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**The Greek macroeconomy:  
A note on the current situation and future outlook**

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# **The Greek macroeconomy: A note on the current situation and future outlook**

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**Abstract:** The aim of this non-technical article is threefold. It first presents the main characteristics, both positive and negative, of the Greek macroeconomy in the current situation. Second, since economic growth seems to be the best possible way of addressing the various imbalances and future challenges, it reviews the main lessons from the growth literature; one such lesson is the importance of complementarities in production which implies that what is crucial is the economy's weak links. Third, it lists some of Greece's weak links, namely its barriers to durable economic growth.

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This non-technical article is organized as follows. It first summarizes the main current features, both positive and negative, of the Greek macroeconomy (section 1). In turn, given the importance of economic growth for avoiding unpleasant decisions, it reviews the main lessons from the empirical growth literature (section 2). Finally, it lists the weak links, namely the barriers to durable growth, in the case of Greece (section 3).

The conclusions can be summarized as follows:

First, the Greek macroeconomy has been doing well in recent years relative to other EU countries, especially in terms of growth and public finances. This owes itself mainly to the momentum of the post-sovereign (2009-2016) and the post-pandemic (2020-2022) rebounds, to a strong national fiscal stimulus during the pandemic, and to the ongoing significant financial support by the EU's NGEU/RRF. But all these growth drivers are temporary.

Second, despite progress and positive developments, there are chronic macroeconomic imbalances. On top of them, repayment of EU bailout loans until 2070 will require persistent primary fiscal surpluses over time and this will be challenging. Within this economic environment, durable economic growth seems to be only way to deal with these problems and avoid unpleasant fiscal decisions.

Third, lessons from the empirical growth literature, as well as complementarities in production, imply that what is crucial for durable growth is the economy's weak links. This is because when productive factors are complements to each other, rather than substitutes, output is shaped by the minimum of these factors. Therefore, the priority should be given to the identification and correction of Greece's weak links that suppress the country's prospects for durable growth. Here, we single out the following weak links: education, public spending efficiency, core institutions, the efficiency of public administration, the tax system, and demographics.

## 1. Current situation

### Positive macroeconomic developments

Although most economies' post-pandemic rebound came to an end in 2022, which also marked an energy crisis and geopolitical uncertainty due to Russia's invasion of Ukraine, the Greek economy has managed to **keep showing solid real economic growth**. Here are the data for actual and forecasted real GDP growth rates in Greece and, for comparison, the EA (source: European Commission (2024a, 2024b)):

|      | <i>Economic growth</i><br><i>(volume, percentage change on proceeding year)</i> |           |
|------|---|-----------|
|      | <i>Greece</i>   | <i>EA</i> |
| 2023 | 2.0   | 0.4       |
| 2024 | 2.2   | 0.8       |
| 2025 | 2.3   | 1.4       |

**Solid growth has been translated to significant reductions in the unemployment rate** since the sovereign debt crisis years. The data right below (source: European Commission (2024a)) show the progress made. However, notice that unemployment remains relatively high despite its fall. It is also worth reporting that Greece has a relatively high percent of young people who are inactive (see e.g. OECD, 2024, chapter 5, for the share of young people 15-19 years old who are “not in employment, nor in education or training”).

|         | <i>Unemployment rate</i> |           |
|---------|--------------------------|-----------|
|         | <i>Greece</i>            | <i>EA</i> |
| 2015–19 | 21.7                     | 9.2       |
| 2023    | 11.1                     | 6.6       |
| 2024    | 10.3                     | 6.6       |
| 2025    | 9.7                      | 6.5       |

The sources of the above improved macroeconomic performance have been increases in investment (mainly in construction), private consumption, and exports. Focusing on capital accumulation, a productive factor closely associated with growth, the investment to GDP ratio has been rising during the last years converging to that in other European countries. Specifically, **investment as share of GDP was 13.7% in 2022 and increased to around 18.7% at the end of 2023**, which can be compared to e.g. Germany’s where the numbers are 22% and 23% respectively. To get an idea of the progress made, it is worth recalling that the investment to GDP ratio **was around 7% in 2015**.

Thanks to solid economic growth and thereby robust tax revenues, the **primary fiscal balance** (meaning tax revenues minus public spending excluding interest payments on public debt) has been in **surplus** and this is expected to continue in the next years, in contrast to most countries in the Euro Area which show primary fiscal deficits. Here are the data (source: European Commission (2024a)):

|      | <i>Primary fiscal balance</i><br><i>(as share of GDP)</i> |           |
|------|---|-----------|
|      | <i>Greece</i>   | <i>EA</i> |
| 2023 | 1.9   | -1.9      |
| 2024 | 2.3   | -1.1      |
| 2025 | 2.4   | -0.9      |

The combination of economic growth, primary fiscal surpluses, but also high inflation (since 2022), where the latter helps to erode the real value of outstanding public debt, has led to a significant reduction in the **public debt to GDP ratio**. This ratio **has fallen by around 40 percentage points within the last 4 years (!)** and is expected to

fall even further in the next years. Here are the data for gross public debt as share of output (source: European Commission (2024a, 2024b)):

|      | <i>Gross public debt<br/>(as share of GDP)</i> |           |
|------|--|-----------|
|      | <i>Greece</i>                                  | <i>EA</i> |
| 2020 | 207  | 99        |
| 2023 | 162  | 90        |
| 2024 | 154  | 90        |
| 2025 | 150  | 90        |

The above good economic performance is driven by funds from the EU’s Recovery and Resilience Facility (**RRF**).<sup>2</sup> It is worth stressing that the allocation of NGEU/RRF funds has been particularly generous to Greece which has got the lion’s share in terms of each country’s GDP. Here are the **top beneficiaries** (source: European Commission):

| <i>RRF allocation<br/>(as share of each country’s GDP)</i> |      |
|--|------|
| <i>Greece</i>  | 19.6 |
| <i>Croatia</i>   | 17.5 |
| <i>Spain</i>   | 13.5 |
| <i>Romania</i>   | 12   |
| <i>Italy</i>   | 10.9 |
| <i>Portugal</i>  | 10.5 |
| <i>Poland</i>  | 10.4 |

Progress has been made not only in terms of macroeconomic outcomes like the above, but also in terms of fundamentals that typically shape these outcomes. For example, product markets have become more competitive. In the table right below, we report the OECD’s Product Market Regulation (PMR) indicator in 2018 and 2023 (the smaller the number, the more competitive the product markets are). Although **Greece was worse than the average OECD country in 2018 in terms of competition friendly regulations, it scores better than the average in 2023**, and it is widely believed that, in general, stronger product market competition is good for growth (see e.g. Aghion and Howitt, 2009). This positive development is also related to the need to strengthen the EU’s Single Market (see also the recommendations of the European Commission (2024b)). On the other hand, we should keep in mind that indicators like

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<sup>2</sup> See Dimakopoulou et al (2024) for this in a micro-founded macroeconomic model calibrated to the Greek economy.

these, by construction, are based not only on hard data but also on what has been legislated which may differ from what has been really implemented.

*Product Market Regulation (PMR) indicator*

|      | <i>Greece</i> | <i>OECD</i> |
|------|---------------|-------------|
| 2018 | 1.89          | 1.41        |
| 2023 | 1.37          | 1.39        |

Positive macro developments like all the above have been reflected to **optimistic economic sentiments** that reflect trust. Here is the so-called Economic Sentiment Indicator in the recent years as produced by the European Commission (source: Eurostat):

*Economic sentiment indicator*

|      | <i>Greece</i> | <i>EA</i> |
|------|---------------|-----------|
| 2021 | 105.9         | 111.2     |
| 2022 | 104.8         | 102.1     |
| 2023 | 107.6         | 96.4      |

### **Macroeconomic imbalances**

But there are also imbalances, most of them being chronic. For example:

**Very low savings and persistent current account deficits**<sup>3</sup> mean that external institutional funding (like that coming from RRF) and short-term private capital flows from abroad (for portfolio reasons) are crucial for financing trade deficits and economic growth. But, as the sovereign debt crisis of the previous decade has shown, such external financing is temporary only and it also leaves the country **vulnerable to lenders' confidence** within an increasingly uncertain world environment. Funds from the RRF will terminate in 2027, while private capital inflows for portfolio, investment or other reasons will keep coming in only if the country continues to enjoy international trust (recall the loss of trust and the sudden stop in the previous decade). Below we present data for national savings, the saving rate of households and the current account balance (source: European Commission (2024a)). In particular, notice the striking difference in the saving rate between households in Greece and in the EA; **so low savings cannot but affect investment and growth in the future.**

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<sup>3</sup> The accumulation of current account deficits over the years, as result of relatively high domestic demand, translates to external debt (the so-called Net International Investment Position) which remains one of the highest in the EU (see also European Commission (2024b)).

*Gross national saving  
(as share of GDP)*

|      | <i>Greece</i> | <i>EA</i> |
|------|---------------|-----------|
| 2023 | 11            | 26        |
| 2024 | 12            | 26        |
| 2025 | 13            | 26        |

*Saving rate of households*

|      | <i>Greece</i> | <i>EA</i> |
|------|---------------|-----------|
| 2023 | -2.7          | 14.4      |
| 2024 | -1.5          | 15.5      |
| 2025 | -1.3          | 15.1      |

*Current account balance  
(as share of GDP)*

|      | <i>Greece</i> | <i>EA</i> |
|------|---------------|-----------|
| 2023 | -6            | 2.9       |
| 2024 | -5            | 3.2       |
| 2025 | -5            | 3.2       |

Regarding private investment, although it has been rising (see above), attention should also be given to its mix. Most of the recent **increase in investment has been in construction and real estate and less in manufacturing** and, as is well known, manufacturing and services have greater productivity growth potential. And abundance of funds exacerbates this problem.<sup>4</sup> Right below we present data on the growth rate in investment in construction (source: European Commission (2024a)).

*Investment in construction  
(volume, percentage change on proceeding year)*

|      | <i>Greece</i> | <i>EA</i> |
|------|---------------|-----------|
| 2022 | 16.6          | 1.6       |
| 2023 | 11.8          | -0.8      |
| 2024 | 6.5           | -0.5      |

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<sup>4</sup> On one hand, the big increase in construction and real estate can be a catching up effect after their big fall in the previous decade. On the other hand, in their study for the euro crisis of the previous decade, Brunnermeier and Reis (2019) have argued that easy credit and capital inflows searching for a higher return in the 2000s led to a serious resource misallocation in the periphery countries of the EA by going mainly to construction and real estate and so crowding out tradable goods sectors. It is thus important to avoid repetition of a similar resource misallocation.



Let us now return to public finances. Although, as said above, public debt to GDP has been declining since 2021, it remains the highest in the EU, which results, among other things, in high interest payments, and this is despite the fact that most of the Greek public debt is in the hands of EU public institutions at low non-market interest rates and with very long maturity (see below on this). Here are the data on **interest payments to public debt** (source: European Commission (2024a)):

*Interest payments to public debt*  
(as share of GDP)

|      | <i>Greece</i> | <i>EA</i> |
|------|---------------|-----------|
| 2023 | 3.5           | 1.7       |
| 2024 | 3.4           | 1.9       |
| 2025 | 3.2           | 2         |

Actually, it is worth pointing out that the country spends more on interest payments to public debt than on national defense; the latter has been around 3.2% of GDP recently which is less than the numbers above in most years. An increase in sovereign interest rates can make it worse. Also, because of these interest payments, the **fiscal** balance (which is the primary fiscal balance as presented above plus interest payments to public debt) turns from surplus to **deficit** (source: European Commission (2024a, 2024b)), although these deficits are clearly smaller than those of the EA:

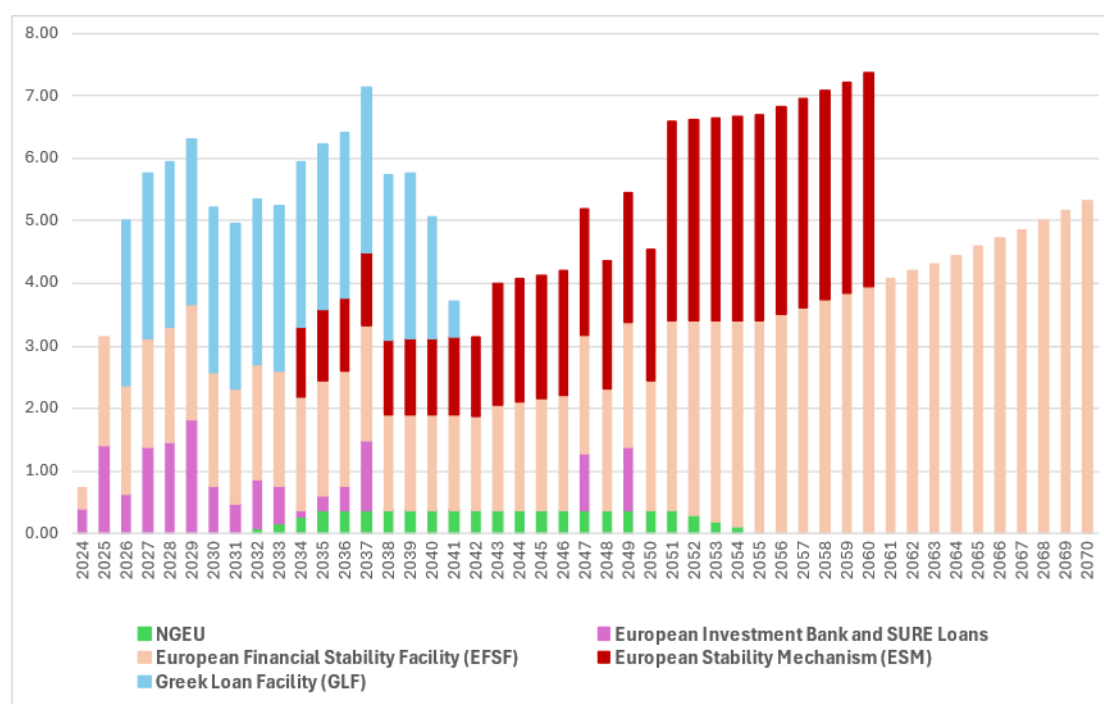
*Fiscal balance*  
(as share of GDP)

|      | <i>Greece</i> | <i>EA</i> |
|------|---------------|-----------|
| 2023 | -1.6          | -3.6      |
| 2024 | -1.2          | -3.0      |
| 2025 | -0.8          | -2.8      |

### **... and an extra challenge for Greece in the years to come**

A distinct feature of the Greek economy is the size and mix of its public debt. Regarding the size, as already said above, Greece has the highest public debt to GDP in the EU (it was 162% at the end of 2023). But its mix is also distinct. Most of the public debt is owed to EU public institutions like ESM, EFSF, NGEU/RRF, etc, as result of the three official fiscal bailout loans during Greece's sovereign debt crisis in the previous decade but also as result of more recent loans from NGEU/RRF. Today, namely in 2024, **this kind of official public debt is around 240 billion euros (see the graph below) which translates to around 70% of today's total Greek public debt. This amount needs to be fully repaid in uneven annual installments between 2024 and 2070** at low non-market interest rates. As the graph below illustrates (source: Greek Public Debt Agency), the country has committed to paying

back the loans from ESM between 2034 and 2060, while loans from EFSF will be paid back between 2023 and 2070.<sup>5</sup>



Therefore, looking forward, except if there is a very favorable growth rate-interest rate differential, **repayment of this debt will require** primary fiscal surpluses in many years over time. For example, according to recommendations by the European Commission (2022b), Greece needs to run a **primary fiscal surplus of around 2% on average over the years** (more specifically, between 1.4% under an optimistic scenario and 3.1% under a pessimistic scenario). **Primary fiscal surpluses of such size, and for so many years, will be demanding**, especially if we look at the country’s historical data in normal times (by normal, we mean excluding the years of forced fiscal austerity in the previous decade).

It is worth stressing, however, that the computation of the size of primary fiscal surpluses needed for the repayment of EU bailout loans cannot be done by simple debt arithmetic exercises like those in European Commission’s reports. This is because this computation is sensitive to assumptions about future growth rates, tax revenues and, perhaps more importantly, the evolution of the part of public debt purchased from now on by private actors at market sovereign interest rates, all of which will be endogenous variables jointly determined.<sup>6</sup> In general, further falls in

<sup>5</sup> For macroeconomic models for the Greek economy during its sovereign debt crisis of the previous decade and the more recent pandemic crisis, as well as for the role played by EU institutions during those crises, see e.g. Economides et al (2021), Dimakopoulou et al (2022) and Chodorow-Reich et al (2023).

<sup>6</sup> Using a structural macroeconomic model calibrated to Greece in the current situation, Dimakopoulou et al (2024) study the consequences of repayment of EU loans and how these consequences depend on the evolution of new privately held public debt issued at market sovereign interest rates, as the EU loans are gradually paid back by 2070.

inflation, a slowdown in growth and higher sovereign interest rates will make it more difficult for governments to reduce their public debt ratio (see also e.g. The Economist, April 13<sup>th</sup> 2024, pp. 64-65).

### **The importance of economic growth**

Inspection of the above data, especially those reflecting imbalances and debt obligations, reveals that there is one variable that appears repeatedly and **shapes almost all of them**: the evolution of per capita real GDP or more specifically its **growth rate**. Although other variables or ingredients are also important (prudent fiscal policy, etc), economic growth can reduce the public debt to GDP ratio over time and thus help the country to avoid unpleasant decisions like raising taxes and/or cutting public spending; generate revenues for public services and social policy; allow for an increase in national savings; signal good prospects for the future which enhances economic trust and confidence; reduce the dependence of the country on external financing; etc. It is thus **not surprising that these days growth is listed as a top priority by national governments and international agencies**. Actually, in several countries, there is nowadays a political consensus on the importance of growth (the UK is perhaps the clearest example where both the new Labor government and the Conservative party have put economic growth at the top of their political agendas).

But, as is widely acknowledged at research level, achieving economic growth on a durable basis is easier said than done. As we shall try to explain next, there is not a magical wand for growth. Besides, as Rodrik (2005) has pointed out, there is a big difference between triggering growth and sustaining it. The former is easy and can be done by a good policy (see e.g. the role of RRF funds in the current situation in Greece). The latter is more difficult and here we focus on this.

## **2. The holy grail of economic growth: what do we know?**

What is economic growth? How can it be sustained once triggered? Why do some countries grow systematically while others do not? Let us recall some basic lessons and empirical findings.

Economic growth is driven by accumulation of physical and human capital and by technological progress.<sup>7</sup> But, as emphasized by North and Thomas (1973) and then re-emphasized by Acemoglu (2009, chapter 4), these do not explain growth; they are growth. In other words, there are deeper reasons or causes of growth, and it is these reasons or causes that can explain, among other things, why in some countries these

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<sup>7</sup> There are two main models of technological progress in the academic literature: the product variety model introduced by Romer (1990) and extended by Jones (1995), and the Schumpeterian model introduced by Aghion and Howitt (1992); for a textbook presentation of the two models see respectively chapters 3 and 4 in Aghion and Howitt (2009). These models are also the most popular models of long-term endogenous growth. Recently, there are also models with intangible capital; the latter does not differ conceptually from “ideas” in the Romer sense (see e.g. Corrado et al (2022) for a review of the literature on intangible capital).

productive factors increase and are used efficiently, while, in some others they do not increase or, even if they do, are misused or underutilized.

There is a vast empirical literature on growth (known as growth regressions).<sup>8</sup> The conventional evidence is that countries that grow on a durable basis feature macroeconomic stability and especially fiscal solvency and low inflation; political stability; public infrastructure; efficient markets meaning regulations that provide market-oriented incentives, but, at the same time, reduce abuse of market power; a good education system; a good tax system; trade openness; social protection and insurance; economically active populations and social use of talent; and good core institutions. Core institutions relate to property rights and enforcement of contracts, the rule of law, the efficiency of public administration, checks and balances, legal traditions, trust, social and political cohesion, etc.<sup>9</sup>

This is a long list. Actually, it is too long to be useful at policy level. But, reading between the lines, there are three pieces of evidence that seem to be particularly useful.

First, as pointed out by e.g. Easterly (2005), the mapping from policies and reforms to outcomes like economic growth is imperfect. Although bad policies, like macroeconomic uncertainty, chronic deficits, violation of property rights and the rule of law, high inflation, poor public administration, poor education and health systems, etc, can destroy growth, it is not so clear which policies can create the conditions for steady growth. In the same spirit, Restuccia and Rogerson (2017), instead of focusing on the engines of growth, have emphasized the importance of barriers to growth (like market regulations and entry barriers that limit competition, inefficient tax systems, fiscal favors to specific firms and social groups, non-protection of legal property rights, etc) that result in misallocation of capital and talent.

Second, deep-seated institutions are particularly significant quantitatively in growth regressions and can explain by themselves most of the cross-country differences in the growth data; that is, most policies cease to be significant once we account for institutions (see e.g. Easterly (2005)). And the problem is that, although policies can affect institutions, institutions change very slowly, especially when it is for the better.

Third, when we search for a growth strategy, there is little consensus on the optimal list or package of policy reforms (see Drazen (2000, chapters 10 and 13) for a review). The early view used to be that reforms should be comprehensive by covering

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<sup>8</sup> For reviews of the theoretical and empirical growth literature, see the papers included in the Handbook of Economic Growth, volumes 1A, 1B, 2A and 2B, edited by Aghion and Durlauf (2005, 2014); among those papers, the papers by Rodrik (2005), Easterly (2005) and Caselli (2005) are particularly useful for empirical evidence. A nice discussion of the pillars and stages of economic growth can be found in Sala-i-Martin (2010). Graduate textbooks on economic growth include Barro and Sala-i-Martin (2004), Aghion and Howitt (2009) and Acemoglu (2009), while see Jones (2013) for a popular undergraduate textbook. Jones (2016) presents stylized facts for the drivers of growth.

<sup>9</sup> See Acemoglu et al (2005), Easterly (2005) and Acemoglu (2009, chapters 4, 22 and 23) for institutions as a cause of long-term growth. Algan and Cahuc (2014) focus on trust.

several areas like the ones listed above.<sup>10</sup> On the other hand, there is the view (see e.g. Rodrik (2005)) that it is better to focus on a narrow range of policy reforms. As Rodrik argues, this is good and bad news at the same time. It is good news because it is not necessary to try to implement a lot and at the same time. The bad news is that it may be difficult to identify the binding constraints and where the key problems or opportunities lie.

**Putting all the above together, a good growth strategy should start by addressing the fundamental barriers to durable growth.** This is for the reasons discussed above but **also because**, as well documented by e.g. Caselli (2005) and Jones (2011), **when there is complementarity in production, the latter puts more weight on the weakest fundamentals or what Jones (2011) has called the weak links.** Following Jones (2011, p. 2), inputs enter in a complementary fashion, in the sense that any problem with one of them can substantially reduce overall output. For example, without skilled labor, without infrastructure, without protection of legal property rights, without an efficient public administration, etc, production will be severely curtailed even if other inputs are in place. Technically speaking, when productive factors are complements to each other, rather than substitutes, output becomes the minimum of the inputs (this is reminiscent of the Leontief production function). By contrast, when productive inputs are assumed to be substitutes to each other, as the degree of substitutability increases, the output converges to the maximum of inputs meaning that, in this too-good-to-be-true case, a “superstar” can drive everything up. Note that these different cases can be captured by an aggregate CES production function which is a power mean of inputs (see Jones (2011, p. 7)); an Appendix at the end of this note formalizes these arguments and presents some simple numerical examples using a function like this.

The Greek sovereign debt crisis of the previous decade can provide another example of the importance of complementarity, this time at macro level: once trust went away, there was a full-scale crisis even if several economic sectors were strong. And the weak links are local which means country specific. So should be the policy reforms; one size cannot fit it all.

### **3. Greece’s weak links and growth outlook**

As already said, the Greek economy has been doing well in recent years, especially in terms of growth, relative to most European economies, and this happens within a difficult and uncertain international environment. However, this good performance owes itself mainly to the momentum of the post-sovereign (2009-2016) and the post-pandemic (2020-2022) rebounds, to a strong national fiscal stimulus in the years of the pandemic, as well as to the financial support by the EU’s NGEU/RRF. But all these growth drivers are temporary. Thus, as in most European countries, there is an urgent quest for engines of sustainable, durable growth. And, as also said above, given complementarity in production, a sensible growth strategy would be to start with addressing the country’s weakest fundamentals. In the case of Greece, inspection

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<sup>10</sup> The so-called Washington Consensus that was popular in the 1980s especially as a strategy suitable for Latin America countries belongs to this case. Aghion et al (2014, section 1.7) also emphasize the need for policies that match the particular context of a country or region.

of various kinds of **data reveals the following (non-exhaustive) list of relatively poor fundamentals or weak links** (we focus on growth-related drivers/barriers in which Greece clearly lacks behind as compared to its EU partners, so we leave aside climate change, etc, which are common problems across most countries):

- **Education.** Although international student assessments are not without problems, in the latest 2022 Program for International Student Assessment for high school pupils (known as PISA and conducted by OECD), Greece is among the lowest in the EU in all three subject areas, mathematics, science and reading. It should be added that what is correlated with growth is skills in mathematics and science (see e.g. Hanushek and Woessmann (2015)). Also at higher education level, there are no Greek universities included in the first 500 in the most recent Times Higher Education ranking. It is worth stressing that there is no robust correlation between rising educational attainment and the rate of growth of per capita output. That is, educational attainment or quantity is not enough and there are several explanations for this: educational quality may be too low to create additional human capital and it is quality rather than quantity that matters to growth; there may be no demand for the kind of education provided (and more education of the wrong kind can lead to rent seeking which makes things even worse); when the economy is stagnant and there are no incentives, migration can take the brightest and most educated away; etc (see e.g. Rajan (2009) for these problems). In sum, quality in education is one of the main challenges for Greek growth and the need to improve it is included in the recommendations of the EC for Greece (see European Commission (2024b)).
- **Public spending efficiency (value for money for public spending).** Greece scores poorly relative to its peers in terms of public spending efficiency which is an output-input index for the public sector. For example, in their recent studies for a rich panel of OECD countries, Afonso et al (2022) and Afonso and Alves (2023, Tables A.11-13) find that in Greece, the same level of public goods and services could be provided with significantly fewer social recourses (around 70% of the inputs used actually). Similar evidence is provided by Schuknecht (2021, chapter 4).<sup>11</sup> Thus, although Greece's public sector wage bill as share of GDP is close to the EU average which is around 11%, the challenge remains the efficiency of public administration rather than its size (again see also the recommendations of the European Commission (2024b)); this is related to the next weak link.
- **Institutional quality.** According to e.g. World Bank indexes, Greece scores poorly and clearly below the European average in **core institutions**, like the rule of law, regulatory quality, protection of legal property rights, the judiciary system, bureaucracy, etc (see also e.g. Christou et al (2021) and Schuknecht (2021, chapter 4)). The quality of core institutions is, of course, closely related

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<sup>11</sup> Although this has to do more with the mix of public spending rather than its efficiency, it is worth adding here that, although most European countries face similar demographic and aging problems, Greece and Italy have the highest public social spending on pensions as percentage of GDP, which comes at the cost of other types of public social spending like on health or active labor market programs (see e.g. OECD, 2019 and 2024, chapter 6; and Schuknecht 2021, Table 2.7)).

to the **efficiency of public administration** already mentioned above. A popular indicator of the efficiency of public administration is the World Bank's "government effectiveness index", which captures the quality of public and civil services, policy formulation and implementation, etc. This index is for more than 200 countries and ranges from -2.5 (worst) to 2.5 (best). Greece has been systematically scoring around 0.3 since 2014 and, interestingly, there has been a very small improvement only since the turbulent years of the sovereign debt crisis.<sup>12</sup> It should also be added that institutional quality is particularly important for countries like Greece blessed with natural resources in the form of natural beauty; there is empirical evidence that natural resources can be a curse, rather than a blessing, for long-term growth when institutions are poor (see e.g. Crafts and O'Rourke (2014) for a review). The need to improve the efficiency of public administration is also included in the recommendations of the EC for Greece (see European Commission (2024b)).

- **The tax system: tax evasion, shadow economy and mix of taxes.** Greece features one of the highest degrees of tax evasion and shadow economy, which both imply a narrow tax base and high effective tax rates that distort work, saving and investment incentives. See e.g. European Parliament (2022) and the recommendations of the European Commission (2024b) for Greece. Also, according to the European Commission's (2022a) Taxation Trends, Greece collects relatively low revenues from personal income taxes and relatively high revenues from social security contributions, where the latter are bad for employment and growth.
- **Demographics.** Greece already has, and this is expected to become worse in the next decades, a **severe percentage population decline** (see e.g. the report by the Foundation of Economic and Industrial Research (2022)). This, together with an ageing population, will exert additional **pressure on public finances** (see also footnote 11 above). Even in the current situation, the percentage change on preceding year in Greek total population is -0.4, -0.4 and -0.3 in 2023, 2024 and 2025 respectively, while the corresponding numbers in the EA are 0.6, 0.4 and 0.3 (source: European Commission (2024a)).

It is important to address these barriers to growth and prosperity. Durable economic growth is a strategic decision like national security and, as such, needs long-term planning and political dialogue and consensus. Borrowing the title of the game-theoretic paper by Geanakoplos and Polemarchakis (1982), "we can't disagree forever".

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<sup>12</sup> To be more precise, in 2022, which was the most recent observation, Greece scored 0.4, Portugal 1.0, France 1.2, Germany 1.3 and the Netherlands 1.6.

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## Appendix: The importance of complementarities and weak links

Following Caselli (2005, section 7) and Jones (2011), consider a CES production function with (for simplicity) two productive factors:

$$y = [\rho(A_g k_g)^\theta + (1-\rho)(A_p k_p)^\theta]^{1/\theta}$$

where  $0 < \rho < 1$ ,  $k_g$  and  $k_p$  can be thought of as public infrastructure and private capital or any other private inputs respectively,  $A_g$  and  $A_p$  are the efficiency units delivered by one unit of the two factors and  $\theta$  is a parameter determining the degree of substitutability,  $\frac{1}{1-\theta}$ , between the factors. Usually, we set  $0 < \theta \leq 1$ , but, as Caselli (2005) and Jones (2011) argue, this is not correct in general. Several productive factors are complements to each other which means that  $\theta$  is negative and, when this is the case, “a stronger degree of complementarity puts more weight on the weakest links and reduces output” (see Jones, 2011, p. 7).

What does this imply? It implies that the stronger the degree of complementarity, the bigger the benefit from an increase/improvement in the weak link assumed here to be  $k_g$ . Here are some numerical examples:

Say  $k_g = k_p = 1$ ,  $A_p = 1$ ,  $\rho = 0.5$  and that we want to see what happens when we increase  $A_g$  from say 0.5 to 0.75, and how the change in output depends on the value of  $\theta$ . Here are some solutions.

When  $\theta = 1$ , as  $A_g$  increases from 0.5 to 0.75, output rises from 0.75 to 0.857.

When  $\theta = 0.5$ , as  $A_g$  increases from 0.5 to 0.75, output rises from 0.728 to 0.870.

When  $\theta = -1$ , as  $A_g$  increases from 0.5 to 0.75, output rises from 0.666 to 0.86.

When  $\theta = -2$ , as  $A_g$  increases from 0.5 to 0.75, output rises from 0.16 to 0.52.

When  $\theta \rightarrow -\infty$ , output becomes the minimum of inputs.

That is, other things equal, the same rise in  $A_g$  has a stronger effect on output when the inputs are complements. A stronger degree of complementarity not only puts more weight on the weakest links and reduces output, but it also makes the benefit from an improvement in the weak link, more specifically from an increase in the efficiency of the least efficient factor, bigger. Naturally, it should not escape our attention that this is also related to the size of fiscal policy multipliers.



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