spending reduces the need for precautionary savings.

- *Financial factors*. We find that private sector credit to GDP is negatively associated with household savings. This is consistent with easier access to credit reducing the precautionary savings motive.

- *Structural factors*. Many structural factors are found to be strong determinants of household saving. We find that the unemployment rate and self-employment rate (which can be seen as a proxy for the size of the informal economy) are negatively associated with household savings, likely reflecting lower incomes that result in lower savings. The negative coefficient for self-employment may also reflect underestimation of actual disposable income due to higher informality and thus an underestimation of the savings rate.[12] The impact of inequality appears to be small and insignificant but is qualitatively aligned with the general finding that richer households tend to save more. We also find a positive relationship between the real effective exchange rate and the savings rate, which can be reconciled with higher relative income as the price of imports decline. For capital controls we find different effects depending on their nature. Higher controls on capital inflows seem to reduce the savings rate, possibly reflecting that they reduce access to finance abroad and thereby forcing households to tap their domestic savings. Capital controls on outflows are associated with higher savings, suggesting that they might constrain household's consumption abroad and thus raise the savings rate.

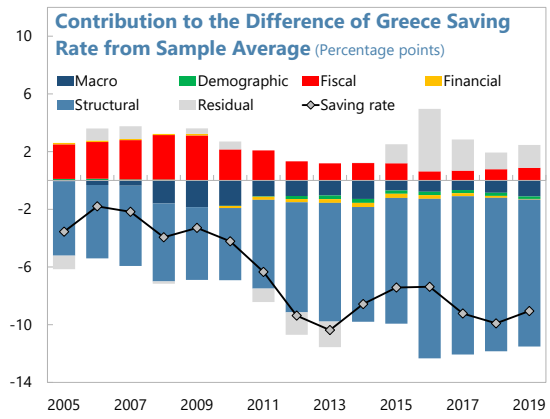
14. The model explains much of Greece's savings gap compared to peers and matches key trends in Greece's savings rate. The model can explain a large part of Greece's lower savings rate compared to the sample average, including the widening of the gap over time (see Figure 9). In addition, the fitted values for Greece's savings rate level match key trends, including the higher pre-SDC savings rate, its subsequent fall to negative levels as well as the recent increase during the pandemic.

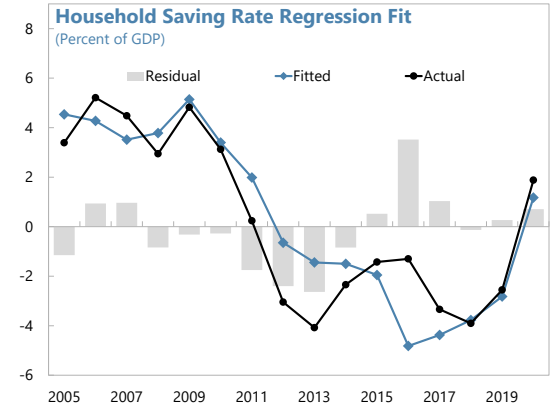
15. Structural variables appear to explain a large part of Greece's savings gap compared to peers and its persistent drop since the SDC. The savings gap is largely explained by three structural factors: Greece's comparatively large share of self-employment (30 percent on average over 2005 to 2019 vs. 16 percent for the sample average), its high unemployment (18 percent vs. 9 percent sample average) and strict controls on capital inflows (an index of 0.23 vs. 0.13 sample average). Structural factors also explain a significant part of the drop observed in Greece's savings rate between 2005 and 2013, with the unemployment rate a key contributor as it rose from 10 percent to 28 percent. Self-employment also contributed as it increased from 30 percent to 32

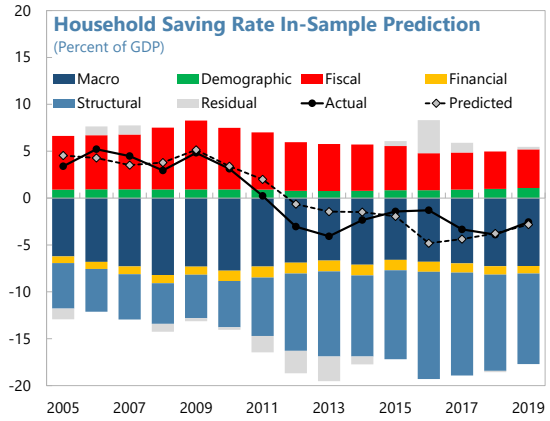
[12] Using self-employment as a proxy for informality has its limits, given that other sources of income may be underestimated as well (e.g., rental income and business profits).

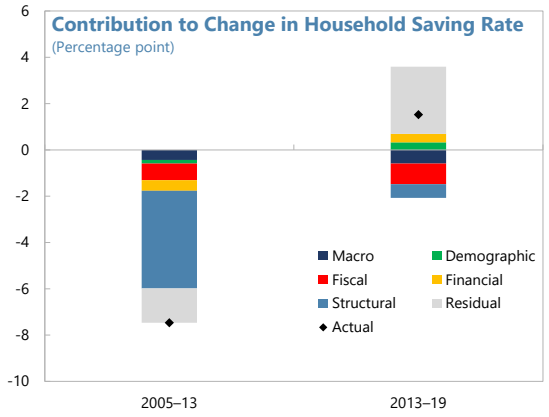
percent. Fiscal factors played a smaller role, with the government deficit declining and pension spending increasing. For the subsequent period, the model suggests that factors that would have pushed up the savings rate (reductions in unemployment, self-employment and pension spending) were largely offset by stricter controls on capital inflows, further improvements in the government balance as well as increases in social spending.

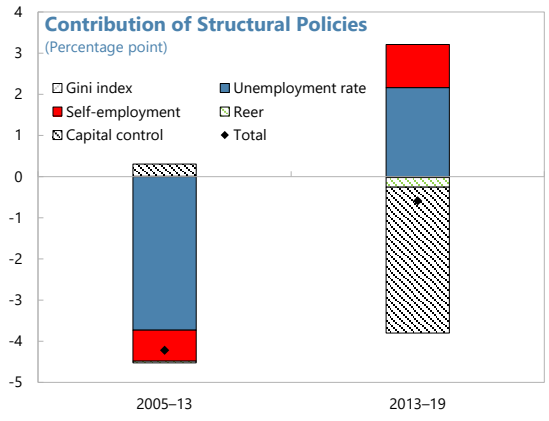
Figure 9. Greece: Historical Drivers of Greece's Household Savings

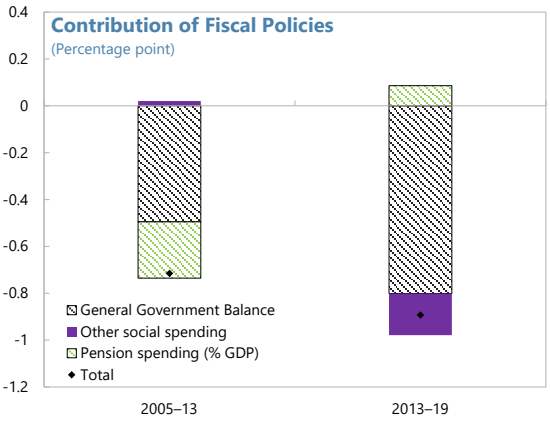








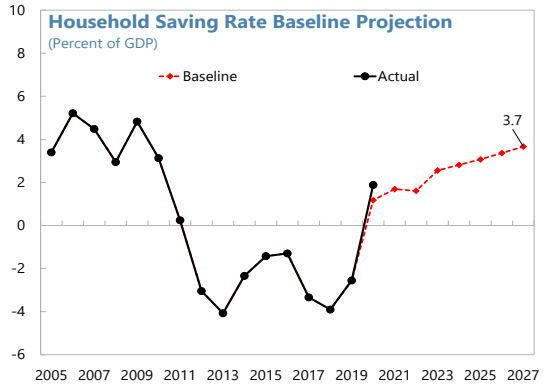


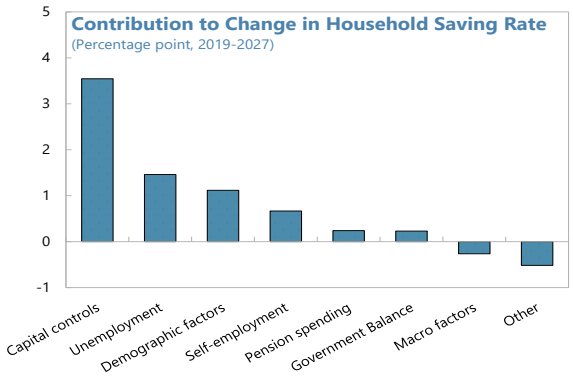


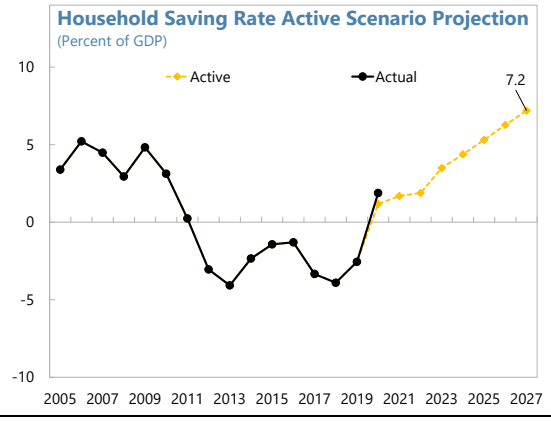
Sources: Eurostat; Haver Analytics; and IMF staff calculations.

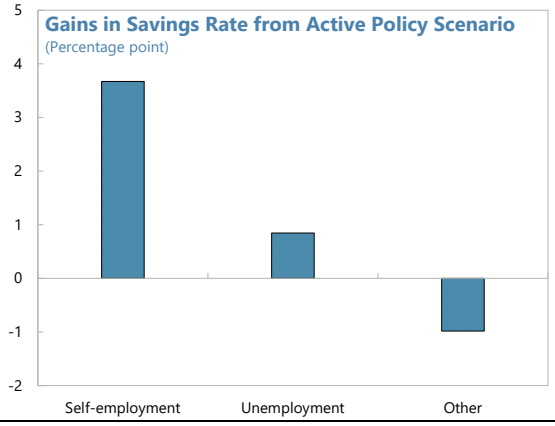
16. Under the baseline household savings is projected to remain positive but not sufficient to support external and debt sustainability. The removal of capital controls that took place in 2019 as well as the projected significant decline in unemployment from 17.5 percent of GDP in 2019 to 10.6 percent in 2027 are expected to be key contributors to keeping the savings rate above pre-pandemic levels (see Figure 10). In addition, increases in old age employment and a slight decline in self-employment would also help. Yet, these significant policy changes do not appear to be sufficient to reach the objectives set out at the beginning of this paper which would require a household savings rate of about 7 percent in the medium-term.[13] Simulating a stronger policy scenario, with key policy variables converging towards the sample average, could achieve such levels. In particular, cutting unemployment to levels of 7 percent and self-employment to 15 percent (proxying a reduction in informality and shift towards higher-quality employment) could provide the additional needed boost to the savings rate. This would support the required levels of investments as well as a sustainable current account. Assuming that households would invest 10 percent of their annual savings into government bonds this could also help rolling over some of the external long-term loans, although other sectors would also need to take on more than they currently hold.

Figure 10. Greece: Household Savings Projections



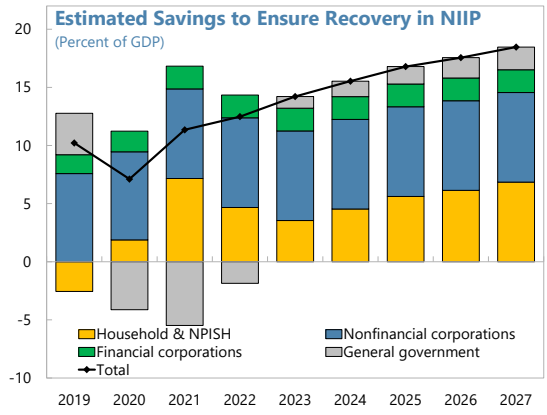


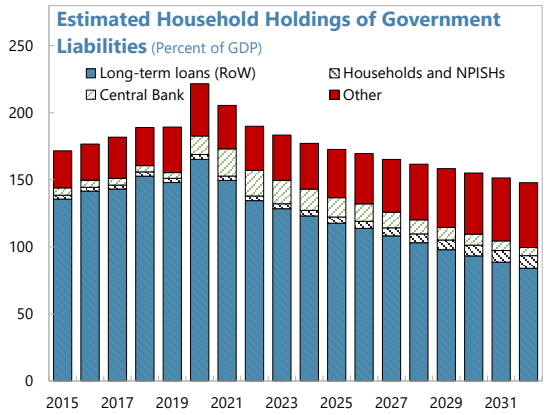




[13] Section A finds that the overall savings rate would need to rise to about 17 percent of GDP. Accounting for the recovery in the fiscal balance that will raise public savings and assuming that corporations' savings will remain at their 5-year averages, this implies a savings gap of 7 percent of GDP that households would need to fill.

Figure 10. Greece: Household Savings Projections (Concluded)





Sources: Bank of Greece; Eurostat; Haver Analytics; and IMF staff projections.

E. Conclusion

17. Greece needs to boost its savings in order to maintain external and debt sustainability while closing the significant investment gap opened up during the long recession. To achieve these objectives, additional savings of 9 percent of GDP would be needed compared to its 2020 level. The country especially lags its eurozone peers in household savings, and to a lesser extent, savings of the non-financial corporates. Household savings surged during the COVID-19 pandemic, due to accommodative fiscal policies, elevated income and employment uncertainty which boosted precautionary savings, and suppressed consumption due to COVID-19 containment measures. As the pandemic improves, households are expected to normalize their consumption behavior and thus the high level of savings in 2020 and early 2021 is likely to be at least partially temporary. To achieve a more sustainable increase in household savings, actions need to be taken to tackle structural constraints, including high unemployment and wide-spread informality.

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Annex I. Short-Term Determinants of Household Savings and Household Survey Information

Data Description

1. The analysis performed in Section C mainly relies on the aggregate indicators of household income and savings as defined in the national account, supplemented by macroeconomic indicators and business and household survey responses. The sample covers eleven eurozone countries: Austria, Belgium, France, Germany, Italy, Netherlands, Finland, Greece, Ireland, Portugal, Spain, with country selection based on the availability of household savings data. The sample is of quarterly frequency and spans 2000:Q1-2021:Q3.

2. Following Mody and others (2012), the baseline approach regresses the household savings rate,[1] defined as the ratio of aggregate household savings to aggregate household disposable income, on the following variables:

- Employment expectations, from EU business and consumer surveys (EUSRVYS of Haver Analytics), seasonally adjusted;
- Household gross disposable income, from quarterly integrated economic accounts of national accounts (EUNA of Haver Analytics), seasonally adjusted;
- Real short-term deposit rate, calculated as the nominal deposit rate for deposits maturing in one year deflated by the year-on-year change of HICP inflation, from EUDATA of Haver Analytics;
- GDP volatility, the estimated time-varying standard deviation from a Garch (1,1) model of the quarter-on-quarter change of real per capita GDP, from EUDATA of Haver Analytics; and
- Fiscal balance as a percent of GDP, from EUGOV of Haver Analytics.

Additional variables are employed in robust checks:

- With respect to forced savings induced by COVID-19 restrictions, a dummy indicating the post-2020 period (starting from 2020Q2) is multiplied by the stringency index, i.e., the Oxford COVID-19 Government Response Tracker.
- Other indicators of household forward-looking income prospects used as alternatives to the lead of gross disposable income growth include consumer confidence, consumer financial

[1] The household savings rate thus constructed turns out to be stationary according to most standard panel unit root tests (the one failed being the Hadri Lagrange multiplier stationarity test).

condition, and general economic situation in the next 12 months, all from EU business and consumer surveys (EUSRVYS of Haver Analytics).

- The world uncertainty index from Ahir, Bloom, and Furceri (2018) is used as an alternative measure of aggregate uncertainty in place of GDP volatility.
- Quarterly house prices from the OECD are used as a proxy of household wealth.

Baseline

3. The COVID-19 pandemic turns out to be an influential period and features statistically significantly different coefficient estimates compared with the pre-pandemic sample (ending in 2019Q4). In particular, the differences are more prominent for coefficients on GDP volatility and the expected employment, though the latter explains a relatively small amount of savings accumulated during the pandemic. The fiscal balance and short-term interest rates remain important drivers of household savings before and during the pandemic, while the effect of forward-looking gross disposable income loses statistical significance if the pandemic period is included.

Table 1. Determinants of Household Savings Rate, Short-Term

	Pre-pandemic sample	Full sample
Expected employment	-0.6304	-4.6599***
	(0.5929)	(0.0004)
Gross disposable income, q/q, lead	-0.2045***	-0.0800
	(0.0003)	(0.1481)
Real short-term deposit rate	-0.2455***	-0.4148***
	(0.0012)	(0.0000)
GDP volatility	1.3216	2.2137***
	(0.1813)	(0.0000)
Fiscal balance (% of GDP), 4-quarter rolling average	-0.1481***	-0.1569***
	(0.0000)	(0.0000)
Observations	818	884
Country fixed effect	Yes	Yes
Number of countries	11	11

Sources: National authorities, Haver analytics, and IMF staff estimates.
Note: *, **, and *** indicate statistical significance at 10, 5, and 1 percent, respectively. P-values in parentheses. All series are seasonally adjusted. The pre-pandemic sample ends in 2019Q4.

Robust checks

4. The robust checks confirm the sign and statistical significance, and in many cases, the magnitude, of coefficients of variables in the baseline specification. Adding a COVID-19 dummy produces a significant positive coefficient but reduces the absolute value of the estimated coefficient on fiscal balance, and switches the sign of the estimated coefficient on GDP volatility.[2] The world uncertainty index captures more the policy uncertainty as opposed to the economic or income uncertainty imbedded in the GDP volatility indicator, thus its inclusion leads to an insignificant coefficient, but coefficients of other variables remain broadly similar to the baseline. Both consumer confidence and consumer financial conditions are found to have positive coefficients when they are included in the regressions to replace the lead of gross disposable income and have influenced the estimated coefficients of the expected employment and the real interest rate, but they do not materially change the estimated coefficients for the fiscal balance and output volatility. Lastly, the change of nominal house prices scaled by household disposable income is included as a proxy of household wealth and found to have a significant negative coefficient, suggesting that an increase in household wealth will reduce households' precautionary savings. The estimated coefficients for other variables are not much affected.

[2] Replacing the COVID-19 dummy with one interacting with the stringency index (Annex I Table 2, Column (5)) leads to similar coefficients for all variables, indicating that having the stringency index as a regressor largely captures the savings behavior in response to the COVID-19 shock, rather than the more narrowly defined forced savings arising from mobility restrictions that hamper consumption. To be compared with the coefficient of the COVID-19 dummy (7.74), the coefficient 0.1120 needs to be scaled up by the mean of the stringency index (62.3), which gives 7.03.

Table 2. Robust Checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Expected employment	-4.6599***	-2.6410**	-4.4757***	-4.7903***	-4.7334***	-5.7622***	-12.6802***	-10.2289***	-5.7832***	-4.6971***
	(0.0004)	(0.0339)	(0.0007)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0002)	(0.0003)
Gross disposable income, q/q, lead	-0.0800	-0.0775	-0.0789	-0.2380***	-0.1738***	-0.0741				-0.0341
	(0.1481)	(0.1564)	(0.1529)	(0.0000)	(0.0004)	(0.1890)				(0.5551)
Real short-term deposit rate	-0.4148***			-0.2563***	-0.2526***	-0.4015***	-0.2597***	-0.2935***	-0.4270***	-0.4408***
	(0.0000)			(0.0015)	(0.0015)	(0.0000)	(0.0022)	(0.0005)	(0.0000)	(0.0000)
GDP volatility	2.2137***	2.3025***	2.3691***	-1.5770***	-1.1699***		2.1008***	1.9769***	2.2389***	2.2312***
	(0.0000)	(0.0000)	(0.0000)	(0.0002)	(0.0028)		(0.0000)	(0.0000)	(0.0000)	(0.0000)
Fiscal balance (% of GDP), 4-quarter rolling average	-0.1569***	-0.1501***	-0.1660***	-0.0662**	-0.0811***	-0.1818***	-0.2340***	-0.2370***	-0.1608***	-0.1463***
	(0.0000)	(0.0000)	(0.0000)	(0.0331)	(0.0078)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Nominal short-term deposit rate		0.0806	-0.2928***							
		(0.3425)	(0.0056)							
Inflation rate, y/y change			0.5059***							
			(0.0000)							
COVID dummy				7.7400***						
				(0.0000)						
COVID dummy * stringency index					0.1120***					
					(0.0000)					
World uncertainty index						0.5354				
						(0.3806)				
Consumer confidence index							0.1453***			
							(0.0000)			
Consumer financial condition, next 12 months								0.1321***		
								(0.0000)		
General economic situation, next 12 months									0.0094	
									(0.2660)	
Nominal house price, % of HH disposable income										-4.2500***
										(0.0083)
Constant	15.6910***	13.4997***	15.0802***	16.4418***	16.1986***	17.0210***	25.2366***	21.5052***	16.8725***	15.7334***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	884	916	884	884	884	884	895	895	895	884
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries	11	11	11	11	11	11	11	11	11	11

Sources: National authorities, Haver analytics, World Uncertainty Index from Ahir, H, N Bloom, and D Furceri (2018), Oxford COVID-19 Government Response Tracker, and IMF staff estimates.

Note: * p<0.10 ** p<0.05 ***p<0.01. P-values in parentheses. All series are seasonally adjusted.

Household Budget Survey 2019

5. An updated profile of the household income and savings pattern has been constructed using the 2019 household budget survey. The amount of household savings is calculated as the difference between its monetary net income ("HH095") and the total expenditure on the purchased goods and services ("HExxA" with xx from 01 to 12). Annex I Figure 1 gives the average income, consumption of purchased goods and services, and savings by households grouped by various characteristics, where the income quintile is calculated based on total income, i.e., monetary net income plus imputed rent and in-kind receipts. Consistent with the general profile presented in Figure 5 based on 2015 data, older and richer households save while the rest dissave. In addition, the more granular 2019 data suggest that pensioners, two-individual households, and households residing in less populated regions tend to save despite their relatively moderate income levels, as they also tend to have lower expenses. There does not seem to be significant differences in savings behavior among households surveyed with reference person being male or female.

Figure 1. Household Income and Savings Profile, 2019

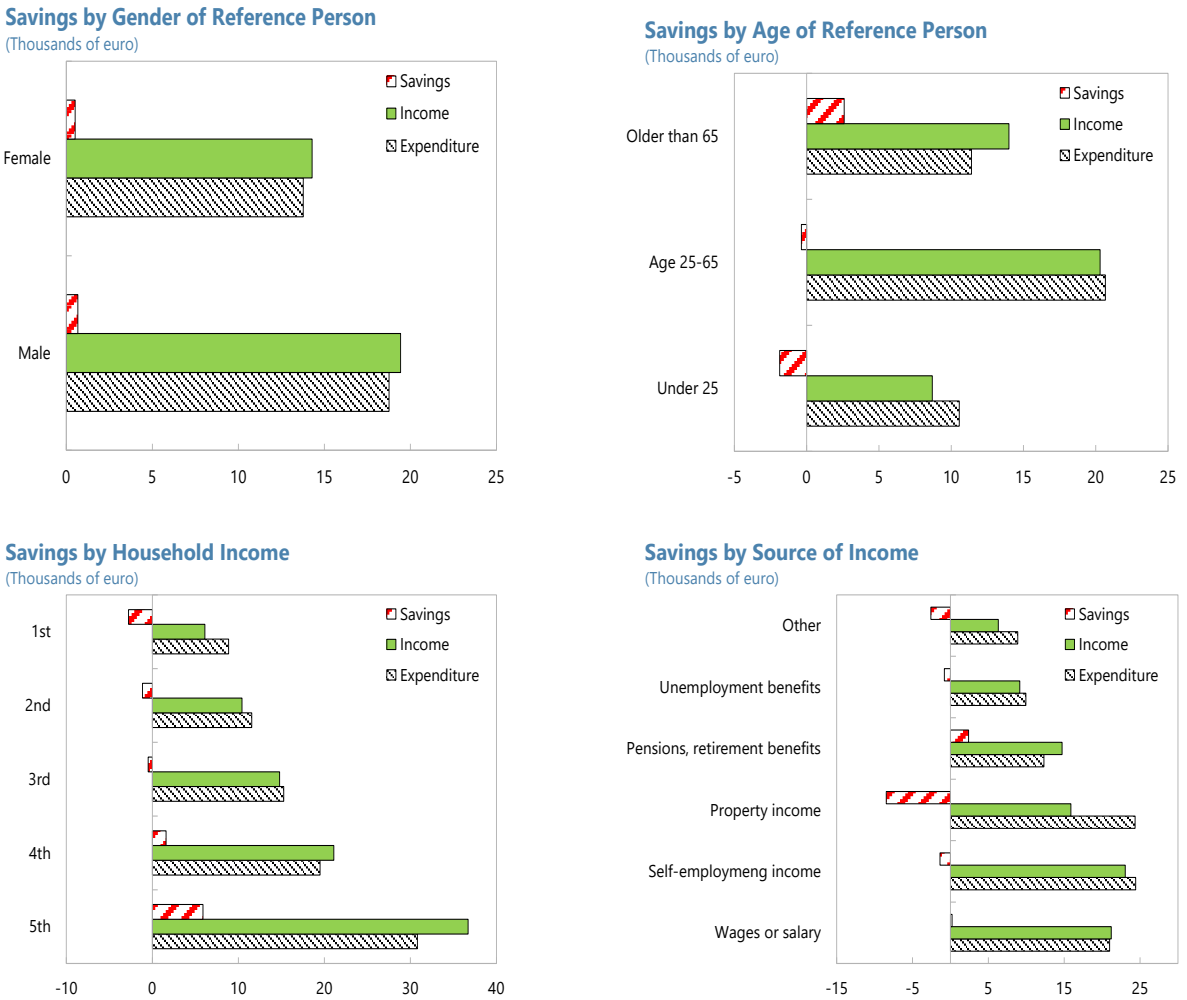
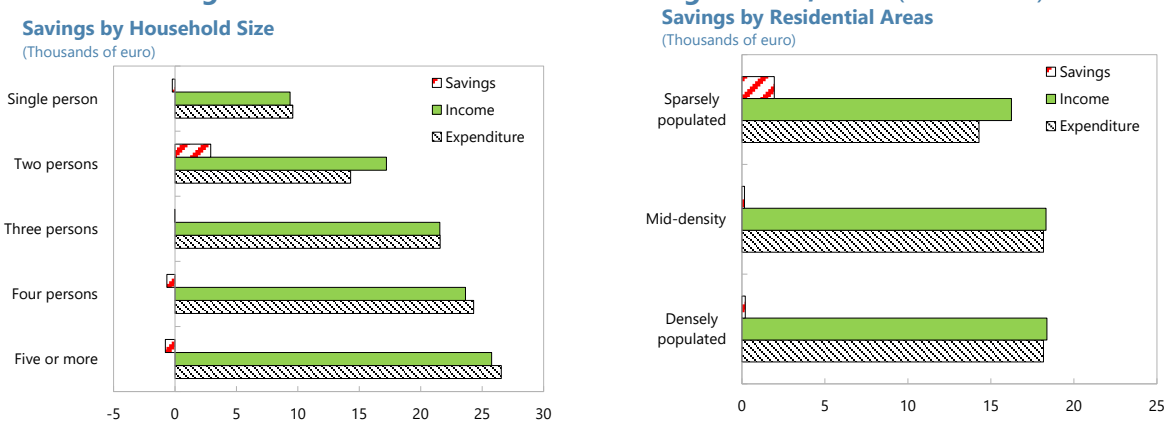


Figure 1. Household Income and Savings Profile, 2019 (Concluded)



Sources: Household Budget Survey, 2019; and IMF staff calculation.

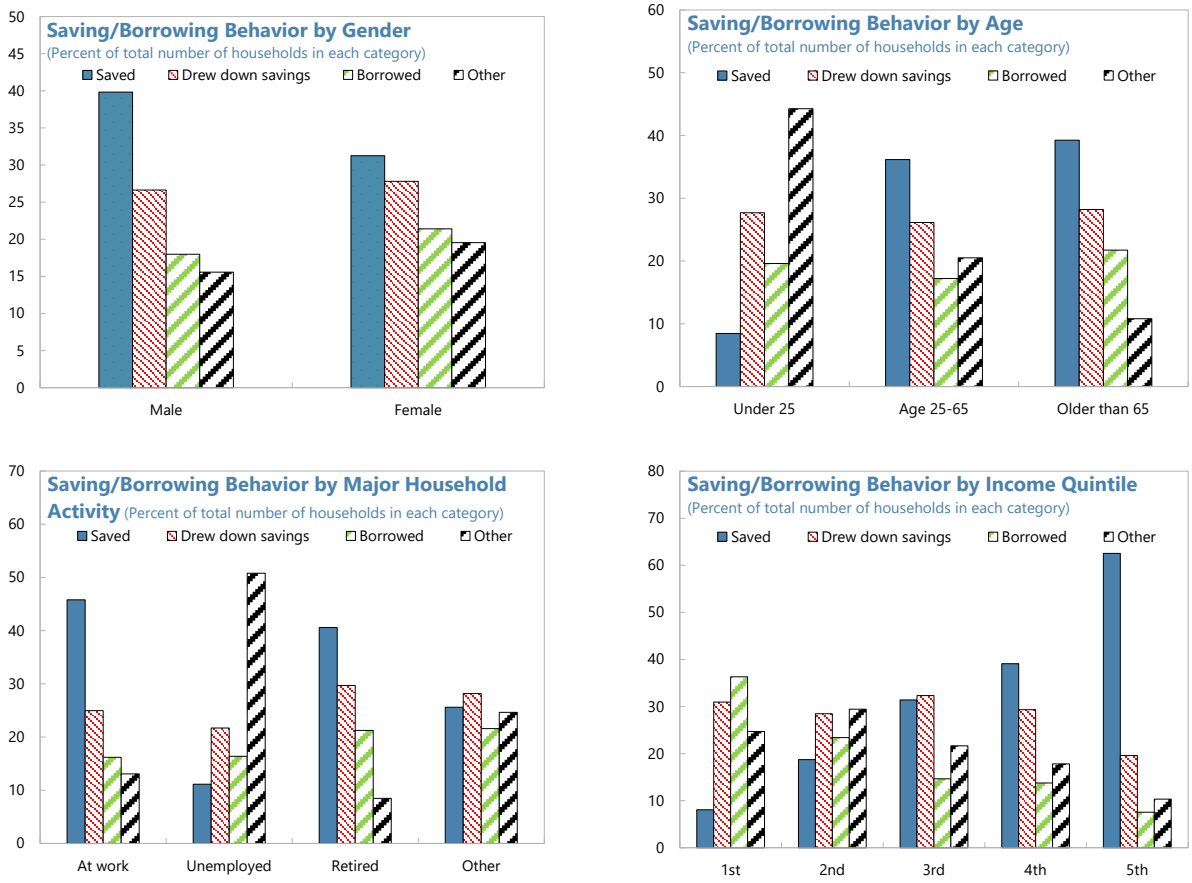
Statistics on Income and Living Conditions (SILC)

6. The 2020 SILC survey for Greek households has been used to gauge household-level savings behavior during the pandemic. The key survey question of interest is HC050 which enquires if, in a typical month, the household saves, needs to draw down savings or borrow, or neither of these. Bar charts in Annex I Figure 2 show households' responses according to groups defined by the following household characteristics:

- Gender ("RB090") of household heads, where household heads are proxied by the most senior member of the household;
- Age of the most senior household member, where the age is calculated as the difference between 2020 and the year of birth indicator ("RB080");
- Major household activities, which are defined as the basic activity status ("RB210") taken by at least half of household members. For cases with exactly half of household members taking different activities, assumptions are made so that the household major activity is assigned according to the order that "at work" supersedes "retired," which supersedes "unemployed."
- Household disposable income ("HY020") which is divided into five groups (quintiles).

7. The household-level survey responses suggest that a significant share of households increased savings in 2020 across almost all groups, except for young households (under age 25), households with the majority members being unemployed, and/or households falling into the bottom two income quintiles.

Figure 2. Household Savings Behavior, 2020 1/



Sources: Statistics on Income and Living Conditions (SILC), 2020; and IMF staff calculation.

1/ The bar charts are estimated based on responses to a question in SILC on the saving or borrowing behavior in a typical month ("HC050"), and the bars are in percent of the total number of households in each category. For multi-person households, absent of an indicator showing household heads, the calculation proxies the gender/age of each household with that of its most senior member. The major household activity is the activity taken by at least half of household members, and the retirement category includes early retirement.

Annex II. Medium-Term and Long-Term Determinants of Household Savings

Data coverage

1. The country set includes Austria, Belgium, Czech Republic, Germany, Spain, Finland, France, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Slovenia, and Sweden. Data of 48 indicators in annual frequency from 1995 up to 2021 for all the 27 EU countries were gathered, but we restrict our sample to construct a strongly balanced dataset. Panel unit root tests (Levin, Lin, and Chu Test) find that the savings rate as well as most explanatory variables are stationary (table A3).

Savings Rate Definition

2. The households sector comprises all households and household firms, including sole proprietorships and most partnerships that do not have an independent legal status. It also includes the non-profit institutions serving households (NPISH), such as charities and trade unions. Their economic weight is relatively limited. The gross savings concept follows the definition and standard of the European System of Accounts (ESA 2010). It measures the portion of gross national disposable income that is not used for final consumption expenditure with the gross disposable income being adjusted for the change in net equity of households in pension funds:

$$Gross\ Saving = Gross\ Disposable\ Income - Final\ Consumption\ Expenditures + Change\ in\ net\ Equity\ in\ Pension\ Fund\ Reserves$$

Table 1. Overview of Key Household Savings Determinants

Variables	Definition	Sources
Real adjusted disposable Income of households per capita growth rate	Annual growth rate of gross disposable income of households adjusted for social transfers divided by the purchasing power parities (PPP) of the actual individual consumption of households divided by total population	Eurostat
Crisis dummy	1 for 2008 and onwards	IMF staff
Real short-term interest rate	Short-term deposit rate less HICP inflation	IMF, WEO/ Eurostat
Employment expectation indicator	Percent of respondents reporting an increase minus the percent of respondents reporting a decrease	European Commission
GDP volatility		IMF staff
65+ employment	Over 65 employment divided by over 15 employment	Eurostat
General government balance	General government net lending/borrowing, percent of fiscal year GDP (current price)	IMF, WEO
Pension expenditure	Social protection expenditures for old age and survivors, percent of GDP (current price)	Eurostat

Table 1. Overview of Key Household Savings Determinants (Concluded)		
Other social protection expenditure	Total social expenditures less pension expenditures, percent of GDP (current price)	Eurostat
Domestic private sector credit	Percent of GDP (current price)	World Bank
Gini coefficient		Eurostat
Unemployment rate		Eurostat
Share of self-employment	Self-employment divided by over 15 employment	Eurostat
Size of shadow economy	Estimated using multiple indicators, multiple causes (MIMIC) model	IMF staff (Kelmanson et al. 2021)
Real effective exchange rate	Trade-weighted exchange rate with 42 trading partners, deflated by CPI	European commission
Capital control, inflow		IMF staff (Fernandez et al. 2016)
Capital control, outflow		IMF staff (Fernandez et al. 2016)

Table 2. Panel Unit Root Test Results of Key Explanatory Variables (Levin, Lin, and Chu Test)			
		Adj. t-statistics	Prob.
Saving rate (%GDP)	Level, intercept	-3.25	0.00
Macro			
Income per capita (%, yoy)	Level, intercept	-8.13	0.00
Crisis years (dummy)	Level, intercept	-3.84	0.00
Real short-term interest rate (%)	Level, intercept	-1.63	0.00
Inflation (%)	Level, intercept	-5.16	0.00
Expected Employment	Level, intercept & trend	-2.39	0.00
GDP Volatility	Level, intercept	-5.66	0.00
Demographic			
65+ employment (% 15+ employment)	Level, intercept	-3.84	0.00
Duration of working life (years)	Level, intercept	-1.63	0.00
Fiscal			
General government balance (%GDP)	Level, intercept	-3.69	0.00
Pension spending (% GDP)	Level, intercept	-3.78	0.00
Other social spending (% GDP)	Level, intercept	-2.33	0.00
Financial			
Domestic credit to private sector (%GDP)	Level, intercept	-7.14	0.00
Structural			
Unemployment rate (%)	Level, intercept	-3.31	0.00
Gini coefficient (index)	Level, intercept	-3.45	0.00
REER (%)	Level, intercept	-2.64	0.00
Shadow economy (Index)	Level, intercept	-5.60	0.00
Capital control (index)	Level, intercept & trend	3.30E+15	1.00
Inflow restriction index	Level, intercept & trend	1.52E+15	1.00
Outflow restriction index	Level, intercept & trend	9.61E+15	1.00

Robustness Checks

3. Adding growth of real disposable income (regression 2) or life expectancy (regression 3) does not significantly alter the r-squared and the relationships are not statistically significant. Including the NPL ratio (regression 3) does raise the explanatory power, suggesting that a higher NPL ratio raises savings, suggesting a precautionary motive. However, we do not include it in our preferred regression as NPL data is not available for the full dataset and including it does not change the fit, projections and overall conclusions of the analysis. Finally, we replace self-employment with a measure of the size of the shadow economy. While the direction of the relationship remains the same, the coefficient is much smaller and the r-squared is lower. This suggests that self-employment captures more than the size of the shadow economy, likely the lower income of self-employed that does not allow much savings. We also ran additional regressions, adding for each explanatory variable an interaction term with a Greece Dummy to explore whether slope parameters are different for the Greek economy. We find that none of these interaction terms are statistically significant.

Table 3. Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)
Macro						
Real disposable income per capita (%, YoY)		-0.0273				
Crisis dummy (2008 onwards=1)	-0.898***	-0.960***	-0.970***	-1.194***	-0.610	-0.205
Real short-term interest rate (%)	-0.133	-0.130	-0.0726	-0.204**	-0.0490	0.0305
Inflation (%)	-0.180**	-0.180**	-0.102	-0.211**	-0.133	-0.0244
Expected Employment	-0.0551***	-0.0526***	-0.0603***	-0.0629***	-0.0499***	-0.0379**
GDP Volatility	-1.875	-2.087*	-1.946	-2.209*	-2.240*	-3.831***
Demographic						
65+ employment (% 15+ employment)	0.486***	0.484***	0.489***	0.438***	0.344***	0.450***
Life expectancy (years)			0.126			
Fiscal						
General Government Balance to GDP (%)	-0.201***	-0.200***	-0.171***	-0.209***	-0.161***	-0.109***
Pension spending (% GDP)	0.845***	0.842***	0.876***	1.225***	2.312***	0.747***
Pension spending (squared)	-0.0321***	-0.0322***	-0.0347***	-0.0521***	-0.101***	-0.0298***
Other social spending (% GDP)	-0.297***	-0.296***	-0.291***	-0.248***	0.00682	-0.354***
Financial						
Private sector credit (% GDP)	-0.00980*	-0.0103**	-0.0131**	-0.00720	-0.0117*	-0.00667
NPL ratio (%)				0.108***	0.0761**	
Structural						
Gini index	0.00674	0.00939	0.0179	0.0810	-0.00729	-0.0147
Unemployment rate (%)	-0.212***	-0.212***	-0.219***	-0.314***	-0.346***	-0.201***
Shadow economy size					-0.108***	
Self-employment (% 15+ employment)	-0.312***	-0.312***	-0.312***	-0.328***		-0.312***
Reer (2010=100)	0.0785**	0.0776**	0.0717**	0.104***	0.0294	0.106***
Overall inflow restriction index	-12.34***	-12.23***	-12.02***	-13.24***	-12.04***	-12.04***
Overall outflow restriction index	1.988***	1.966***	2.104***	2.192***	0.814	1.550**
Constant	9.688**	9.675**	0.585	4.603	3.764	6.609
Overall R-sq	0.756	0.756	0.757	0.780	0.707	0.753
Between R-sq	0.882	0.883	0.888	0.896	0.820	0.884
Within R-sq	0.387	0.384	0.380	0.394	0.397	0.318

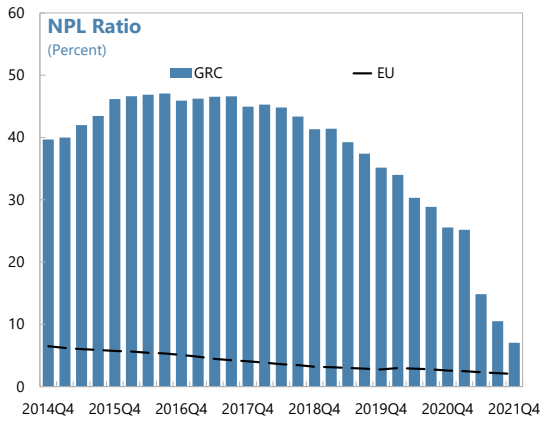
Note: * p<0.10 ** p<0.05 ***p<0.01; model 6 uses first lag for all explanatory variables except for the crisis dummy.
Sources: Eurostat; Haver Analytics; National Authorities; and IMF staff estimates.

FINANCIAL RISKS AND DEBT WORKOUT OF NON-PERFORMING LOANS BY CREDIT SERVICERS IN GREECE[1]

Credit servicers have become key players of distressed debt resolution in Greece after major banks removed €85 billion non-performing loans (NPLs) from their balance sheets since 2016, mainly using state-guaranteed securitization solutions. However, while the NPLs have been removed from the banking system, the debt is still there. Legal reforms aimed at easing NPL workouts have been implemented within the adverse COVID-19 pandemic context, yet obstacles to distressed debt resolution remain and reduction will take time. The authorities should ensure full implementation of legal reforms and increase the pace and effectiveness of amicable and judicial NPL recovery. As credit servicers are now managing more than €120 billion in exposures, close supervision is required to avoid residual credit risk on seller banks in the event of large, unexpected losses. Market transparency and financial disclosure should be improved on credit servicers and NPL workout.

A. Background: An Extraordinary NPL Legacy[2]

Figure 1. Greece: Reduction of Banks' Non-Performing Loans



Source: Bloomberg Finance L.P.; European Banking Authority; and IMF staff projections.

1. The Greek banking sector was saddled with the largest share of NPLs in the eurozone following the global financial crisis. NPLs increased to unsustainable levels, both within the four major Greek banks[3] (Significant Institutions, or SIs) supervised by the Single Supervisory Mechanism at the European Central Bank (ECB-SSM) and within other banks (Less Significant Institutions, or LSIs) supervised by the Bank of Greece (BoG). After peaking in March 2016, the ratio of non-

[1] Prepared by Alexis Boher (MCM) and Chanda DeLong (LEG).

[2] For more detailed information and historical perspective, see the IMF Country Reports No. 19/341 and No. 20/308.

[3] Alpha Bank, Eurobank, National Bank of Greece, Piraeus Bank.

performing loans and advances to total loans (NPL ratio) stood at 41.8 percent by end-2018 for all Greek banks. Notwithstanding a sharp reduction of NPLs in 2021 the NPL ratio remains well above the European Union (EU) average (7.0 percent against 2.0 percent) by Q4:2021[4], which remains a source of concern in the short-term (Figure 1).

2. Public intervention was needed to address the systemic NPL issue. Given challenges to resolve NPLs organically, including through restructuring and forbearance, as well as weak investor sentiment, the Greek government established the Hellenic Asset Protection Scheme (HAPS, or so-called Hercules) in 2019 (Box 1). Supervisory authorities (the SSM and the BoG) aided Hercules by assigning a zero-risk weight on the senior tranches of NPL securitizations, while corporate hive-downs allowed banks to dispose under-provisioned NPLs without the subsequent losses triggering conversion of Deferred Tax Credits (DTCs). At the same time, the government implemented legal reforms to ease the overall NPL workout process, including the adoption of a significant overhaul of the insolvency law in 2020, amending Hellenic Financial Stability Fund law, and operationalizing frameworks to ease loan resolution, building on new digitalization platforms and processes, and subsidizing loan repayments to distressed debtors (GEFYRA). The functioning of the early warning platform completed the electronic infrastructure of the new insolvency framework by end-2021.

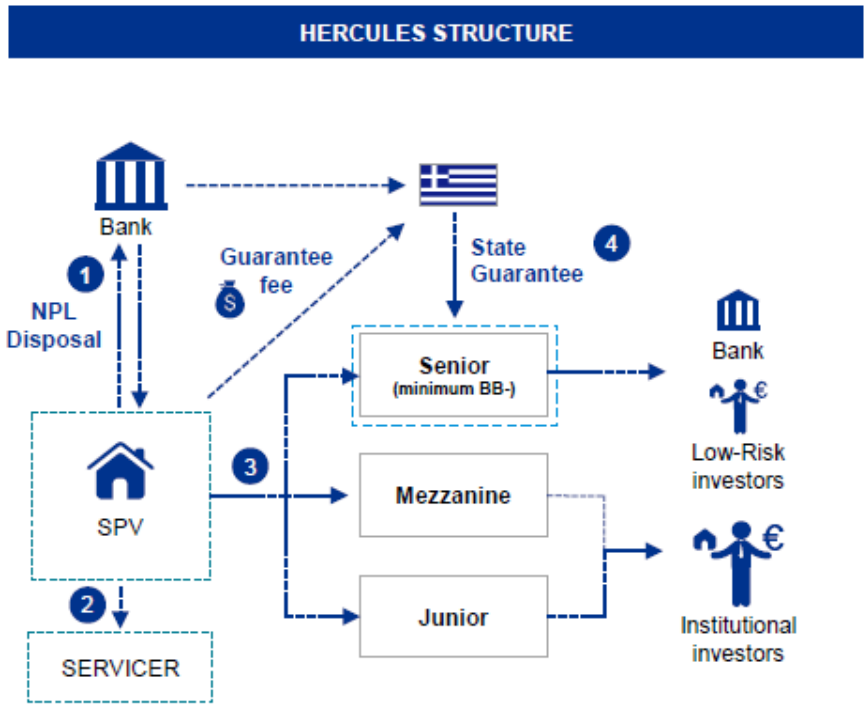
Box 1. Overview of Greek Government NPL Reduction and Workout Schemes

The key initiatives by the Greek government for reducing NPLs and enhance their workout include:

- ***Hellenic Asset Protection Scheme (HAPS, so-called Hercules I & II).*** Broadly similar to the Italian "GACS", Hercules (Law 4649/2019) is a securitization framework designed to remove NPLs from banks' balance sheets through special purpose vehicles (SPVs) that issue junior, mezzanine and senior securities tranches sold to investors (Figure 2). Senior tranches are held by banks and guaranteed by the Greek government, which gets market-priced fees for providing these guarantees to comply with EU state aid rules. NPLs are securitized at market value triggering additional loan-loss provisioning if needed. Hercules II is the extension of this scheme, ending by October 2022.
- ***GEFYRA, GEFYRA II, and so-called "step-ups" (subsidized loans).*** Step-up products are temporary instalment subsidies granted by the government to distressed debtors after loan moratoria were lifted throughout 2021. They have been offered by major banks to retail customers. One of these initiatives is GEFYRA, or "bridge" scheme, in which the government subsidizes mortgage repayments on primary residences of borrowers who have run into difficulties. GEFYRA, which started in 2020, replaced the Katseli Law, which was introduced in 2010 to protect heavily indebted homeowners from foreclosure, and received widespread criticism because of its abuse by strategic defaulters. The Greek government started GEFYRA II in 2021, to offer similar subsidies for corporate borrowers. GEFYRA programs, largely unused since end 2021, will terminate in H1:2022.

[4] Source: European Banking Authority (EBA), Risk Dashboard, Data as of Q4 2021 (on a consolidated basis).

Figure 2. Greece: Illustration of the Hercules Framework



(Source: KPMG)

3. As a result, most NPLs removed from Greek banks have been transferred to credit servicers through securitizations. NPL sales have been concluded with external purchasers, often international investors specialized in distressed debt restructuring. Thus, Greek credit servicers have been playing an increasing role in banks' NPL resolution and are now managing a systemically important amount of distressed debt. From March 2016 to Q2:2021, €78 billion of NPLs have been removed from Greek banks' balance sheets[5]. According to the BoG, by end-2021 credit servicers were managing €123 billion of loans, both from NPL purchasers (€85 billion) and Greek banks (€38 billion, including €12 billion off-balance sheet claims). A large proportion (84 percent) of loans managed by credit servicers were NPLs of relatively poor quality, mainly denounced loans.

4. Credit servicers require close supervision. Supervisors should assess whether financial risks relating to the management of distressed debt by credit servicers might affect financial stability. To apply the regulatory and prudential supervisory framework, a clear picture of the current landscape of credit servicers, from an entity-based and activity-based perspective, is needed. This includes monitoring the effectiveness and efficiency of distressed debt collection and restructuring by credit servicers to assess the residual level of credit risk and implications for bank lending. While it is expected that credit servicers will be more successful than banks in reaching solutions with borrowers on NPL resolution, this will depend on the effective implementation of the legal

[5] Source: Bank of Greece, Financial Stability Review, December 2021.

framework for debt resolution and the willingness to offer sustainable solutions to reduce the private debt overhang in the long-term.

B. Collecting and Working out Non-performing Loans by Credit Servicers: A Long Process Facing Tough Constraints

Overview of Credit Servicers

5. Credit servicers act on behalf of NPL purchasers independently from banks that originated NPL securitization sales. The Hercules framework involves several stakeholders, including:(i) banks which sold NPLs, (ii) SPVs issuing NPL securitization notes, (iii) NPL purchasers of junior and mezzanine notes exposed to the lowest risk levels, and (iv) credit servicers in charge of operational processing of NPL recovery. A loans sale through Hercules is valid only if a servicing agreement is signed between an NPL purchaser and a credit servicer. Credit servicers are Greek regulated companies, which, although legally independent, partner with banks that originated NPL sales. On a bilateral basis, banks have provided operational support to credit servicers through staffing and customer data sharing to ease the workout of NPL portfolios transferred to them[6]. Three major banks have also maintained a 20 percent minority shareholder stake in each credit servicer they have partnered with. Detailed public information on NPL securitization sales and ownership typology is unavailable. As SPVs and NPL purchasers are allowed to be foreign-owned entities, big international investment firms specialized in distressed debt restructuring have entered the Greek NPL market, building on experience gained in other European countries that faced similar NPL issues, like Spain and Italy.

6. As credit servicers are not exposed to credit risk from the NPLs they manage, it is the Greek government and ultimately banks that face residual risks. Credit servicers do not assume credit risk on their balance sheets. They generate revenue from servicing fees according to long-term servicing agreements signed with banks and NPL investors, which have been validated by authorities and are monitored by the BoG. Based on these agreements, they adjust their policy taking into account the credit policy manual of each bank that originated NPLs under management. Under the Hercules' scheme, the Greek government guarantees senior tranche notes held by banking institutions which must be rated by one credit rating agency at least, not lower than BB-. Thus, should additional losses be generated by the NPL workouts, potential activation of the state guarantee may be a source of eventual residual risk for the government, and ultimately for banks in case the maximum amount of the state guarantee would be reached.

[6] According to the Hellenic Loan Servicers Association (HLSA), the so-called "Carve-Out" model has been the most common approach for the servicing of NPL portfolios held by major Greek banks. This model involves the purchase of the NPL portfolio(s) together with the bank's dedicated NPL servicing platform. This model has several benefits for both the servicer and the bank, including but not limited to: (i) banks reduce staff in line with balance sheet reduction; (ii) servicers acquire staff to deal with the increased portfolio; (iii) staff have experience of the asset and IT systems (if also acquired) reducing training needs.

7. The credit servicers' sector is quite concentrated in Greece. By end-2021, 24 credit servicers were licensed from the BoG to operate in Greece, of which 16 were active. The four major players (Cepal, DoValue, Intrum and QQuant) were managing a dominant 88 percent market share of total loans assigned to credit servicers and most of their capital is owned by foreign investment firms specialized in distressed debt restructuring. Other Greek credit servicers focus on managing smaller and/or specific NPL portfolios.

Legal and Regulatory Framework Applicable to Credit Servicers in Greece

8. The new EU Directive 2021/2167 (COD) dated November 24, 2021, on credit servicers and credit purchasers requires a review of Greek legislation. This new EU Directive is aiming to contribute to more effective management of NPLs within a single EU market and increase the transparency of services offered accordingly. The impact of the transposition of this EU Directive on the applicable legal framework in Greece is not expected to be substantial. Greece had already set up and implemented an effective regulatory framework governing the licensing and supervision of NBFIs specialized in NPL management.

9. Credit servicers are regulated by the Bank of Greece and specific licensing is required. Credit servicers are subject to the Greek Law 4354/2015 on non-performing loans and other topics, supplemented by the Executive Committee Act (ECA) 118/19.5.2017 of the Bank of Greece on a "Framework of establishment and operation of credit servicing firms", which sets out the framework of sale and transfer of claims from financial institutions to credit purchasers. This legal framework is designed to ensure adequate monitoring by Greek authorities of sound risk management practices by credit servicers. The current regime provides credit servicers the possibility to either focus on NPL recovery, as well as provide refinancing to the residual proportion of viable distressed debtors through a more demanding licensing procedure. To provide some flexibility and enhance NPL resolution, credit servicers may request that the scope of their authorized activities is extended to debt refinancing. To date, no NPL servicer has applied for the extension of its license and any expressed interest is still at a preliminary stage.

10. Credit servicers are subject to basic prudential regulation. They must comply with minimum capital requirements, yet no risk-based quantitative prudential ratios are applicable to solvency, liquidity, or even concentration risks. Credit servicers are subject to qualitative prudential rules. According to the BoG, the scope of Law 4354/2015 and ECA 118/2017 on the regulation of credit servicing firms includes the following items: (i) authorization of credit servicers; (ii) submission of servicing agreements and establishment of minimum requirements; (iii) assessment of qualifying holdings and fit & proper requirements; (iv) assessment of the adequacy and efficiency of internal systems, controls, procedures, and management bodies; (v) reporting requirements; (vi) enforcement of sanctions, if needed, including a possible withdrawal of authorization. Credit servicers must also comply with rules governing relations with borrowers (Code of Conduct).

11. Supervision of credit servicers by the Bank of Greece at the national level is adapted to their specific activity and risk profile. The BoG is directly in charge of the supervision of credit

servicers, monitoring their compliance with applicable regulations, their regulatory reports, and their NPL workout performance. Thus, the BoG's supervisory strategy on credit servicers focuses on the following: (i) monitoring of reporting, including portfolio evolution and aggregation, collateral coverage, modifications, auctions performed, and so on; (ii) monitoring of financial performance, with a special focus on compliance with minimum capital requirements; (iii) examination of submitted business plans, including projected financial information and foreseen business strategy; (iv) review of loan servicing agreements, policies, and procedures; (v) compliance assessment of policies and procedures with the revised Code of Conduct, and analysis of commercial practices; (vi) monitoring customers' complaints against servicers; (vii) fit & proper assessment of direct/indirect shareholders, board members, and AML/CFT officers. The BoG's supervision is gaining momentum, yet on-site inspections of credit servicers have been delayed to 2022 because of the pandemic.

Business Models and NPL Resolution Strategies of Greek Credit Servicers

12. Greek credit servicers, engaged in managing portfolios under the Hercules scheme, have a commitment to achieve performance objectives of NPL recovery through agreed business plans. Business plans of credit servicers and NPL purchasers are confidential, but despite this limited information disclosure, it appears that credit servicers must meet conflicting expectations from their stakeholders, that is, among other duties: implementing approved business plans; maximizing the NPL recovery rate; solving debt including collateral sale at best market price conditions; avoiding additional losses or re-default of viable debtors; optimizing recovery delays; ensuring efficient processing of NPL management with limited staff and budget resources; leveraging digitalization tools, innovative information sources such as big data, and workout procedures; staying compliant with applicable laws and regulations relating to debt recovery and customer protection. In that sense, each credit servicer brings in its own expertise.

13. So far, the NPL secondary market has not yet developed significantly in Greece. Given that NPLs have been transferred to credit purchasers mainly through primary securitization sales, more than through direct outright sales, distressed debt is managed through agreed and monitored securitization frameworks. Thus, NPL resales by credit purchasers on the secondary market have not yet become usual practice, but they are expected to develop, especially once Hercules lapses and direct NPL sales are completed by banks afterwards.

Issues and Challenges Faced by Greek Credit Servicers

14. In practice, NPL recovery may be processed in various ways, depending on the viability status of debtors and their typology, such as: individuals, including consumers, which may be "vulnerable" debtors, individual entrepreneurs, and enterprises, including SMEs and larger corporates. According to credit servicers, their internal process for NPL resolution aims to: (i) assess the debtors' financial situation, in order to determine their capacity to pay; (ii) develop tailor-made offers by applying advanced IT and data analytical methods; (iii) reach amicable and optimal solutions for debtors, which are often long-term repayment plans.

15. Credit servicers can avail themselves of various NPL workout mechanisms, although legal and operational constrains remain. Main legal tools are: (i) initiation of proceedings relating to the adjudication of any claim, or issuance of payment orders (unsecured claims); (ii) foreclosure and auction of debtors' assets (secured claims); (iii) initiation of and/or participation in any other judicial or extra-judicial insolvency proceedings available in respect of individuals or legal entities, including bankruptcy, rehabilitation, and Out-of-Court Workout of the new Insolvency Code, which aims to allow debtors with multiple creditors (including the tax and social security authorities) to reach agreement on restructuring solutions, after full information on the debtor's financial situation has been disclosed. However, as of end-2021, NPL workout processing by credit servicers has proceeded more slowly than expected, given various legal obstacles (see Box 2)[7]. The authorities could help address these obstacles by (i) collecting and analyzing data on the use of the system and the restructuring solutions reached; and (ii) increasing the capacity and efficiency of the court system, including by accelerating, where possible, digitalization and remote hearings, and by eliminating case backlogs, particularly of household insolvency cases.

Box 2. Legal Issues Relating to Distressed Debt Resolution in Greece

The Greek Insolvency Framework was substantially amended in 2020 to harmonize Greek insolvency law with the European Directive on Preventive Restructuring and Insolvency, and to simplify and modernize procedures. Greece was one of the first European countries to integrate the Directive into national legislation, and while experience with the law is limited given full implementation was delayed until end-2021, its design is commendable. While legislation is vastly improved, these efforts should be complemented with efforts in key areas:

Institutional Capacity: Court processes in Greece are slow, hindered by a case backlog (exacerbated by court closures during COVID) and lack of modernization (for instance, remote hearings, electronic filings). While Greece is making some progress in processing its backlog of insolvency cases (including through increasing the number and mobility of judges), a significant number of unresolved cases remains (around 48,000 as of Q1:2022). Moreover, while a court modernization plan is in train, progress is expected to be gradual over the next decade and could usefully be accelerated.

Sale and Lease Back (SLBO): The Insolvency Code included provisions for protection of the most vulnerable Greek debtors to prevent loss of their primary residence. The "Sale and Lease Back" envisages the purchase of primary residences of the most vulnerable debtors, which would then be leased back to debtors. However, delays in operationalization (now expected in mid-2023 at the earliest) prevents debt resolution for these debtors. Steps to encourage meaningful restructuring of these loans, such as linking the ongoing subsidy scheme with sustainable restructuring, could be taken, while efforts to speed up operationalization of the SLBO take place.

Enforcement Procedures ("E-Auctions): After years of suspension until 2017and a further suspension during the COVID pandemic, e-auctions of foreclosed properties have resumed as of September 2021. However, the numbers of successful auctions have been relatively low and most real estate is acquired by the bank leading the auction. However, since Q1:2022 there have been signs of a gradual improvement. The

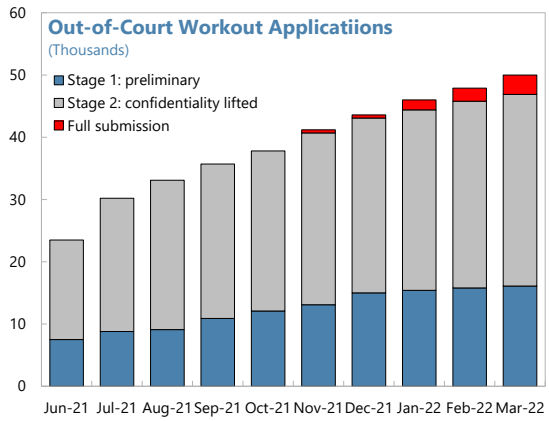
[7] No data from public sources has been provided on NPL recovery performance by credit servicers.

Box 2. Legal Issues relating to Distressed Debt Resolution in Greece (Concluded)

authorities have recently adopted legal enhancements to facilitate the procedure, although close monitoring of the procedures is needed to ensure continued improvement, given the importance of a "credible threat" of enforcement for amicable debt resolution.

Data Collection and Monitoring: The Greek authorities have access to significant amounts of data through electronic platforms used for initiating insolvency procedures (e.g., OCW, "second chance" procedure). The authorities should develop a comprehensive framework for the collection and analysis of the data to evaluate the procedures, including bottlenecks, and depth of debt restructuring. The authorities should also actively monitor performance of credit servicers, including the depth of solutions offered and debtors' capacity to repay. Information on debtors' financial situation could give the authorities critical information as to what solutions might be needed going forward as the debt overhang is gradually resolved, while recognizing that the requirements to lift bank secrecy in the OCW may hinder debtors from applying.

Figure 3. Greece: Out of-Court Workout Implementation



Source: Bloomberg Finance L.P.; European Banking Authority; and IMF staff projections.

Risk Assessment of the Current NPL Resolution Framework by Credit Servicers on Financial Stability in Greece

16. From a macroprudential perspective, financial stability risks from credit servicers appear modest. Financial stability has clearly been enhanced from the banking sector's perspective with the reduction of NPL-related credit risk. The credit servicers' sector might be less impactful on financial stability because these non-bank financial intermediaries are less interconnected with the financial system and payment system infrastructure. Unexpected additional losses on securitized NPL portfolios would have a fiscal impact on the government through the state guarantees on senior notes held by banks, meaning that only losses beyond the maximum amount of state guarantees might be impactful on banks.

17. But credit servicers face micro-prudential risks. Being non-bank financial institutions, collecting no customer deposits, credit servicers are exposed to specific financial risks from a micro

prudential perspective. Based on loan servicing agreements, credit servicers are supposed to be immunized against direct credit risk, to which bearers of senior notes are ultimately exposed. Yet credit risk has not disappeared, due to possible further deterioration of debtors' financial situation, depreciation of real estate collateral, and/or ineffectiveness of other available guarantees; however, this risk is not borne by credit servicers. Credit servicers are now exposed to other kinds of risks, such as operational risk, including fraud, cyber, legal and compliance risks, possibly coming from (for instance) poor data quality on NPLs, adverse events undermining workout execution, customer complaints, and so on. The risk profile of credit servicers may vary, depending on their respective situation, but NPL servicing is a higher risk activity than regular loan servicing. No public rating of credit servicers is available. If a credit servicer faced any severe financial difficulty or default, the BoG could make use of existing legal powers at national level.

C. Policy Recommendations

18. Regulation of credit servicers enhances transparency and the monitoring of NPL workout strategies, achievements, and risks. The Greek authorities have implemented a regulatory framework applicable to credit servicers since 2015, to be aligned with the EU Directive 2021/2167 (COD) of November 24, 2021, on credit servicers and credit purchasers. Such large regulatory scope and powers are welcome, as it may enhance current supervisory strategy of credit servicers and implement direct and impactful offsite and onsite controls. The BoG is monitoring credit servicers through regular prudential supervision, including licensing, watching their business plans and effective NPL recovery performance.

19. Yet several issues should be addressed to ease the completion of NPL workouts in Greece, from a financial stability perspective, among which:

- **Market transparency is low,** with few available and reliable public information and data on the Greek NPL market, NPL investors, and credit servicers.
- **Financial disclosure on NPL recovery performance and risks is insufficient,** making it difficult for outsiders to monitor the effectiveness and efficiency of NPL workouts.
- **Supervision of credit servicers could be stepped up,** with more thorough on-site inspections to be performed once the pandemic recedes.
- **The recovery performance of distressed debt by credit servicers has been weak so far,** raising uncertainty about their capacity to comply with business plans in the long run, adding to overall uncertainty that has steadily increased since 2022.

20. Several recommendations could be considered to support an efficient NPL workout by credit servicers, contributing to financial stability.

- **Ensure full implementation of legal reforms aimed at easing NPL workouts and increase the pace and effectiveness of amicable and judicial NPL recovery (See Box 2).** In the wake of substantial reforms to the Insolvency Framework, authorities should focus their efforts on: (i) data collection and analysis, regarding the use of the system and the

restructuring solutions reached, in order to identify possible bottlenecks and impediments; and (ii) increasing the capacity and efficiency of the court system, including by accelerating, where possible, digitalization and remote hearings, and by eliminating case backlogs, particularly of household insolvency cases. These efforts should aim to reduce moral hazard and ensure debtors have incentives to agree to restructuring solutions offered. Data collection and monitoring should also focus on the analysis of remaining NPL borrowers, as well as solutions offered by credit servicers, to ensure that realistic, sustainable solutions are being offered based on reasonable capacity-to-pay indicators.

- **Improve market transparency, enrich financial disclosure, and systematize data collection and analysis relating to credit servicers and NPL purchasers.** Increased market transparency on credit servicers' activities and performance may help external stakeholders assess financial risks relating to NPL recovery in Greece: (i) financial disclosure standards applicable to credit servicers should be upgraded; (ii) periodic surveys including risk-based indicators should be published by the Bank of Greece together with relevant legal and analytical information; (iii) relevant statistics should be disclosed on distressed debts due by the private sector, whether they are still bank NPLs or they have been transferred to credit servicers through securitization or outright sales, to enable global monitoring of the resolution of NPL legacy, including post-pandemic NPLs. Rating credit servicers may be considered as an incentive for transparency and performance.
- **Fine-tune supervisory expectations relating to credit servicers and implement thorough onsite inspections.** The BoG is planning to resume onsite inspections of credit servicers in 2022, which will usefully supplement the remote surveillance based on regulatory reporting, in order to ensure that NPL recovery is appropriately processed. On the micro prudential front, monitoring a risk-based set of early warning indicators is essential for the BoG to ensure diligent identification of, and reaction to, any material risk that might undermine the implementation of credit servicers' business plans and eventually lead to additional loan losses requiring the use of state guarantees or ultimately impacting banks. Implementation of the aforementioned EU Directive in Greece may be an opportunity to review and fine-tune the regulatory and prudential framework applicable to credit servicers. The BoG may also consider publishing prudential guidelines to credit servicers to specify risk-based supervisory expectations relating to the appropriate management of NPL legacy.
- **Encourage credit servicers to apply for extending their license in order to be able to provide refinancing to support restructurings of viable debtors**. Yet credit servicers would become more high-risk profile regulated institutions, and their exposure to financial risks would have to be closely monitored and subject to more thorough and adapted prudential requirements on solvency, liquidity, risk management, and governance.
- **Coordinate authorities' action plans to reduce the distressed debt overhang in Greece.** The distressed debt overhang requires a coordinated response beyond financial stability considerations, given its broader economic and social implications. While debt is gradually being offloaded from the banks, it remains in the real economy with attendant economic effects, and a strategy to deal with the *distressed debt* as opposed to *non-performing loans*

should be put in place. Debt should be restructured, or written off, depending on the financial condition of the debtor, using legal tools available so that viable debtors may get access to bank credit again after their debt repayment obligations are cleared in a reasonable timeframe.

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