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National Productivity Boards: Institutional Set-up and Analyses of Productivity

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European Commission
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National Productivity Boards: Institutional Set-up and Analyses of Productivity

Luis García, Luigi Giamboni and Mauro Vigani

Abstract

In 2016, the Council of the European Union called on all euro area Member States to set up an NPB. NPBs consist of sectoral institutions aiming to foster debate on matters related to productivity and competitiveness. Six years after the adoption of the Council recommendation on the establishment of NPBs, the network of NPBs is now well established, although still incomplete. NPBs publish regular reports, thus contributing to evidence-based policymaking. Existing literature on NPBs, such as the two progress reports published by the European Commission, has mostly analysed their institutional set-up. This paper, while also reviewing the NPBs' institutional characteristics and aspects to improve, in addition summarises the main findings of their annual reports, an area that has to date, received less attention. The topics discussed reflect a key challenge for EU economies, namely that of maintaining satisfactory rates of productivity growth, which is key not only to improve living standards sustainably and to foster real convergence, but also to address macrofinancial imbalances and more recently, to ease possible temporary tensions between addressing climate change and economic growth.

JEL Classification: E02, E60, O32, O40, O43.

Keywords: National Productivity Boards, productivity, competitiveness, investment, human capital, skills, digitalisation, green transition.

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ABBREVIATIONS

GDP: gross domestic product

IFI: independent fiscal institution

NPB: National Productivity Board

R & D: research and development

SMEs: small and medium-sized enterprises

STEM: science, technology, engineering and mathematics

TFP: total factor productivity

COUNTRY CODES

BE	Belgium
BG	Bulgaria
CZ	Czechia
DK	Denmark
DE	Germany
EE	Estonia
IE	Ireland
EL	Greece
ES	Spain
FR	France
HR	Croatia
IT	Italy
CY	Cyprus
LV	Latvia
LT	Lithuania
LU	Luxembourg
HU	Hungary
MT	Malta
NL	Netherlands
AT	Austria
PL	Poland
PT	Portugal
RO	Romania
SI	Slovenia
SK	Slovakia
FI	Finland
SE	Sweden

1. INTRODUCTION

Based on a proposal by the Commission, in September 2016 the Council adopted a recommendation inviting the Member States to establish National Productivity Boards (NPBs) by March 2018 (hereinafter the NPB recommendation) ([1])**.** The NPB recommendation is addressed to euro area Member States. Non-euro area Member States are also encouraged to identify or set up similar institutions. The NPBs were envisaged as objective, neutral and independent institutions for the analysis of national productivity challenges and for contributing to evidence-based policymaking. Although the NPBs are based on a common set of characteristics and tasks, the recommendation allows each Member State to determine the specific set-up of its own NPB.

To date, 19 EU Member States have established an NPB, including 17 euro area Member States (Belgium, Germany, Ireland, Greece, France, Croatia, Cyprus, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland). A further two, non-euro area, Member States have identified or set up similar institutions (Denmark and Hungary). While the network of NPBs has grown steadily over time, no new NPBs were set up in 2022, and eight EU countries have yet to establish one. The latest developments are that, first, in December 2021, the Slovak government appointed a new NPB under the leadership of Slovakia's Minister of Economy, and, second, in the second quarter of 2022, the Austrian NPB became operational.

All NPBs build upon or receive assistance from existing institutions. Ten Member States (Denmark, Germany, Ireland, Greece, Croatia, Lithuania, Malta, the Netherlands, Portugal and Slovenia) have appointed existing institutions by broadening their mandate to execute the additional tasks necessary to become an NPB. The remaining nine countries that have an NPB have set up a new institution, typically consisting of a board of directors assisted by a ministerial department or an existing independent body, which provides secretariat services. This assistance facilitates access to resources and enables a smooth start-up.

The institutional designs of the NPBs are broadly in line with the requirements of the NPB recommendation. However, the provisions governing seven NPBs do not explicitly state the functional autonomy envisaged by the recommendation. The provisions of eight other NPBs do not guarantee NPBs access to the information needed to perform their duties; this guarantee is set out in the recommendation. Moreover, some NPBs have reported challenges in securing resources for their activities, such as failure to increase the funding of the existing institution following the new mandate, despite the additional duties.

The NPB recommendation also calls on NPBs to publish an annual report. The mandates of all but one NPB include this requirement. However, not all NPBs have issued a report every year, thus reflecting an uneven pace of publication.

Through the annual reports, NPBs can inform the discussions on policies to boost productivity and competitiveness, contributing to evidence-based policymaking. Examples are the analyses of the productivity slowdown affecting advanced economies since the turn of the century, the macroeconomic effects of the recovery and resilience plans ([2]) and the specification of criteria for the design of support measures in the context of the COVID-19 pandemic.

([1]) Council recommendation of 20 September 2016 on the establishment of National Productivity Boards (OJ C 349, 24.9.2016, p. 1).

([2]) As in Belgian NPB (2020) and Council for Productivity (Portugal) (2021).

The reports of the majority of NPBs include recommendations for governments, allowing NPBs to have an increasing role in the public debate. In general, the NPBs with higher visibility are those based on existing institutions that are already well trusted among policymakers and the public at large.

There is a variety of contents and analytical approaches across the NPBs' annual reports. This allows NPBs to exchange insights into different methodologies, drivers of productivity and competitiveness, and related policies. However, there are recurrent topics in the publications, such as the productivity slowdown, the effects of COVID-19 on productivity and the twin transitions. Section 3 summarises the main messages of the latest NPB reports (published in 2021 or 2022).

2. CHARACTERISTICS OF NATIONAL PRODUCTIVITY BOARDS

In September 2016, the Council recommended that EU Member States, notably euro area countries, set up an NPB. This followed the identification of the need to have institutions that press for the right productivity-enhancing policies. NPBs can also raise awareness of adverse national developments in productivity and competitiveness. Moreover, they can increase ownership of reforms by building consensus and informing policymakers. Furthermore, NPBs can focus on long-term policy issues, beyond the scope of the electoral cycle, while informing on short-term policy challenges (Renda and Dougherty, 2017).

This initiative originated from the Five Presidents' Report. This report recommended the creation of a euro area system of independent competitiveness authorities, tasked first with assessing the evolution of wages and productivity in each country and relative to the other euro area countries, and second with assessing progress made with competitiveness-enhancing reforms. Against this backdrop, in October 2015, the European Commission presented a recommendation for a Council recommendation on the establishment of National Competitiveness Boards (now known as NPBs) among euro area Member States. The remaining EU countries were also encouraged to set up similar bodies. In September 2016, the Council adopted the NPB recommendation with some changes relative to the Commission's proposal.

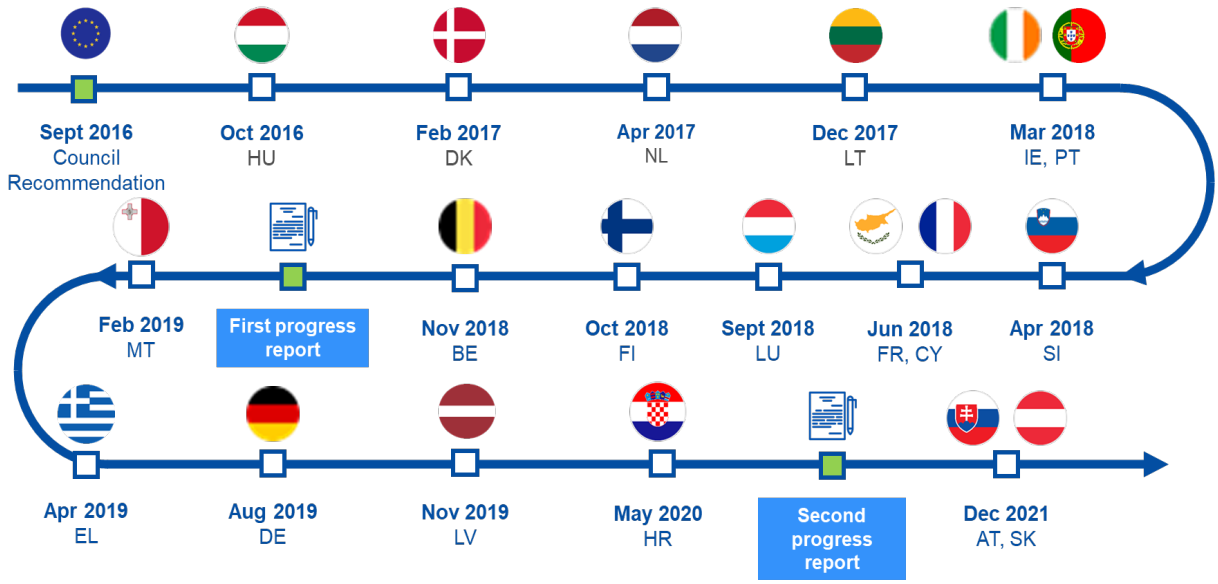
The changes focused on the mandate of the NPBs and the role of the European Commission in respect of the NPB network. In particular, the NPB recommendation no longer tasks NPBs with informing the wage-setting process in each Member State or with formulating policy advice on the implementation of country-specific recommendations. Moreover, the NPB recommendation provides that the Commission could *facilitate* the exchange of views between the NPBs. However, according to the Commission's proposal, the Commission would be tasked with *coordinating* the activities of the NPBs and considering inputs from the system of NPBs in the context of the European semester, including the macroeconomic imbalance procedure and the country-specific recommendations.

At present, 19 EU Member States have an NPB. Most Member States implemented the NPB recommendation shortly after its adoption (most NPBs were set up in 2017 or 2018). The latest countries to have appointed an NPB are Croatia, Austria and Slovakia ([3]) (Chart 1). However, to date,

([3]) On 22 December 2021, the Slovak government set up a new productivity board. Compared with the previous board, the new board has a more focused mandate in that its basic task is to 'analyse productivity and competitiveness in the Slovak Republic, in particular in the areas of business environment, innovation, foreign trade, education and efficient public administration'. Moreover, it consists of 23 members, and is chaired by Slovakia's Minister of Economy, with the Ministry of Economy providing secretariat services to the board. Ten members are government officials, eight others are representatives of unions and business associations, three represent subnational governments and the remaining two come from other associations.

three countries in the euro area (Estonia, Spain and Italy) and five countries not in the euro area (Bulgaria, Czechia, Poland, Romania and Sweden) have not established an NPB.

Chart 1. **Establishment of NPBs in the EU Member States**



2.1. INSTITUTIONAL SET-UP

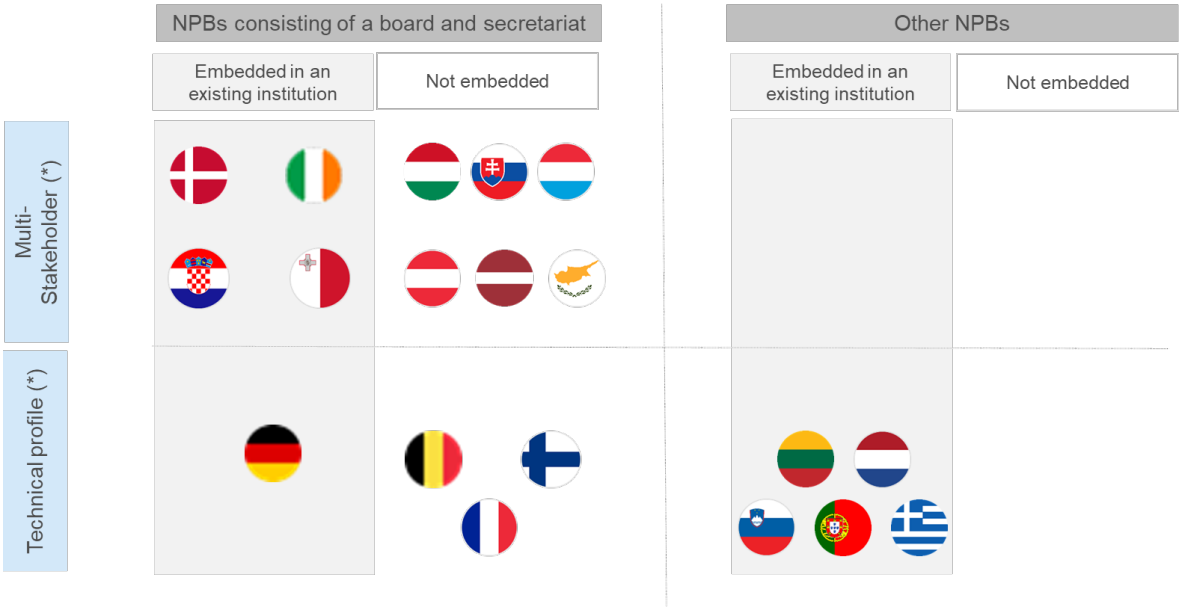
The NPB recommendation allows several types of institutional design. Chart 2 summarises the various set-ups in respect of the following aspects.

- **Organisational structure.** The majority of NPBs consist of a board and a secretariat. The board gives the strategic direction to the secretariat. The secretariat, in turn, convenes meetings, sets agendas and, usually, draws up the annual NPB report based on the board's guidance. In most cases, a ministerial department provides secretariat services. Alternatively, the role of an NPB is entrusted to an independent body (such as in the Netherlands and Slovenia) or a ministerial department (such as in Portugal), either of which is led by a director or chairperson working full time and equipped with its own staff.

- **Whether or not NPBs are embedded in an existing institution.** Most NPBs are embedded in an existing institution (i.e. the NPB is a section of the host institution, such as a ministerial department, a government advisory body, an academic/research institution, an independent fiscal institution (IFI) or an independent government agency). Those that are not count on the support of an existing body, such as a ministerial department or an autonomous institution. The advantages of an NPB being embedded in an existing entity are the facilitation of access to resources (offices, ICT equipment, etc.) and a smooth start-up.

- **Composition of the board: multistakeholder NPBs vs. NPBs with a mainly technical profile.** Just over half of NPBs belong to the multistakeholder category, meaning that their decision-making bodies include relevant stakeholders. Among stakeholders, the three most represented institutions are academia, government, and employers' associations (Charts 3a and 3b). The other NPBs have opted for a mainly technical profile, with a decision-making body consisting of economists. A priori, to meet their transparency and openness objectives, multistakeholder NPBs are less reliant on public stakeholder consultation than are technical profile NPBs (Renda and Dougherty, 2017).

Chart 2. **Types of NPBs**



NB: Multistakeholder: decision-making bodies are made up of relevant stakeholders. Technical profile: decision-making bodies consist of economists.

Chart 3a. **Total number of board members, by stakeholder type**

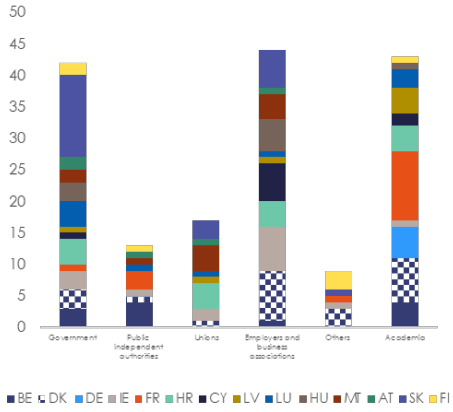
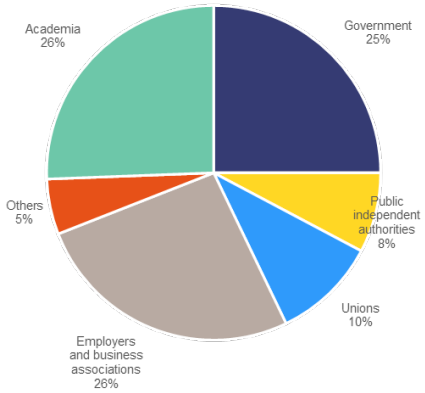


Chart 3b. **Board composition, by stakeholder type**



NB: These charts look at the 14 NPBs consisting of a board and a secretariat.

Source: European Commission.

While allowing for flexibility, the NPB recommendation sets out several requirements for NPBs. These are (i) an open-ended mandate, to build credibility over time; (ii) functional autonomy, to prevent undue influence from government; (iii) procedures for nominating members based on experience and competence, to ensure academic excellence; (iv) adequate access to information, to conduct their analyses successfully; and (v) capacity to communicate in public, so that they can play a role in national/international debates on productivity. The aim is to guarantee independence and high-quality analysis, and therefore the credibility and effectiveness of NPBs.

These requirements mirror those of the IFIs. However, there are differences between NPBs and IFIs. First, the legal framework governing IFIs (i.e. Directive 2011/85/EU and Regulation (EU) 473/2013) has a higher standing than that governing NPBs (a Council recommendation). Second, the

IFI legal framework clearly states that IFIs should have adequate resources to fulfil their mandate; in the case of NPBs, that is, in the NPB recommendation, this is only implied. Third, in the case of IFIs, the provisions underpinning the legal framework must be of sufficient legal standing; the NFB recommendation, in contrast, does not specify the nature of the legal framework.

The NPBs set up to date broadly comply with the spirit of the NPB recommendation. In most cases, the NPB's functional autonomy is set out in the domestic legislation. In addition, in most cases, the domestic legislation sets out eligibility criteria for the NPB members/management in terms of professional qualifications and/or experience, as well as safeguards for access to information. Conversely, the provisions governing seven NPBs do not explicitly state their functional autonomy. In eight others, they do not guarantee access to information needed for NPBs to carry out their duties.

Table 1 shows examples of compliance with the NPB recommendation. These consist of (i) the choice of legal instrument to establish the NPBs ([4]) and (ii) how NPBs' functional autonomy, members' eligibility, access to information and public consultation practices are regulated in the domestic legislation or handled in practice. In some cases, domestic legislation goes beyond the recommendation, for example in the case of setting out a fixed term of office for NPB members/managers that is longer than the term of parliament, as this helps to foster independence of opinions ([5]).

Table 1. **NPBs' institutional set-up – examples of compliance with the NPB recommendation and beyond**

Source	Area	Content	Action	Country examples
Requirements set out in the recommendation	*Statutory regime*	The regulation of NPBs should be underpinned by national provisions	Adopt a law in parliament, as opposed to subordinate legislation, to set up the NPB	BE, DK, DE, LU, AT
	Functional autonomy	NPBs should have functional autonomy vis-à-vis any public authority in charge of the design and implementation of policies in the field of productivity and competitiveness in the Member State or at European level	Set out in the domestic legislation that NPBs have functional autonomy in respect of government	BE, DK, DE, LV, LU
			Specify in the domestic legislation the prohibition on NPBs seeking or accepting instructions from other entities	NL, AT
			For NPBs consisting of a board and a secretariat, select a body that is independent of government to provide secretariat services	AT
	Eligibility criteria for NPB decision-making members	Nomination procedures based on competence and experience should be used in the appointment of NPB decision-making members	Set out the nomination procedures, based on competence and experience, of board members in domestic legislation	BE, DE, IE, AT
			Set out in domestic legislation the requirement to avoid incompatibilities and/or conflicts of interest in the NPB's decision-making body (e.g. a ban on holding certain positions)	BE, DK, DE, AT
	Access to information	NPBs should have timely access to information required to carry out their mandate	Set out in domestic legislation safeguards guaranteeing NPBs timely access to information required to carry out their duties	BE, DE, LU, AT
	Communication	NPBs should have the ability to communicate in public in a timely manner	Set out in domestic legislation provisions grounding the NPB's ability to communicate in public in a timely manner	BE ([1])

([4]) Primary laws have higher standing than ministerial decisions and cabinet agreements, thus granting NPBs a greater guarantee of continuity, especially in countries with highly legalistic traditions.

([5]) For those NPBs defining a term of office for the NPB board members / managers, the most frequent term is 3 years (7 of 19 NPBs do not define a term of office).

Source	Area	Content	Action	Country examples
	Consultation of NPB annual reports	NPB may consult relevant stakeholders, but should not convey only or mainly the opinions and interests of a particular group of stakeholders	Set out formal consultation processes (this is especially applicable to NPBs without stakeholder representation in their decision-making bodies)	BE ([2]), FR ([3])
Other features beyond the recommendation	*Allocation of resources*	To be able to carry out the given tasks to appropriate standards and in a timely fashion, NPBs should be properly resourced, in terms of budgetary means and human resources	Provide NPBs with a dedicated budget line in the state budget (i.e. the budget of the NPB should not be mixed with that of the host institution or the institution providing secretariat services to the NPB)	AT, FI
	Length of appointments	The term of office for NPB leadership should be sufficiently long to foster independence of opinions and to be disconnected from the term of parliament	Set out in domestic legislation a term of office for the NPB leadership longer than 4 years	DK, DE: 6 years (applies to the professors chairing the NPB) NL: 7 years (applies to the director of the Bureau for Economic Policy Analysis) AT: 5 years (applies to the board members)

([1]) Note, however, that other well-established institutions, such as the Dutch Bureau for Economic Policy Analysis, the Danish Economic Councils and the German Council of Economic Experts, have their own communications departments and a long-standing tradition of engaging with the press.

([2]) The Belgian NPB presents its annual report to the Conseil Central de l'Economie, which represents the social partners. The council's formal opinion on the NPB report is annexed to it.

([3]) The French NPB sends its draft annual report to social partners for feedback. Additionally, the French NPB has a 1-month consultation process with the public.

Selected legal texts:

BE: http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2018112501&table_name=loi.

DK: https://www.retsinformation.dk/eli/lta/2017/181.

DE: https://www.sachverstaendigenrat-wirtschaft.de/fileadmin/dateiablage/Sonstiges/act_council_of_economic_experts.pdf.

IE: https://www.competitiveness.ie/ncc/about-us/ncpc%20terms%20of%20reference/.

LU: https://legilux.public.lu/eli/etat/leg/agd/2018/09/23/a951/jo.

NL: https://wetten.overheid.nl/BWBR0002029/2019-01-01#:~:text=1%20Het%20Centraal%20Planbureau%20heeft,de%20Regeering%20wordt%20vastgesteld%2C%20alsmede and https://wetten.overheid.nl/BWBR0031972/2012-04-01#:~:text=Aangezien%20planbureaus%20onder%20het%20gezagsbereik,geven%20die%20hij%20dienstig%20acht..

AT: https://www.produktivitaetsrat.at/dam/jcr:cf526a85-482c-44e1-8c01-2e4f9586183e/FPRG%202021-Gesetz-Bundesgesetzblatt_2021_I_226%20(002).pdf.

2.2. STAFF AND RESOURCES

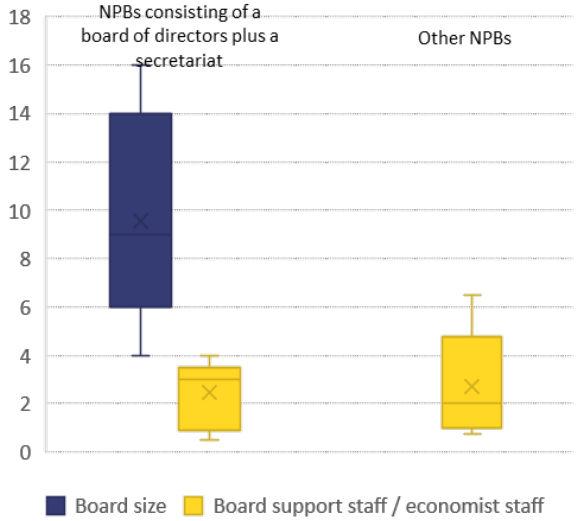
The average number of technical staff is fairly homogeneous across the NPBs. Chart 4 shows the range of numbers of support and economist staff for two categories of NPBs: (i) NPBs consisting of a board and a secretariat and (ii) the remaining NPBs. The average number of secretariat staff in the first category and the average number of economist staff in the second category are broadly similar, although the range of the number of economist staff is wider in the case of "other NPBs". Another interesting observation is that, in the first category of NPBs, the average number of board members is clearly higher than the average number of support staff (Chart 4, left-hand side). The existing literature points to cases of reduced NPB effectiveness originating from low ratios of board members to support staff.[6]

NPBs have reported challenges in securing resources for their activities. When the funding of the institution hosting the NPB does not increase proportionally to the additional tasks, the NPB might become under-resourced. Moreover, when there is no separate budget line for an NPB, the allocation of resources becomes unclear, and, when NPBs receive funding per project, their budget might

[6] For example, according to Renda and Dougherty (2017) *(...) the existence of a board that is more numerous than the underlying staff was reported as potentially hampering the efficacy of the decision-making process in the Chilean National Productivity Commission. A similar problem emerged in Mexico due to the limited number of government staff working to support the activity of the productivity commission.*

become unstable. Finally, when there are delays in funding, the NPB is likely to struggle to start its activities. By contrast, some good practices in budgeting are observed when the funding for the institution in which the NPB is embedded is raised accordingly (as in the case of the German Council of Economic Experts) and when there is a dedicated budget line in the government's budget law for the NPB (e.g. as in the case of the Austrian Productivity Board).

Chart 4. **Numbers of board members and support or economist staff in NPBs**



NB: NPBs consisting of a board plus a secretariat: BE, DK, DE, IE, FR, CY, LV, LU, FI.
Other NPBs: EL, LT, NL, PT, SI.
Source: Based on data from the NPBs of BE, DK, DE, IE, EL, FR, CY, LV, LT, LU, NL, PT, SI and FI.

2.3. MANDATE

The tasks allocated to the NPBs are broadly in line with those in the NPB recommendation. NPBs are tasked first with the discussion of productivity developments and second with the analysis of policy challenges in the areas of productivity and competitiveness. The legislation setting up the NPBs may also include tasks that go beyond those of the recommendation. For example, the mandate of the Belgian NPB includes the study of the impact and the implementation of the European institutions' recommendations in the productivity and competitiveness fields. The Austrian NPB is tasked with assessing productivity and competitiveness factors such as legal certainty, education level, demographic structure, environmental and climate protection, and people's quality of life.

The NPB recommendation calls on NPBs to publish an annual report. The mandates of all but one NPB (i.e. Hungary) include this requirement. However, not all NPBs have issued a report every year (Charts 5a and 5b), which reflects an uneven pace of publication ([7]).

Through the annual reports, NPBs can inform the discussion on policies to boost productivity and competitiveness. They can also contribute to evidence-based policymaking, an area with room for improvement across EU countries ([8]). Examples are the analyses of the macroeconomic effects of recovery and resilience plans or the specification of criteria for the design of support measures in the context of the COVID-19 pandemic. Moreover, 12 NPBs produce other publications (e.g. monographs) in addition to the annual report (Chart 5c).

([7]) The NPB reports can be found on the NPBs web page of the European Commission's website.
([8]) The OECD indicators on regulatory policy and governance practices show that, on average, countries do better at conducting stakeholder consultation and *ex ante* regulatory impact assessments than at carrying out *ex post* evaluation of legislation. They also reveal that the mechanisms to ensure high-quality stakeholder consultations, regulatory impact assessments and *ex post* evaluations of legislation are largely underdeveloped in many EU Member States.

Chart 5a. **Average number of annual reports published per year by the 19 NPBs since 2016**

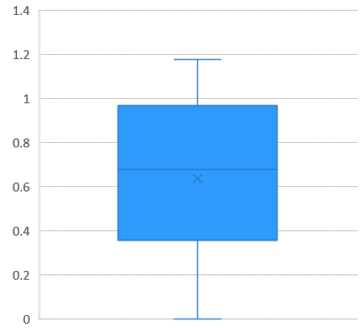


Chart 5b. **Number of annual reports published per year and number of NPBs**

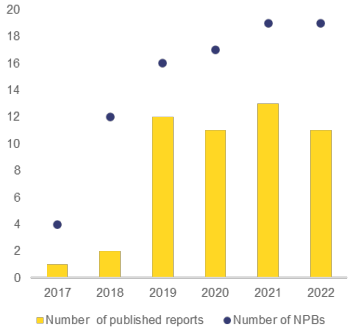
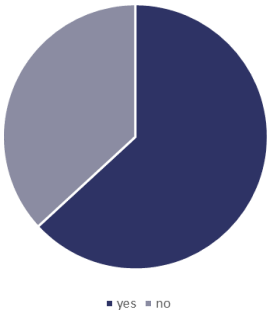


Chart 5c. **Share of NPBs producing reports in addition to the annual report**



Source: Based on the number of annual reports published by NPBs since 2016 and on the NPBs' websites by 24 December 2022.

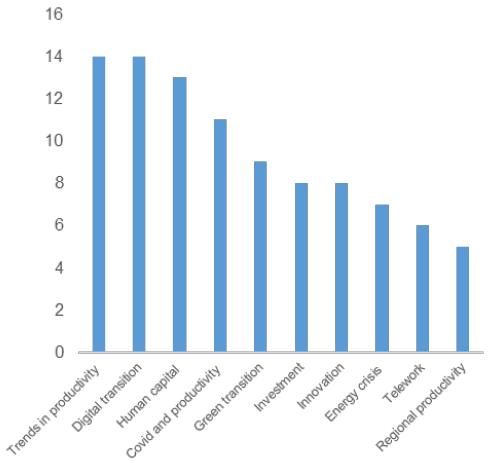
3. CONTENT OF THE LATEST NPB ANNUAL REPORTS

Although the content of NPB annual reports varies, there are some recurrent topics. All NPBs discuss recent productivity developments, including against the backdrop of the slowdown in productivity growth. Moreover, most reports discuss the impact of COVID-19 on productivity. The twin transitions, especially the digital transition, are also frequently present in the NPBs' analyses. Furthermore, topics related to skills and human capital appear relatively frequently in the annual reports (Charts 6a–b).

There is a variety of analytical approaches across the annual reports. NPBs differ in the use of quantitative techniques (e.g., use of firm-level data, use of own econometric estimations, use of own model-based results) in their annual reports (Chart 7a). This allows NPBs to exchange insights into methodologies.

Chart 6a. **Word cloud on the NPBs' latest annual reports**

Chart 6b. **Topics in the 2021–2022 annual productivity reports (number of reports per topic)**



Source: European Commission, based on the following annual reports: Conseil National de Productivité (France), 2022 (executive summary); Danish Economic Councils, 2022 (executive summary); German Council of Economic Experts, 2022 (executive summary); National Competitiveness and Productivity Council (Ireland), 2022; Belgian NPB, 2022 Bureau for Economic Policy Analysis (Netherlands), 2021; Cyprus Economy and Competitiveness Council, 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021 (executive summary); Greek NPB, 2022; Institute of Macroeconomic Analysis and Development (Slovenia), 2022 (executive summary);

Maltese NPB, 2021; Ministry of Finance (Finland), 2021; Institute for Strategy and Analysis of Slovakia, 2021; Conseil National de la Productivité (Luxembourg), 2022. Cut-off date: 24 December 2022.

Most annual reports include recommendations for government. However, recommendations differ in their degree of detail, ranging from providing broad orientations to specifying concrete action. The recommendations allow NPBs to have an increasing role in the public debate (Chart 7b). The annex provides a sample list of recommendations made by NPBs in their latest annual reports.

Chart 7a. **Use of firm-level data, own econometric model results and own macro model results in NPBs' annual reports**

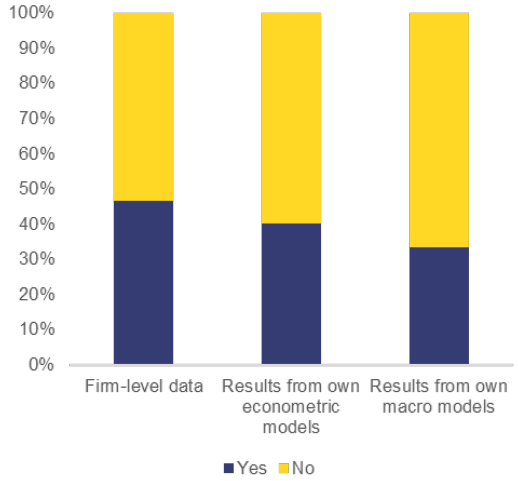
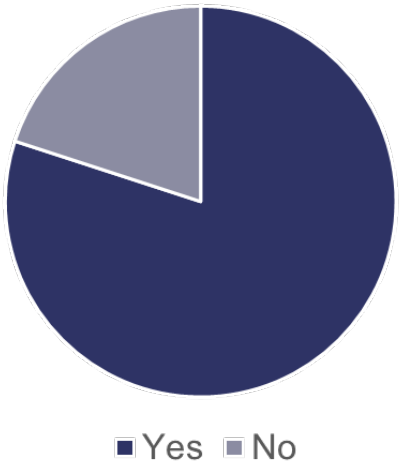


Chart 7b. **Share of NPBs' annual reports making recommendations**



Source: Based on the latest annual reports of BE, DK, DE, IE, EL, FR, CY, LV, LT, LU, HU, MT, NL, PT, SI, SK and FI.

This section summarises the content of the annual reports, covering the following topics: (i) recent economic developments, (ii) the productivity slowdown, (iii) the effects of COVID-19 on productivity, (iv) tangible and intangible investment, (v) innovation, (vi) human capital, (vii) the digital transition, (viii) the green transition and the energy crisis, (ix) business environment and institutions, and (x) regional productivity.

3.1. RECENT ECONOMIC DEVELOPMENTS

Russia's war of aggression has created new economic uncertainties, which add to the lingering negative economic consequences of the coronavirus pandemic. The war has ignited inflation, due to the substantial reduction in Russian natural gas supplies in summer 2022 (German Council of Economic Experts, 2022) and to the impact of retaliatory measures on the prices of energy, agricultural products and metals since February 2022 (Conseil National de Productivité (France), 2022; Danish Economic Councils, 2022; National Competitiveness and Productivity Council (Ireland), 2022). It has also magnified the COVID-19-led disruption of global supply chains (Greek NPB, 2022). These factors have placed a visible financial burden on households and companies, and have consequently slowed down the recovery from the COVID-19 crisis (German Council of Economic Experts, 2022; National Competitiveness and Productivity Council (Ireland), 2022).

The war has revived the debate on industrial competitiveness policies. It has revealed a high dependence of EU economies on foreign suppliers, especially for energy and critical raw materials, with various degrees of dependency across countries. The 2022 German report notes that energy prices have increased more in the EU than in other world regions. This is likely to continue in the coming years, thus lowering the competitiveness of EU energy-intensive industries that compete with companies outside the EU – they could be forced to relocate (at least part of) their production outside

the EU. Against this backdrop, the reports stress the importance of a sustainable and diversified energy supply (German Council of Economic Experts, 2022; National Competitiveness and Productivity Council (Ireland), 2022) and of greater diversification of value chains, including through strategic alliances with countries that share the EU's values. The transformation of value chains may include the reshoring of aspects of production to the EU, which may represent an opportunity for central and eastern European Member States (Institute of Macroeconomic Analysis and Development (Slovenia), 2022). Moreover, dependencies can be reduced by expanding EU production capacities and infrastructures in strategic areas such as renewable energies or the domestic extraction of critical raw materials (German Council of Economic Experts, 2022).

In the longer term, the war could lead to less trade, a shift in energy supply and higher defence spending. Trade reduction could reduce specialisation gains, and therefore productivity, most affecting those EU Member States with intensive trade with Russia (Danish Economic Councils, 2022). Higher defence spending can affect productivity growth because of a shift of public money out of other sectors such as research and development (R & D), investment and education (Danish Economic Councils, 2022).

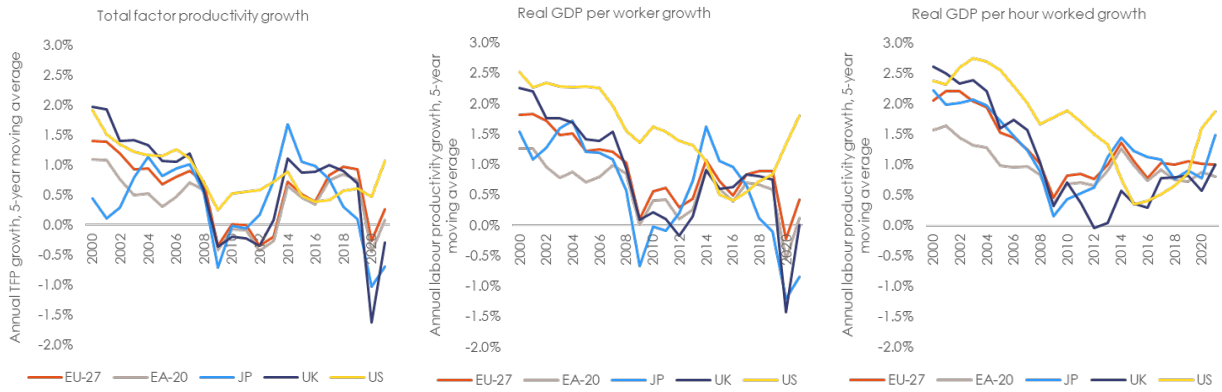
The current energy crisis, combined with the need to decarbonise the economy, puts more emphasis on sustainability issues, including for competitiveness. Therefore, the analysis of competitiveness in a number of reports goes beyond the traditional assessment of price competitiveness, also considering the competitiveness generated by digitalisation, the green transition, R&D performance and the ability of a country to attract foreign direct investment (Greek NPB, 2022; Institute of Macroeconomic Analysis and Development (Slovenia), 2022). Regarding such investment, the 2022 French report shows that a tax structure that weighs less heavily on labour and productive capital would render France a more attractive destination for investors. Moreover, automation can help restore French competitiveness by lowering production costs (Conseil National de Productivité (France), 2022).

3.2. THE PRODUCTIVITY SLOWDOWN

Several NPBs have discussed the issue of the slowdown in productivity growth. They stress the importance of productivity growth ([9]); hence, they try to provide explanations for its slowdown, which has affected the advanced economies, albeit in different degrees (Chart 8). Moreover, not all EU countries are in the same situation as regards the productivity slowdown. For example, while hourly productivity growth in Denmark slowed over a longer period leading up to the turn of the millennium, the trend over recent years indicates that the decline has come to an end, and there are instead signs of a slight increase in productivity growth in Denmark (Danish Economic Councils, 2022).

([9]) For example, productivity growth is the basis for creating material conditions that, in combination with appropriate public policies for income redistribution, enable higher incomes for the entire population, widely available public services and sustainable financing of social protection systems, thus improving the standard of living and welfare of the population (Institute of Macroeconomic Analysis and Development (Slovenia), 2021).

Chart 8. **Productivity growth over 2000–2021**



NB: EA-20, 20 countries of the euro area; TFP, total factor productivity.

Source: AMECO.

3.2.1. Analyses at aggregate level

Three main approaches and explanations have been applied by the NPBs to understand the productivity slowdown at the aggregate level.

1. Breakdown of productivity into capital deepening and total factor productivity (TFP) ([10]). Although referring to different time periods, two NPBs conclude that the slowdown in productivity originates from lower contributions of TFP relative to capital deepening (Conseil National de Productivité (France), 2022; Belgian NPB, 2021). The Dutch report notes that TFP has contributed more than capital deepening to gross domestic product (GDP) growth (Bureau for Economic Policy Analysis (Netherlands), 2021) ([11]). By contrast, in Slovenia, the slowdown originates from capital deepening, against the backdrop of declining investment (Institute of Macroeconomic Analysis and Development (Slovenia), 2021).

2. Between-sector productivity developments. Two reports note that the slowdown in productivity has coincided with the tertiarisation of the economy. This is a process that affects most developed economies, albeit at different paces (Belgian NPB, 2021), whereby both market and non-market services gain importance in terms of share in gross value added, while, in parallel, manufacturing becomes less important (Conseil National de Productivité (France), 2022). Services generally have lower productivity levels and gains than manufacturing, because they offer fewer possibilities for economies of scale (Belgian NPB, 2020) and because they are typically less capital intensive and less exposed to competition, given that they are not very, or not at all, tradable (Albrizio and Nicoletti, 2016).

Against this backdrop, the 2021 Belgian report finds that, if Belgium's sectoral structure had remained unchanged over 2000–2017, productivity would have grown 3.2 percentage points more over this period. Moreover, the 2022 Belgian report shows that, over 2000–2019, market services were the main contributor to productivity growth in the overall economy, while the contribution of industrial activities was negative. However, the contribution of industry was positive between 2012 and 2019, suggesting that deindustrialisation appears to be slowing down in Belgium. By contrast, the 2022

([10]) Capital deepening is the share of productivity that is due to the use of capital by the labour force, while TFP is the share of productivity that is due to improvements in the efficiency of combining labour and capital to carry out production.

([11]) Based on 1995–2019.

French report finds that, if France had had the economic structure of other large European economies, while keeping the observed rates of growth of productivity in each sector, overall productivity growth would have been similar to the actual rate. This suggests that France appears to be neither favoured nor disadvantaged by the sectoral distribution of its employment in relation to the best-performing countries.

3. Within-sector productivity developments. The 2022 French and Belgian reports conclude, based on macrodata, that intrasectoral productivity dynamics are the main contributor to productivity growth. The French report also shows evidence of declining and lower reallocation of labour between sectors in France compared with other large European economies over 1995–2017 ([12]).

3.2.2. Analyses at firm level

Firm-level data allows NPBs to dig deeper into the reasons for the productivity slowdown. Several annual reports rely on firm-level data to (i) evaluate whether the gap in productivity between frontier and laggard firms is getting bigger, (ii) analyse business dynamism ([13]) and (iii) analyse factor reallocation. The reasons are as follows. First, a widening gap would indicate that there are obstacles to diffusing innovation across the economy, thus hindering productivity growth (Albrizio and Nicoletti, 2016). Second, low business dynamism also reduces the ability to absorb and spread knowledge. Third, factor reallocation is a critical lever of productivity growth.

Evidence of a widening productivity gap between frontier and laggard firms varies across reports. For example, the French report notes that, over 1991–2016, the slowdown in productivity growth of laggard firms was faster than that of frontier firms, therefore widening the productivity gap. The slowdown of the frontier firms suggests a declining contribution of technological progress, while that of the laggard firms indicates a slowdown in the diffusion of productivity gains from the best-performing firms (Conseil National de Productivité (France), 2022) ([14]). By contrast, differences in productivity between frontier and laggard firms in Slovenia have been narrowing, especially since 2009. This is because there are small differences in productivity levels between firms, partly due to the absence of large and highly productive companies (Institute of Macroeconomic Analysis and Development (Slovenia), 2019). The Dutch report finds no evidence of the productivity of frontier firms in the Netherlands increasing faster than that of laggard firms. It therefore concludes that it is unlikely that the lack of technology diffusion between frontier and laggard firms explains the slowdown in productivity growth in the Netherlands (Bureau for Economic Policy Analysis (Netherlands), 2021).

Some reports show a decline in business dynamism and comment on the consequences for productivity growth. The 2022 French report notes that business renewal ([15]) at the productivity frontier decreased in France between 1992 and 2016, except in 2008 and 2010. This suggests that it is increasingly difficult for laggard firms to catch up with the productivity performance of frontier firms ([16]). The 2021 Belgian report also shows declining business dynamics, pointing to relatively low

([12]) This is shown through a labour sectoral reallocation index, which quantifies net employment changes between sectors; see formula 6 of the technical annex of France Stratégie's Note d'analyse No 105, 'Dynamiques sectorielles et gains de productivité'.

([13]) Business dynamism is a term including firm birth, growth, decline and exit.

([14]) Additional evidence points to varying dispersion of firm productivity growth across sectors. This is lower for manufacturing and high-tech services than for low- and medium-tech services, suggesting that technological diffusion is faster in the former than in the latter sectors (Conseil National de Productivité (France), 2022).

([15]) Business renewal is the proportion of 'new' firms joining the productivity frontier each year, which corresponds to the proportion of firms at the frontier in a given year but not the previous one.

([16]) However, the renewal rate of firms in industries with a higher financial dependence rate, a higher ICT investment rate or a higher import rate is greater, which is indicative of competition between firms linking positively to these three dimensions.

firm birth rates and even lower exit rates of firms in Belgium ([17]). This is combined with start-ups' difficulties in reaching the average level of productivity of mature companies ([18]). The 2021 Dutch report concludes that slowing firm dynamics in the Netherlands over 2006–2016 does relate to the productivity slowdown, although it is not the only factor, and its impact varies across sectors.

The reports study resource reallocation / allocative efficiency over time using firm-level data. For example, the 2022 French report shows a significant decline in labour reallocation across sectors in France at the start of the 2000s. This finding is consistent with the conclusions drawn from aggregate data, pointing to a limited contribution of factor reallocation to productivity growth in France (see above). In Denmark, just over half of the productivity growth throughout 2000–2018 results from reallocation of economic activity between firms. This is due to the combined effects of firms entering and exiting the market and to shifts in activity towards the existing firms that are the most productive (Danish Economic Councils, 2022) ([19]). Finally, the Finnish report shows evidence of labour and capital misallocation in Finland across 16 sectors. This is based on two approaches. According to the first, most companies in those sectors operate with more capital and less labour intensity than would be optimal in terms of profit maximisation. In other words, in most sectors it would be profitable to recruit more labour. According to the second, allocative efficiency in manufacturing is lower than in the services sectors ([20]). The above, combined with the loss of competitiveness in the years following the financial crisis and the negative shock caused by the collapse of Nokia, account for a significant part of the decline in the Finnish economy's productivity (Ministry of Finance (Finland), 2020, 2022).

3.3. THE EFFECTS OF COVID-19 ON PRODUCTIVITY

3.3.1. Effects of the COVID-19 crisis on productivity and support measures

The reports discuss the impact of COVID-19 on recent productivity figures. They note that, due to job retention schemes, output per worker and output per hour worked have different recorded trends. While outcomes vary across countries, the most common pattern in 2020 consists of a decline in output per worker and an increase in hourly labour productivity, whereas the opposite applies for some countries in 2021 (Conseil National de la Productivité (Luxembourg), 2022; Greek NPB, 2022) (Chart 9).

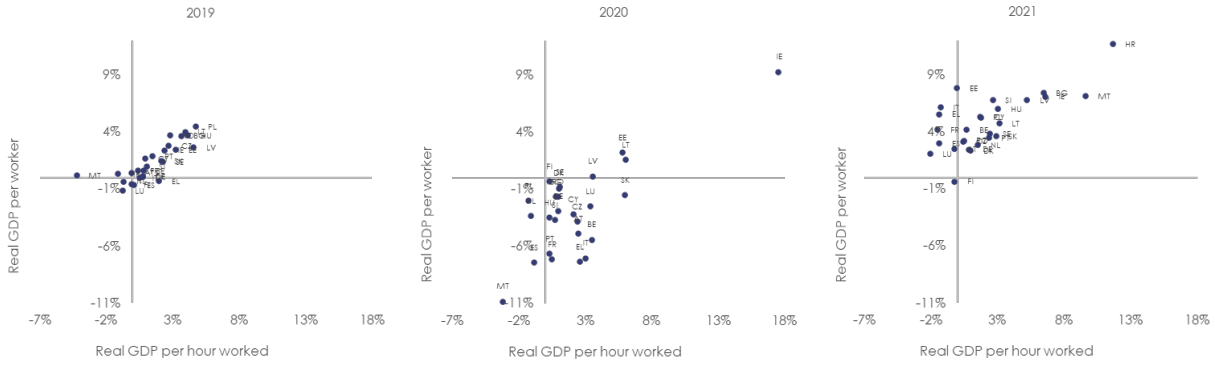
([17]) Low exit rates of firms could be indicative of barriers to the exit of less productive firms.

([18]) The Belgian report notes, however, that the fact that entrepreneurial dynamism and productivity growth are both showing a clear downward trend does not necessarily prove a cause-and-effect link between the dynamism of companies and productivity levels. This is because both trends could be due to other underlying factors such as demographics or technological opportunities.

([19]) The remainder of the productivity growth over the period can be due to increases in productivity in the individual firms, which could result from Danish firms participating in global value chains.

([20]) Reasons for inefficient allocation of resources are lack of competition and local market power, skills mismatches between jobs, labour shortages for skilled workers and the outsourcing of labour, which may biasthe measurement of the main factors of production and intermediate inputs.

Chart 9. **Real labour productivity growth in 2019, 2020 and 2021**



Source: AMECO.

The reports acknowledge, however, that there is uncertainty surrounding the productivity figures of 2020–2021. It is still difficult to assess whether the COVID-19 crisis led to permanent changes in the economic structure that have resulted in long-term labour productivity change. On the one hand, the COVID-19 crisis has brought about advances in digitalisation, which may lead to productivity growth (Conseil National de Productivité (France), 2022; German Council of Economic Experts, 2021). On the other hand, the disruption to students' education caused by the pandemic could have a negative effect on productivity in the long term (German Council of Economic Experts, 2021; Institute for Strategy and Analysis of Slovakia, 2021). However, the latest Danish report concludes that COVID-19-related school closures may not lead to a loss of learning for primary and junior high school students in Denmark (Danish Economic Councils, 2022). In contrast, the 2022 Belgian report cites evidence of significant learning loss for the 2020 Flemish primary school cohort affected by school closures. Other pieces of evidence show that there had already been a decline in education levels in Belgium in the years leading up to the pandemic, but that these levels fell even further after the pandemic; consequently, there is an urgent need to help students catch up. Other risks to firms' productivity due to the COVID-19 crisis relate to the increase in net debt of some companies, which could reduce their investments (Conseil National de Productivité (France), 2022).

Among NPBs, there is consensus that support measures were justified. Support measures have prevented massive bankruptcies (Conseil National de Productivité (France), 2022; Institute of Macroeconomic Analysis and Development (Slovenia), 2021) ([21]). The measures have also helped to retain employment, thus helping to preserve human capital (German Council of Economic Experts, 2021). They also helped companies to keep intangible assets such as customer relationships (Conseil National de Productivité (France), 2021; German Council of Economic Experts, 2021) and R & D (Danish Economic Councils, 2021).

However, the reports point also to possible drawbacks of the support measures. Support measures that do not differentiate between viable and non-viable firms may prevent factor reallocation, keeping non-viable firms on the market. This would in turn translate into lower productivity growth (Danish Economic Councils, 2022; Belgian NPB, 2021; Conseil National de Productivité (France), 2021; Danish Economic Councils, 2021; German Council of Economic Experts, 2021; Institute for Strategy and Analysis of Slovakia, 2021; National Competitiveness and Productivity Council (Ireland),

([21]) Thanks to the support measures, the solvency of the corporate sector had not deteriorated by mid 2022, and the number of bankruptcy proceedings initiated against legal entities and sole proprietors was lower in the first 9 months of 2022 than in the same period of 2019 (Institute of Macroeconomic Analysis and Development (Slovenia), 2022). In addition, the average financial situation of French companies did not weaken over 2020–2021 (Conseil National de Productivité (France), 2022). In addition, instead of increasing, bankruptcies fell by 45 % in March 2020 to October 2021 compared with the same period in 2018–2019 (Conseil National de Productivité (France), 2022).

2021 ([22])). In addition, keeping short-term working schemes for too long reduces individuals' incentives to look for a new job, thus inhibiting the productivity-enhancing reallocation process (German Council of Economic Experts, 2021). Moreover, prolonging credit support may result in corporate over indebtedness ('zombie firms'), thus limiting firms' ability to invest in the future (Conseil National de Productivité (France), 2021). It may also lead to a moral hazard, as firms would expect to be protected in similar future crises, in the same way as they would be insured. Against this backdrop, most reports published in 2021 recommend criteria for withdrawing the support measures to companies, with varying degrees of detail (see Box 1).

Box 1. **Criteria for withdrawing the support measures to companies in the 2021 NPB annual reports**

- **Targeted support.** As health restrictions were being lifted, some NPBs considered it important to phase out broad-based support for businesses and to replace them with more targeted support focused on viable but vulnerable businesses (National Competitiveness and Productivity Council (Ireland), 2021), irrespective of their sector of activity.

- **Gradual withdrawal.** There is wide recognition that support measures should be withdrawn gradually (Belgian NPB, 2021; Conseil National de Productivité (France), 2021; Danish Economic Councils, 2021; National Competitiveness and Productivity Council (Ireland), 2021). Against this backdrop, the reports provide criteria for the timing of the withdrawal:
    - the 2021 Belgian, Irish and French reports state that such withdrawal should be based on a proper risk assessment, avoiding bankruptcies of productive or systemic companies (should stimuli be terminated prematurely) and, at the same time, avoiding protecting unproductive/non-viable companies (in case of an overly lengthy extension of support measures);
    - the 2021 Danish report states that lifting the health restrictions should be in tandem with phasing out the support packages (23);
    - the German NPB recommended that the special arrangements for short-time workers be discontinued by the end of 2021 and replaced with stronger incentives for training.

- **Factoring in of risks to public finances.** Several NPBs (Belgian NPB, 2021; Danish Economic Councils, 2021; Institute for Strategy and Analysis of Slovakia, 2021; National Competitiveness and Productivity Council (Ireland), 2021) call for factoring in of the risks to public finances as a result of prolonged support measures. Public deficits and increasing debt levels may leave economies in a vulnerable position regarding future shocks (Institute for Strategy and Analysis of Slovakia, 2021; National Competitiveness and Productivity Council (Ireland), 2021). However, other boards (e.g. Conseil National de Productivité (France), 2021) believe that the guiding principle for the withdrawal of support measures should be the company perspective (in particular, to avoid supporting unviable companies once economic activity has resumed) more than their cost to public finances.

- **Flanking measures**
    - Some boards recommended putting in place appropriate insolvency frameworks to help businesses restructure in an orderly way (German Council of Economic Experts, 2021; Institute for Strategy and Analysis of Slovakia, 2021; National Competitiveness and Productivity Council (Ireland), 2021). In particular, the German NPB suggests simplifying insolvency proceedings for small and medium-sized enterprises.
    - In parallel, several boards called for measures targeting workers who had lost their jobsor were likely to lose their jobs with a view to them retraining and re-entering the labour market (German Council of Economic Experts, 2021; Institute for Strategy and Analysis of Slovakia, 2021; National Competitiveness and Productivity Council (Ireland), 2021). The 2021 German report also calls for a lifting of the requirements to hold specific professional licences, to help improve labour reallocation.

Finally, the French NPB (Conseil National de Productivité (France), 2021) recommends reducing the debt of viable but financially challenged companies, so that these companies can invest and therefore become more productive. To that end, it presents various options that differ in the degree of public and private sector involvement.

([22]) The 2022 Danish report cites evidence of compensation schemes weakening the underlying adjustments in the economy. For example, Mattana et al. (2020) find that the wage compensation schemes in connection with the first lockdown in 2020 were particularly used by people in job categories that had weakened employment opportunities even before the COVID-19 crisis. The results in Borgensgaard (2022) indicate that the wage compensation scheme was also used by employees who the firms did not plan to dismiss.

([23]) This is because the problems related to maintaining the support packages increase when the restrictions are removed. However, there may be a few exceptions for industries in which returning to production is associated with large fixed costs, and where the production has significant positive social returns.

As COVID-19 is no longer classified as a critical public health threat in EU countries, some NPBs have outlined their views about the characteristics of future support packages. For example, the 2022 Danish report recommends that (i) future support packages should be reserved for situations where, as a result of an acute health crisis, measures of a significantly activity-limiting nature are implemented; (ii) future support packages should not be used in the event of ordinary economic downturns, just as support packages should not compensate for structural changes in the economy; (iii) future support packages should be targeted ([24]); and (iv) the possibility of obtaining interest-free loans should be reserved for exceptional circumstances when the financial markets do not function normally.

Due to the progressive improvement of the pandemic and the worsening effects of the energy crisis, support provided to businesses is moving from COVID-19 measures to energy bill relief measures. The recovery of the global economy from the pandemic has been accompanied not only by supply-side bottlenecks but also by a rise in commodity and energy prices. The latter have been magnified by Russia's war of aggression and are placing a massive burden on households and companies. Against this backdrop, the 2022 German report and, to a lesser extent, the 2022 Belgian report recommend that relief measures should (i) include a strong incentive to save energy, (ii) be provided only to vulnerable households and viable but overburdened companies, (iii) not put undue strain on government budgets and (iv) be coordinated among EU partner countries.

3.3.2. Telework

The NPBs concur that the pandemic has accelerated the digital transition. E-commerce expanded: new customers emerged and those who already shopped online bought more. This trend is expected to continue (Belgian NPB, 2021; Danish Economic Councils, 2021). Moreover, the COVID-19 crisis may lead to a lasting positive evolution in the field of e-learning (Belgian NPB, 2021).

Telework has been the largest accelerator of the digital transition. Remote working is showing signals of remaining a consolidated work practice in the future (Conseil National de Productivité (France), 2022; Danish Economic Councils, 2022): around 63 % of managers and 74 % of workers replying to a 2020 Organisation for Economic Co-operation and Development survey gave an overall positive assessment of their telework experience in terms of company performance and workers' subjective well-being, respectively. This calls for finding the optimal frequency of remote working, which, according to the same survey, is 2–3 days per week.

NPBs note that the ability of workers to telework varies across sectors. During the pandemic, many enterprises were able to adapt to wholesale remote working, allowing them to continue operating. However, other industries and occupations were unable to make this adjustment due to the nature of their activities (National Competitiveness and Productivity Council (Ireland), 2021) ([25]). According to the 2022 French report ([26]) and the 2021 Latvian report, 38 % of jobs in France and Latvia can be carried out remotely.

Several reports describe how telework can affect national productivity. The more recent reports also provide evidence of the effects of telework (see Box 2).

([24]) For example, the Danish report notes that 'businesses operating in industries that have not been forced to close should, therefore, not be able to access economic support packages, regardless of whether they have increased costs due to increased social distancing requirements or other measures put in place to reduce the spread of the virus'.

([25]) The prevalence of teleworking varies considerably depending on the country, sector, profession and business characteristics. Telework is more frequent in developed countries, in the most highly qualified professions, in occupations where face-to-face work is not essential and in large organisations.

([26]) This is based on Dingel and Neiman (2020).

Box 2. **Positive and negative effects of telework on aggregate productivity**

Positive effects

- Positive productivity effects are linked to increasing the efficiency of workers: improved ICT skills (Belgian NPB, 2020), a better work–life balance (National Competitiveness and Productivity Council (Ireland), 2021; Belgian NPB, 2020; Institute for Strategy and Analysis of Slovakia, 2020), reduced commuting time and costs (Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; Belgian NPB, 2020; Institute for Strategy and Analysis of Slovakia, 2020) and reduced absenteeism (Belgian NPB, 2020).
- Positive productivity effects are also linked to increased efficiency of firms, due to reduced costs for offices (Belgian NPB, 2021) and land (Conseil National de Productivité (France), 2022) (27), and ease of organising meetings. Companies can spend the saved money on innovation, therefore boosting productivity. Moreover, reduced real estate costs could lead some companies to re-evaluate the location of their employees and, hence, also reduce labour costs.
- The reduction in commuting time could increase both the intensive margin of working time and employees' personal free time (Conseil National de Productivité (France), 2022).
- There are positive spillover effects for society, such as enhanced connectivity, increased use of digital tools, reduced traffic congestion, reduced greenhouse gas emissions and lower house prices in densely populated areas (Danish Economic Councils, 2021).
- Productivity can also increase if companies expand the pool of workers from which they can choose and improve the skills of workers by hiring new talent (Conseil National de Productivité (France), 2022).

Negative effects

- Telework can reduce communication between managers and employees, and make management oversight more difficult. It may also slow down innovation activities within companies.
- A lower share of real estate assets in companies' balance sheets could hinder firms' access to credit, as banks use real estate as collateral (Conseil National de Productivité (France), 2022).
- There are also concerns regarding remote workers potentially missing out on career development, training and promotion opportunities as on-site employees may have an advantage by being physically visible on a day-to-day basis. In addition, telework does not promote the successful integration of newcomers into their jobs.
- Telework could replace geographically close and more expensive workers with cheaper, more distant workers, affecting the productivity and competitiveness of countries through brain drain and increased bargaining power of companies, which would compress wages (Conseil National de Productivité (France), 2022).
- 'Excessive' teleworking may affect workers' well-being and mental health, with workers experiencing feelings of isolation, stress and difficulties in switching off and keeping regular working hours (Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021).

A potential increase in productivity gains through greater use of telework can be expected (Conseil National de Productivité (France), 2022). According to Bergeaud, Cette and Drapala (2021), a 1-percentage-point increase in the share of teleworkers in total employment would improve TFP by an additional 0.45 % on average. This is, however, a initial estimate, which would need to be confirmed by further studies once the telework situation has stabilised (Conseil National de Productivité (France), 2022) ([28]).

To foster telework, the French NPB recommends avoiding unnecessary obstacles to teleworking in legislation (Conseil National de Productivité (France), 2022). Legislation should also ensure that home workplaces meet health standards (Danish Economic Councils, 2022).

([27]) According to Conseil National de Productivité (France) (2022), Gupta et al. (2021) analysed the effect of the COVID-19 pandemic on housing prices and rents, and found a flattening of the inner-city/suburban differential, particularly in cities where telework was more widespread.

([28]) According to the same study, the overall long-term effect of extending telework from about 5 % to 25 % of total employment could improve productivity by about 9 % under the assumption of an absence of a downward U-curve between telework and productivity gains (note: according to several studies, the productivity effects of telework would be non-linear and would have an inverted U-shaped profile).

3.4. TANGIBLE AND INTANGIBLE INVESTMENT

The NPB reports analyse gross fixed tangible and intangible capital formation. The amount of investment in intangible assets ([29]) and the importance of intangible assets for productivity growth are increasing in some Member States (Bureau for Economic Policy Analysis (Netherlands), 2021; Conseil National de la Productivité (Luxembourg), 2021).

- Luxembourg's 2021 productivity report shows that investments in both tangible and intangible assets have had a positive impact on labour productivity growth in Luxembourg (against the backdrop of negative average TFP growth between 2005 and 2019). Investment in ICT, which has been particularly pronounced since 2013, stands out for its stronger contribution to productivity growth than non-ICT capital.

- According to the 2022 Dutch report, total gross fixed capital formation has remained constant in the Netherlands since 2011, but the proportion of intangible investments has increased (while tangible investments have decreased). In almost all Dutch industries, relatively large investments are made in automated information, suggesting a higher degree of digitalisation of Dutch industries than of industries in other EU Member States (Bureau for Economic Policy Analysis (Netherlands), 2021).

- In Portugal, investment has decreased in all dimensions of gross fixed capital formation, except for intellectual property. Investment dynamics are determined by factors such as financial constraints, indebtedness, uncertainty and the level of interest rates (Council for Productivity (Portugal), 2021).

- Before joining the EU, Slovenia was among the leading European countries investing in soft intangibles (i.e., design, branding and organisational capital), but it is now an average investor, with investment in intellectual property currently below the EU average (Institute of Macroeconomic Analysis and Development (Slovenia), 2021).

Some NPBs discuss investment and capital formation in relation to the COVID-19 pandemic. Damage to the capital stock during the pandemic due to deterioration and obsolescence has the potential to delay the economic recovery (Danish Economic Councils, 2022; Ministry of Finance (Finland), 2022; Belgian NPB, 2021). Moreover, the uncertainties of the crisis and the COVID-19 containment measures reduced the total amount of new business investments (Danish Economic Councils, 2022; National Competitiveness and Productivity Council (Ireland), 2022; Belgian NPB, 2021; Ministry of Finance (Finland), 2021). The type of investments changed during the pandemic, with accelerations in ICT investments and reductions in R & D, limiting technological progress and long-term growth (Belgian NPB, 2021). Very intensive intangible capital companies have been less vulnerable to the COVID-19 crisis as they rely more on internal financing because intangible capital is difficult to finance through bank credit. However, in the post-crisis period these companies might face the risk of financial vulnerability if the source of internal financing were to shut down (Conseil National de Productivité (France), 2022).

3.5. INNOVATION

NPBs view innovation as the backbone of productivity growth. There is consensus that innovation will play a crucial role in the transition to a low-carbon economy. For this reason, some NPBs discuss challenges to innovation such as attracting and retaining employees with the necessary skills or compliance and documentation burdens of the corporation tax credits system, which create barriers to

([29]) Intangibles include intangible ICT assets (e.g. computer software and databases), intellectual property (e.g. R & D, design) and economic competencies (e.g. organisational capital, training).

small and medium-sized enterprises (SMEs) engaging in R & D activities (National Competitiveness and Productivity Council (Ireland), 2022). Other challenges identified are the small domestic market, the lack of large enterprises, the service-oriented structure of the economy and the domestic banking crisis (Cyprus Economy and Competitiveness Council, 2021).

The COVID-19 pandemic fostered innovation, albeit in specific fields. In Belgium, the expenditure on innovation in 2020 and 2021 focused mostly on new digital products such as apps to trace infections and to make contactless payments easier. Most R & D was focused on new treatments, vaccines or other COVID-19-related challenges (Belgian NPB, 2021). In Ireland, more than 22 % of the firms participating in a survey had introduced a product or process innovation in response to the COVID-19 pandemic in 2020, while nearly 14 % had abandoned or suspended an innovation due to the pandemic. More than 88 % of firms stated that they planned to keep the COVID-19-related innovation after the pandemic, suggesting that innovations introduced during the crisis period might have long-lasting benefits (National Competitiveness and Productivity Council (Ireland), 2022).

R & D makes a significant contribution to innovation, so a number of NPBs benchmark their country's innovation and R & D performance (Greek NPB, 2022; Institute of Macroeconomic Analysis and Development (Slovenia), 2022; National Competitiveness and Productivity Council (Ireland), 2022). Recent contributions have focused on the effectiveness of public support for R & D through spending and tax relief (Belgian NPB, 2022). The evaluation finds a positive effect of subsidies and the partial exemptions of withholding taxes for research personnel, but the effect of corporate income tax benefits is unclear. It concludes that a better combination of both measures could therefore help to boost R & D.

To boost innovation, NPBs recommend the funding of basic (Cyprus) and interdisciplinary (Ireland) research, the improvement of the institutional framework for innovation (Ireland, Lithuania, Malta) and the implementation of diffusion strategies (Belgium, Ireland, Cyprus, Malta). Funding can also be in the form of tax breaks (Council for Productivity (Portugal), 2021; Cyprus Economy and Competitiveness Council, 2021); for the diffusion of innovation, demonstrator pilot projects are considered useful (Bureau for Economic Policy Analysis (Netherlands), 2021; Maltese NPB, 2021); (see Table 4 in the annex). Innovation (in a broad sense) will also play a crucial role in the transition to a low-carbon economy. Markets' underinvestment in clean technologies also justifies some steering through green innovation policy (Belgian NPB, 2022).

3.6. HUMAN CAPITAL

The analysis of human capital features in most NPB reports. Like physical capital, human capital can be 'accumulated', usually through investment in education, training or better health systems. Similarly, it can depreciate due to the lack of use, ageing or even obsolescence – when new and disruptive technologies emerge, making old skills redundant, thus implying that education policies can generate and help to maintain skills that are complementary to labour market demands and technological advancements (Conseil National de Productivité (France), 2022; Danish Economic Councils, 2022; National Competitiveness and Productivity Council (Ireland), 2022; Belgian NPB, 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021; Ministry of Finance (Finland), 2021). Most reports analyse human capital through enrolment rates, years of schooling, education attainment, the share of school leavers and skills levels (Belgian NPB, 2022; Conseil National de Productivité (France), 2022; National Competitiveness and Productivity Council (Ireland), 2022; Belgian NPB, 2021; Conseil National de la Productivité (Luxembourg), 2021; Conseil National de Productivité (France), 2021; Danish Economic Councils, 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; Institute for Strategy and Analysis of Slovakia, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021; Maltese NPB, 2021; Ministry of Finance (Finland), 2021).

Human capital is critical for good economic performance. The 2022 French report shows that almost one third (31 %) of the labour productivity gap between frontier and median firms is explained by differences in human capital, while physical capital explains only 20 % of the gap. Based on a literature review, the 2022 Belgian report shows that a 10-percentage-point increase in Programme for International Student Assessment scores in mathematics would lead to a 0.2-point increase in GDP per capita growth.

NPBs show that pursuing formal education improves productivity growth. In France, the existing high education attainment rates suggest limited opportunities for additional progress. Sources of future growth will therefore have to come from better-quality education, to ensure that, given a constant number of years of education, human capital can continue to grow (Conseil National de Productivité (France), 2022). Conversely, in Portugal, additional years of schooling might still lead to productivity gains, and allow the country to catch up with the more productive EU Member States (Council for Productivity (Portugal), 2021).

Skills are also a lever for productivity growth. The 2022 French report provides evidence that differences in cognitive and non-cognitive (or soft) skills available in a firm's workforce can help explain productivity differences between firms. The 2022 Belgian report also shows that the more productive a company is, the more highly skilled workers it employs, in particular (highly skilled) science, technology, engineering and mathematics (STEM) workers. Moreover, NPBs emphasise the relevance of managerial skills, as they influence a firm's ability to adopt new technologies and to innovate (Bureau for Economic Policy Analysis (Netherlands), 2021; Cyprus Economy and Competitiveness Council, 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021; Maltese NPB, 2021; Ministry of Finance (Finland), 2021) and have a positive effect on productivity (Conseil National de la Productivité (Luxembourg), 2022). The Irish NPB highlights the importance of investing in management and leadership capability skills, as a means of stimulating innovation and productivity, particularly in digitalisation and for SMEs (National Competitiveness and Productivity Council (Ireland), 2022). In addition, digital skills are seen as innovation enablers. These skills are so important that some types of innovation and infrastructure investments cannot be effective in their absence (National Competitiveness and Productivity Council (Ireland), 2022; Cyprus Economy and Competitiveness Council, 2021). Furthermore, a diverse workforce is also associated with higher productivity. The analysis of workforce composition by the French NPB reveals that frontier firms are closer to gender parity, their workforces have a more heterogeneous cultural background and they have a greater dispersion of employees' ages (Conseil National de Productivité (France), 2022).

Skills gaps are increasingly recognised as a major obstacle in emerging sectors closely linked to the 'green economy'. In Ireland, the *Skills for Zero Carbon* report ([30]) identifies the skills needed in Ireland to deliver on key climate action plan targets, with a focus on the renewable energy, residential retrofit and electric vehicle deployment sectors (National Competitiveness and Productivity Council (Ireland), 2022). Skills gaps can also materialise in other sectors of the economy. Generally speaking, NPBs point to the possibility of widening digital skills mismatches (Conseil National de Productivité (France), 2022; Danish Economic Councils, 2022; National Competitiveness and Productivity Council (Ireland), 2022; Belgian NPB, 2021; Bureau for Economic Policy Analysis (Netherlands), 2021; Conseil National de la Productivité (Luxembourg), 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; German Council of Economic Experts, 2021; Greek NPB, 2021; Institute for Strategy and Analysis of Slovakia, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021; Maltese NPB, 2021). Focusing on

([30]) The report forecasts that national employment in wind and solar energy generation will have to triple (from approximately 3 000 people) by 2030. The workforce engaged in residential retrofit and heat pump installation will have to increase more than fourfold (from approximately 4 000 people), to reach over 17 000 by the end of the decade. The existing motor mechanic workforce will meanwhile need to be transitioned to work on electric vehicles as the uptake of such vehicles increases.

digital platforms, the 2021 German NPB report discusses the issues surrounding the shortage of workers with ICT skills (German Council of Economic Experts, 2021). As the nature of and the tasks associated with construction occupations are undergoing substantial change, recruiting more construction workers, and upskilling existing and future ones, will be necessary for enabling the sector to improve its productivity and meet its demand (National Competitiveness and Productivity Council (Ireland), 2022; Maltese NPB, 2021). The 2021 Maltese report calls for enhancing the skillset of the small-scale farming community especially in terms of new farming methods, organic farming and the use of pesticides (Maltese NPB, 2021).

The Danish, German and French NPBs discuss labour shortages. Shortages of workers have been on the rise in Germany and France since the beginning of 2021 (Conseil National de Productivité (France), 2022; German Council of Economic Experts, 2021). In the Danish economy, such shortages led the government to propose measures to improve access to foreign labour (e.g. reduce minimum salaries for foreign workers), which can bring new knowledge and ideas that can lead to new and more efficient ways of working, improving productivity growth. Complementarity between native and foreign labour skills can lead to the more efficient use of skills, but, if the skills of native and foreign workers are too similar, a surplus of foreign labour can lead to higher competition and lower wages, especially in low-skilled jobs (Danish Economic Councils, 2022).

Several NPBs recommend improving the education system and matching skills to labour market needs. They recommend a closer connection between education systems and the labour market. This entails the need to raise the number of graduates in science and technical subjects to keep pace with changes induced by modern technologies and digitalisation (Belgian NPB, 2022). Better alignment between labour market needs and skills is a key element for improving productivity. For example, the 2021 Cypriot report points out that the country has a relatively small share of STEM graduates (despite a large proportion of tertiary graduates) and one of the highest levels of overqualification in manufacturing, construction, professional services, wholesale and retail distribution, and public administration (Cyprus Economy and Competitiveness Council, 2021).

Lifelong learning helps countries keep up with the pace of technological advancements and to avoid obsolescence of human capital and skills mismatches. Pursuing informal education and work experience is also acknowledged to have positive effects on productivity. Without good-quality education and upskilling/reskilling opportunities throughout the life course, economies are at risk of being constrained, because these provisions support the structural change that accompanies digital innovations and climate change investments (Belgian NPB, 2022; Conseil National de Productivité (France), 2022; National Competitiveness and Productivity Council (Ireland), 2022; Bureau for Economic Policy Analysis (Netherlands), 2021; Conseil National de la Productivité (Luxembourg), 2021; Cyprus Economy and Competitiveness Council, 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021; Maltese NPB, 2021; Ministry of Finance (Finland), 2021). Furthermore, unskilled workers are more likely to be in precarious employment, to have limited access to the labour market and to experience poverty and social exclusion (Conseil National de Productivité (France), 2022; National Competitiveness and Productivity Council (Ireland), 2022). According to the 2022 Irish report, barriers to participation in lifelong learning include family circumstances and schedule / timing constraints. Furthermore, enterprise support for lifelong learning is not uniform. Support is higher among foreign-owned than among indigenous enterprises, among service businesses than among manufacturing enterprises, among larger organisations than among smaller enterprises and among enterprises based in Dublin than among those situated outside Dublin (National Competitiveness and Productivity Council (Ireland), 2022).

3.7. DIGITAL TRANSITION

The majority of NPBs discuss the digital transformation of the economy and society, its potential to bring new opportunities for individuals and enterprises and the challenges of achieving a successful transition. Digital technologies are increasingly becoming an integral part of business activities, interactions with government and our everyday lives. Importantly, the NPBs stress that, despite disrupting supply chains, the pandemic has also boosted the process of digitalisation and the demand for data-driven services, suggesting that the pandemic might have created momentum for the acceleration of the digital transition (Conseil National de Productivité (France), 2022; Danish Economic Councils, 2022; National Competitiveness and Productivity Council (Ireland), 2022; Belgian NPB, 2021; Bureau for Economic Policy Analysis (Netherlands), 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; German Council of Economic Experts, 2021; Institute for Strategy and Analysis of Slovakia, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021; Maltese NPB, 2021; Ministry of Finance (Finland), 2021) ([31]). In terms of methodology, most of the NPBs assess the status quo of digitalisation by making use of the Digital Economy and Society Index, a useful benchmark tool to compare the performance of a country with that of the rest of the EU (National Competitiveness and Productivity Council (Ireland), 2022; Cyprus Economy and Competitiveness Council, 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; Greek NPB, 2021; Institute for Strategy and Analysis of Slovakia, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021; Maltese NPB, 2021).

The digital transition can boost productivity growth. NPBs emphasise that digital technologies are characterised by strong complementarities between technologies themselves, with firms' capabilities and assets (i.e. technical, and managerial skills), organisational capital, innovation and financing capacity, and with policies to increase competition and reallocate resources in the economy. Shortfalls in any of these can affect the diffusion of digital technologies and reduce the potential productivity benefits. The 2022 Irish NPB report notes that the possible positive impact of the digital transformation on productivity and welfare is associated with how certain workers, firms and sectors carry out their activities (including the shift to more flexible working patterns); the incorporation of digital technologies in manufacturing, finance, health and education; and the onshoring of the production (with greater capital intensity) of certain essential products. The 2021 German report points to the growing importance of data in creating value added and, therefore, to the importance of enhancing cloud ecosystems for facilitating data access.

Start-ups are a core element of the digital transformation, due to their role in the innovation and reallocation processes. During the coronavirus crisis, business start-ups in digital-intensive sectors of the economy increased in comparison with the previous year, while they declined in less digital-intensive sectors. For example, one of the highest rises in business start-ups was in the software and gambling sectors (German Council of Economic Experts, 2021; Maltese NPB, 2021).

There are challenges associated with the digital transition, especially for small and vulnerable firms, including regional inequalities. The 2021 Maltese report suggests that enterprises, especially SMEs, are not yet prepared to face the challenges coming from the digital transition. It recommends carrying out a sectoral digital skills audit across firms and employees as part of the planned skills census to reconcile skills demand and supply (Maltese NPB, 2021). The Latvian NPB points to a digital divide between urban and rural areas, which have unequal development of digital infrastructure and therefore unequal access to digital services (Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021). The Irish NPB notes that groups that are unprepared and vulnerable to these changes need protection and assistance throughout the transformation (National Competitiveness and Productivity Council (Ireland), 2022).

([31]) See section 3.3.2 for an analysis of the accelerating effects of teleworking on the digitalisation process.

Digitalisation will also trigger adjustments in labour markets due to an increased demand for digital skills. Digitalisation has brought about a shift in the employment structure, as evidenced by the rapid growth in employment in computer science and ICT-related occupations in both the manufacturing sector and the services sector. This rising demand has led to a shortage of skilled workers in ICT in many countries. Some reports show that digitalisation of enterprises is often correlated with a shift of workers towards larger firms, possibly accompanied by higher productivity growth (Danish Economic Councils, 2021; German Council of Economic Experts, 2021; Institute for Strategy and Analysis of Slovakia, 2021; Maltese NPB, 2021). In Germany, the development of digital platforms and their widespread use is hampered by a shortage of staff to develop digital business innovations (German Council of Economic Experts, 2021).

The commercial use of data is becoming increasingly important in the value added process but gives rise to security concerns. The 2021 German report includes an analysis of digital platforms ([32]) and their tendency towards concentration. The report looks at whether the EU legal framework should strengthen competition in digital markets. It considers whether platform concentration results from abusive behaviour by market-dominant players and inadequate scrutiny of mergers or from these markets constituting natural monopolies that should be regulated (German Council of Economic Experts, 2021).

To address these challenges, governments need to actively support the transition. Several reports explain that policies have a crucial role in an efficient and inclusive transformation, by ensuring that the necessary complementarity factors are in place (German Council of Economic Experts, 2021; National Competitiveness and Productivity Council (Ireland), 2022; Bureau for Economic Policy Analysis (Netherlands), 2021; Conseil National de la Productivité (Luxembourg), 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021). Most reports point to the role of government in deploying the infrastructure investment (e.g. 5G) needed to fully benefit from the digital technologies. In this respect, many Member States have adopted digital strategies (Conseil National de Productivité (France), 2022; Danish Economic Councils, 2022; National Competitiveness and Productivity Council (Ireland), 2022; Belgian NPB, 2021; Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021; German Council of Economic Experts, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021; Maltese NPB, 2021; Ministry of Finance (Finland), 2021). The 2021 Maltese report identifies the following key enablers for the digital transition: (i) talent and skills, (ii) research and innovation, (iii) finance and incentives, (iv) infrastructure and security, and (v) policy and governance. A coherent strategy and the setting of priorities, such as a clear pathway to secure access to data and technologies, are required to unlock the potential of accelerated digitalisation (German Council of Economic Experts, 2021). Finally, governments should also ensure that legal frameworks are regularly updated in parallel with the advancement of the digital economy and digital markets, especially with regard to new business models that will be progressively created (Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021).

Secure data access and trading, and effective and fair competition on digital marketplaces need to be ensured. Cybersecurity is one of the most critical areas of risk for companies (Maltese NPB, 2021). In Germany, the development of digital platforms and their widespread use is hampered (on top of the skills shortages mentioned above) by security concerns regarding the storage of sensitive data by external cloud providers (German Council of Economic Experts, 2021). The Irish NPB reports that the Irish government is addressing this risk by expanding the National Cyber Security Centre and by establishing a new statutory body (National Competitiveness and Productivity Council (Ireland), 2022).

([32]) Platforms are multisided markets in which various actors meet. They typically give rise to network effects both within and between the groups of market participants. The benefit of direct network effects increases in line with the number of other users on the same side of the platform, as is the case with social media. Multisided markets are especially characterised by positive indirect network effects, where the benefit for market participants is determined by the number of participants on the other side of the platform.

3.8. GREEN TRANSITION AND ENERGY CRISIS

Across NPBs, there is consensus that the green transition will significantly restructure the energy market, thereby affecting the whole economy. The reports highlight the challenges linked to the green transition.

- Challenges in Cyprus are linked to its dependency on fossil fuels for energy (the highest in the EU). However, recently discovered offshore gas fields offer a significant opportunity for Cyprus to further build its energy independence to mitigate the energy crisis, in parallel with its efforts to accelerate measures for renewables and energy efficiency (Cyprus Economy and Competitiveness Council, 2021).

- In the German report, the green transition is seen in the context of the structural change in manufacturing. The current energy crisis is increasing the pressure on companies to reduce their energy intensity, accelerating the ongoing green transition (German Council of Economic Experts, 2022).

- The Danish report focuses on green taxation challenges, stressing that, to achieve the climate target of 70 % CO_2 equivalent abatement by 2030, the Danish government should raise greenhouse gas taxation (Danish Economic Councils, 2022).

- For Greece, the main challenge is the phasing out by 2025 of lignite in power generation ([33]) (Greek NPB, 2021).

- In Ireland, to deliver on the government's climate action plan targets, employment in wind and solar energy generation will have to increase from 3 000 to 9 000 full-time-equivalent workers by 2030, while employment in residential retrofit and heat pump installation will have to increase from 4 000 to 17 000 full-time-equivalent workers. However, Irish enterprises are not yet prepared for the climate transition, especially small firms, 83 % of which have no climate plan in place (National Competitiveness and Productivity Council (Ireland), 2022). The 2022 report therefore recommends that the government assists enterprises and workers in adjusting to the changes.

- The 2022 report of Luxembourg's NPB investigates Luxembourg's industries' comparative environmental performances. It shows that industries posing low risks to the environment (according to the European Bank for Reconstruction and Development's taxonomy) account for the highest share of output and pollution, although medium- and high-risk industries account for a greater proportion of emissions per unit of output. In addition, in relation to sustainable development, the report monitors Luxembourg's performance in terms of (i) resource productivity (i.e. the ratio of GDP to domestic material consumption), (ii) energy productivity, which measures the amount of economic output per unit of gross energy available, and (iii) the concept of decoupling of economic growth from resource and energy consumption. It concludes that, while Luxembourg has failed to decouple GDP growth from domestic material consumption over the past decade, it has managed to continuously increase its economic output at the same time as reducing its energy consumption (and greenhouse gas emissions).

- The 2021 Slovenian report focuses on the challenges for the labour market. In 2021, the Slovenian government provided financial assistance to firms hiring unemployed workers in green jobs. The report emphasises that education and (re)training programmes should be promoted to develop green skills, especially for employees whose jobs will be most affected by the green transition (Institute of Macroeconomic Analysis and Development (Slovenia), 2021).

([33]) Lignite energy production is the main economic activity of the municipality of Megalopolis and the region of Western Macedonia, which will suffer the largest economic and social consequences of phasing out lignite.

The transition to a green economy also represents a challenge for productivity growth. While it can stimulate innovation, the sizeable investments needed may reduce resources available for R & D over time, with such investments often being less associated with learning effects than investments in new productive capital (Belgian NPB, 2022).

The energy crisis brought about by Russia's war of aggression calls for an acceleration of the transition to a low-carbon economy (Greek NPB, 2022; Institute of Macroeconomic Analysis and Development (Slovenia), 2022). It has highlighted the importance of a sustainable and diversified energy supply, resulting in an intensification of strategies for energy security (Belgian NPB, 2022; German Council of Economic Experts, 2022; National Competitiveness and Productivity Council (Ireland), 2022). Against this backdrop, the NPB recommendations for the green transition focus on the development of green skills to ease the reallocation of workers from brown to green sectors (Conseil National de Productivité (France), 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021), and on enhancing investment and infrastructure for renewable energies (German Council of Economic Experts, 2022; Greek NPB, 2021). The design of green taxation is also an issue addressed by the 2022 Danish report. Finally, green innovation is critical to lowering the economic and social costs of emission reduction policy (Belgian NPB, 2022).

3.9. BUSINESS ENVIRONMENT AND INSTITUTIONS

'Business environment and institutions' refers to the legal, administrative and regulatory environment for businesses. The smooth and efficient operation of public institutions is a key determinant of a country's economic performance (Cyprus Economy and Competitiveness Council, 2021). It affects the capacity and the extent of growth of an economy, and the global competitiveness of domestic firms. Six NPBs (those of Ireland, France, Cyprus, Latvia, Malta and Slovenia) have discussed the business environment, including red tape, the tax system and the effectiveness of public administrations, in their annual reports. Examples are provided below.

- The Greek NPB carried out a public consultation in 2022. Institutional dysfunctionalities in the public administration and the judicial system were identified as key risks to Greek productivity by 50 % of the stakeholders. These were related to the public sector's efficiency, the quality of institutions and investment attractiveness. Institutional reforms in the public sector and markets have been indicated by stakeholders as important horizontal policies needed to boost productivity in the coming years (Greek NPB, 2022).

- Some French companies have relocated their production sites abroad, where production costs and fiscal pressure are lower, to the detriment of employment in France (Conseil National de Productivité (France), 2022).

- Ireland has high energy, credit, insurance and legal services costs; these are particularly important for SMEs. Moreover, businesses in Ireland face higher interest rates than the average business in the euro area, due in part to low competition within the domestic banking sector (National Competitiveness and Productivity Council (Ireland), 2022).

- The Latvian NPB report focuses on the legal framework of the innovation system, which needs better coordination between stakeholders, non-governmental organisations and the government (Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia, 2021).

- Malta's NPB report focuses on the country's insolvency framework, recommending improvements to address the following shortcomings: an inefficient liquidation process, low recovery rates, weak creditor rights and an inefficient judicial system (Maltese NPB, 2021).

- Other recommendations regarding business environment and institutions focus on reducing the administrative weight on business activity (France) and on strengthening institutions and legislation to attract investors (Cyprus and Malta); see Table 8 in the annex.

3.10. REGIONAL PRODUCTIVITY

Four NPBs (Belgium, Greece, France and Slovenia) provide analysis of regional dynamics and differences in labour productivity.

- In Belgium, the slowdown of labour productivity (measured in hours worked) in manufacturing affects all regions, while hourly productivity of market services has been growing only in Wallonia (Belgian NPB, 2022).

- Regional inequalities in Greece are among the largest across the EU Member States, and the emerging trends in digitalisation, climate change and demographic changes may further affect the regional gaps (Greek NPB, 2021).

- The French report warns about an increased risk of divergence between regions in France (Conseil National de Productivité (France), 2022).

- The Slovenian NPB report focuses on regional business dynamics. The highest share of fast-growing enterprises in relation to all enterprises is in the Littoral–Inner Carniola region (8 %) (Institute of Macroeconomic Analysis and Development (Slovenia), 2021).

Regional inequality in productivity is related to the geographical concentration of high-productivity sectors, which are often concentrated in the capital regions.

- In France, over 2000–2018 Île-de-France accounted for 4 percentage points of the cumulative national productivity growth. Indeed, the sectors that drive domestic productivity growth (non-market services; scientific, technical and administrative activities; real estate; trade; transport; accommodation; and catering activities) are highly concentrated in Île-de-France (Conseil National de Productivité (France), 2022).

- The Greek report shows that the capital region, Attica, has a higher level of competitiveness than the other regions in the country (Greek NPB, 2021). Island regions fall behind mainland regions in innovation (except for Crete) and public investment, their economies rely more on the services sector (especially tourism) and they are more vulnerable to climate change. To increase the productivity and competitiveness of these regions, it is crucial to reduce transport costs to/from mainland Greece and energy costs (Greek NPB, 2022).

- In Slovenia, most fast-growing enterprises (48 %) are in the Central Slovenia region (Institute of Macroeconomic Analysis and Development (Slovenia), 2021).

4. CONCLUSIONS

To date, 19 EU Member States have an NPB. While the network of NPBs has grown steadily over time, no new NPB was set up in 2022 and eight EU countries have yet to establish one.

NPBs can press for productivity-enhancing policies in several ways. They can raise awareness of challenges relating to productivity and competitiveness; they inform the policymaking process by

providing evidence and guidance on policy responses; and they help to increase ownership of reforms by triggering a debate on which policies are most suited to a given country and by reaching out to relevant stakeholders. While the institutional designs of the NPBs are broadly in line with the requirements of the NPB recommendation, there is however, room for improvement in some cases regarding the NPBs functional autonomy, access to information and sufficiency of resources.

With their annual reports, NPBs contribute to evidence-based policymaking. In turn, their impact depends on the country's culture of evidence-based policymaking (i.e. whether governments are active users of their reports and those of other independent research institutions). Overall, the topics discussed by the annual reports reflect a key challenge for EU economies, namely that of maintaining satisfactory rates of productivity growth, which is key not only to improve living standards sustainably and to foster real convergence, but also to address macrofinancial imbalances. Moreover, in a context where EU Member States have stepped up their commitments to progress towards the green transition, strong productivity dynamics are increasingly important, as they help to ease possible temporary tensions between addressing climate change and economic growth.

Although it is difficult to quantitatively assess the impact of NPBs on productivity and competitiveness outcomes, these institutions do play a useful role through their annual reports. Examples are the analyses of the productivity slowdown affecting advanced economies since the turn of the century, the macroeconomic effects of the recovery and resilience plans, the specification of criteria for the design of support measures in the context of the COVID-19 pandemic and the role of data in the digital transition. Emerging topics are those linked to the green transition and the challenges regarding energy prices, brought about by Russia's war of aggression; the disruption of global value chains; and the debate on EU strategic autonomy in areas such as digital and industrial policies. NPBs therefore combine analysis of structural determinants of productivity growth and of shorter-term challenges, to increase the effectiveness of their analyses and the impact of their recommendations. The main messages of the NPB reports published in 2021 and 2022 are the following.

- **The drivers of the productivity slowdown differ across Member States.** Within-sector productivity developments are the largest contributor to aggregate (and declining) productivity growth in Belgium and France, against the backdrop of a low and decreasing reallocation of labour across sectors (Belgian NPB, 2022; Conseil National de Productivité (France), 2022). At firm level, the Danish report finds that two factors – within-firm productivity growth and between-firm factor reallocation – are equally important for explaining the slowdown in Danish productivity until 2018 (Danish Economic Councils, 2022). The Dutch report notes that, among other reasons, declining firm dynamics (i.e. entry and exit of firms) in the Netherlands over 2006–2016 are related to the productivity slowdown (Bureau for Economic Policy Analysis (Netherlands), 2021). Misallocation of labour and capital across sectors, combined with the loss of Finland's leading company in the communications sector, account for a significant part of the decline in the country's productivity (Ministry of Finance (Finland), 2022).

- **NPBs consider it still too early to fully assess the effects of the COVID-19 pandemic on productivity.** However, there is consensus that the pandemic has accelerated the adoption of digital technologies, which may contribute positively to future productivity growth. Telework is a case in point. Most reports describe its implementation and how it affects productivity, be it positively or negatively, while acknowledging that the ability of workers to telework varies across sectors. There is also consensus among NPBs that measures to support firms during the pandemic were justified, to prevent the bankruptcy of viable businesses. However, support measures should

be subject to criteria to avoid impairing resource reallocation. Following the surge in energy prices caused by Russia's war of aggression against Ukraine, the focus is currently shifting from COVID-19 support to relief measures for vulnerable households and energy-intensive companies. The latest Belgian and German reports recommend conditionality for their implementation.

- **Some NPB reports point to a growing share of intangible assets on gross fixed capital formation** (Bureau for Economic Policy Analysis (Netherlands), 2021; Conseil National de la Productivité (Luxembourg), 2021). While both tangible and intangible investments have a positive effect on labour productivity growth, investment in ICT capital has a stronger impact than investment in non-ICT capital (Conseil National de la Productivité (Luxembourg), 2021).

- **The main challenges in innovation are skills' availability and red tape** (National Competitiveness and Productivity Council (Ireland), 2022; Cyprus Economy and Competitiveness Council, 2021). Attracting and retaining employees with the necessary skills are key for innovation. The automation of industrial processes is an opportunity for productivity growth, although it can lead to a reallocation of employment (Conseil National de Productivité (France), 2022; Danish Economic Councils, 2022). For SMEs, a major barrier to innovation is the bureaucratic burden associated with R & D activities (National Competitiveness and Productivity Council (Ireland), 2022; Cyprus Economy and Competitiveness Council, 2021).

- **Most of the NPBs investigate aspects related to human capital accumulation.** They conclude that the workforce's cognitive and non-cognitive skills are a key factor explaining productivity differences between firms. Managerial skills and organisational factors also influence firms' ability to adopt modern technologies and to develop and deploy innovations. The available evidence confirms that productivity gains can be achieved by reducing skills mismatches, improving managerial skills and promoting lifelong learning (Conseil National de Productivité (France), 2022).

- **The digital transformation can potentially bring productivity increases, but it will require a significant reallocation of resources.** Early evidence suggests that enterprises are not yet prepared to face the new challenges. Hence, governments can play a key role in providing incentives to digitalise the economy and in establishing regulatory frameworks. Management and organisational practices are also expected to play a significant role during the transition, together with the availability of digital skills.

- **The green transition will significantly affect the labour and energy markets.** Challenges in the labour market are due to greater demand for green skills, which could be addressed through education and (re)training programmes. Economies with stronger dependence on fossil fuels should accelerate investment in renewable energy production and infrastructure (Danish Economic Councils, 2022; German Council of Economic Experts, 2022; National Competitiveness and Productivity Council (Ireland), 2022; Cyprus Economy and Competitiveness Council, 2021; Greek NPB, 2021; Institute of Macroeconomic Analysis and Development (Slovenia), 2021).

REFERENCES

Albrizio, S. and Nicoletti, G. (2016), *Boosting Productivity: A framework for analysis and a checklist for policy*, OECD background paper.

Belgian NPB (2022), *Annual Report 2022*, Brussels.

Belgian NPB (2021), *Annual Report 2021*, Brussels.

Belgian NPB (2020), *Annual Report 2020*, Brussels.

Bergeaud, A., Cette, G. and Drapala, S. (2022), 'Telework and productivity: insights from a new survey', *SSRN* (http://dx.doi.org/10.2139/ssrn.4015066).

Borgensgaard, P.V. (2022): *Job Retention during the Covid-19 Pandemic*. Working Paper. Danmarks Nationalbank.

Bureau for Economic Policy Analysis (Netherlands) (2021), *National Productivity Board – 2021 annual report*, CPB communication, the Hague.

Conseil National de la Productivité (Luxembourg) (2022), *Rapport annuel 2021–2022*, Luxembourg.

Conseil National de la Productivité (Luxembourg) (2021), *Rapport annuel 2020–2021*, Luxembourg.

Conseil National de Productivité (France) (2022), *Productivity and Competitiveness: Post-COVID cyclical and structural analyses*, Paris.

Conseil National de Productivité (France) (2021), *The effects of the Covid-19 crisis on productivity and competitiveness*, Paris.

Council for Productivity (Portugal) (2021), *Second Activity Report 2020/21*.

Cyprus Economy and Competitiveness Council (2021), *2021 Cyprus Competitiveness Report*, Nicosia.

Danish Economic Councils (2022), *Productivity 2022*, Copenhagen.

Danish Economic Councils (2021), *Productivity 2021*, Copenhagen.

Dingel, J. I. and Neiman, B. (2020), 'How many jobs can be done at home?', *NBER Working Paper*, No 26948.

Forum for Productivity, Efficiency, Development and Competitiveness, University of Latvia (2021), *Latvia's 2021 Productivity Report*, Riga.

German Council of Economic Experts (2022), *Managing the energy crisis in solidarity, shaping the new reality*, Berlin

German Council of Economic Experts (2021), *Shaping the Transformation: Education, digitalisation and sustainability*, Berlin.

Greek NPB (2022), *Annual Report 2022*, Athens.

Greek NPB (2021), *Annual Report 2021*, Athens.

Gupta A., Mittal V., Peeters J. et Van Nieuwerburgh S. (2021), « Flattening the curve: Pandemic-induced revaluation of urban real estate », NBER Working Paper, n° 28675, April.

Institute for Strategy and Analysis of Slovakia (2021), *Report on productivity and competitiveness of the Slovak Republic 2020*, Bratislava.

Institute of Macroeconomic Analysis and Development (Slovenia) (2022), *Productivity Report 2022*, Ljubljana.

Institute of Macroeconomic Analysis and Development (Slovenia) (2021), *Productivity Report 2021*, Ljubljana.

Institute of Macroeconomic Analysis and Development (Slovenia) (2019), *Productivity Report 2019*, Ljubljana.

Maltese National Productivity Board (2021), *Annual Report 2021*, Valletta.

Mattana, E., V. Smeets og F. Warzynski (2020): *Changing Skill Structure and COVID-19*. Covid Economics, 45, pp. 1-30, CEPR press.

Ministry of Finance (Finland) (2022), *Wages and Competitiveness Depend on Productivity – How can we foster productivity growth?*, Finnish Productivity Board, Publications of the Ministry of Finance, 2022:79, Helsinki.

Ministry of Finance (Finland) (2021), *Productivity and Resource Allocation – Weak level and growth of productivity in Finland's digital services*, Finnish Productivity Board, Publications of the Ministry of Finance, 2021:68, Helsinki.

Ministry of Finance (Finland) (2020), *The State of Productivity in Finland – Why did its growth stop? Will it start again?*, Finnish Productivity Board, Publications of the Ministry of Finance, 2020:60, Helsinki.

National Competitiveness and Productivity Council (Ireland) (2022), *Ireland's Competitiveness Challenge 2022*, Dublin.

National Competitiveness and Productivity Council (Ireland) (2021), *Ireland's Competitiveness Challenge 2021*, Dublin.

Renda, A. and Dougherty, S. (2017), 'Pro-productivity institutions: learning from national experience', *OECD Productivity Working Papers*, No 7, OECD Publishing, Paris (https://www.oecd-ilibrary.org/economics/pro-productivity-institutions-learning-from-national-experience_d1615666-en).

ANNEX. EXAMPLES OF RECOMMENDATIONS IN THE NPBS' ANNUAL REPORTS

Table 2. **NPBs' policy recommendations for telework**

Country	*Recommendations*
DK	Avoid legislation creating unnecessary obstacles to teleworking. Legislation should ensure that home workplaces meet health standards (Danish Economic Councils, 2022).

Table 3. NPBs' policy recommendations for investments

Country	*Recommendations*
FR	Improve France's attractiveness for investment by reducing the weight of taxes on production factors (capital and labour) (Conseil National de Productivité (France), 2022).
CY	Encourage and facilitate investment in high value added and innovative activities and sectors (Cyprus Economy and Competitiveness Council, 2021)

Table 4. NPBs' policy recommendations for innovation

Country	*Recommendations*
IE	• Implement the Impact 2030 strategy and monitor progress on targets on an annual basis. • Adopt the research bill and establish a new research and innovation funding agency to drive and fund research, particularly interdisciplinary research.
CY	• Reduce start-up costs, and provide subsidies and tax breaks for R & D. • Increase funding for basic research.
LT	• Improve the legal framework of the innovation system, particularly with regard to the duties and responsibilities of stakeholders and non-governmental organisations, and the system of State aid.
MT	• Implement sectoral demonstrator sites for companies to learn about new technologies. • Support firms to develop technology-driven pilot projects that would act as exemplars to other firms. • Develop collaboration between academia and the private sector through traineeships and pilot transformation projects.

Table 5. NPBs' policy recommendations for the green transition

Country	*Recommendations*
DK	• Adopt uniform green taxation and avoid sector-specific taxation, which is less cost-effective (Danish Economic Councils, 2022).
DE	• Ensure the availability of renewable energy supplies by (i) expanding energy infrastructure and (ii) accelerating the expansion of renewables. • Accelerate the decarbonisation of manufacturing by (i) reducing distortions in energy supply and (ii) increasing flexibility of energy demand (German Council of Economic Experts, 2022).
EL	• Support the areas economically dependent on lignite mining and electricity production. • Promote the electrification of the transport sector, the use of alternative fuels, the management of energy demand and the energy efficiency of buildings. • Promote sustainable investment in energy infrastructure: establishment of new renewable energy plants, energy storage projects, offshore wind farms and natural gas plants; and development of green hydrogen technologies (Greek NPB, 2021).
FR	• Adopt measures to facilitate intersectoral and intrasectoral reallocation of workers towards high-growth industrial activities based on green innovation (Conseil National de Productivité (France), 2022).
SI	• Strengthen the development of green skills through education and (re)training programmes, especially for employees whose jobs will be at risk because of the green transition and who will move to occupations with growing demand (Institute of Macroeconomic Analysis and Development (Slovenia), 2021).

Table 6. NPBs' policy recommendations for human capital

Country	*Recommendations*
	Education
CY	• Enhance connectedness and collaboration between the business community and tertiary education and research. • Increase the number of graduates with technical and natural science qualifications, and strengthen education and training (all levels) to support entrepreneurship.
MT	• Establish more flexible pathways between vocational education or training streams and non-vocational education or training streams. • Create a stronger link between the labour market and education and training, including by building links between education and businesses.
SK	• Reform the education system to improve the skills level and reconcile the needs of digitalisation and Industry 4.0.
	Skills

IE	• Continue to roll out engagement programmes through Intreo (the public employment service of Ireland), targeting specific cohorts including 'returners' to re-engage those currently outside the labour market, with a focus on job and skills matching. • Increase outreach for skilled labour beyond the EU / European Economic Area. • Ensure the upskilling of construction workers, enabling them to develop skills relating to modern methods of construction.
CY	• Improve alignment of education and training to jobs demand, and strengthen prediction of future skill needs.
MT	• Improve flexibility at work and availability of skilled labour so that the benefits of new technology, innovation and R & D can be more readily exploited. • Upskill and reskill workers through support and incentives before the end of the wage subsidy scheme applied during the COVID-19 pandemic. • While embracing foreign talent, increase investment by businesses, trade unions and government in incentivising low-wage workers to participate in training.

Table 7. NPBs' policy recommendations for digitalisation

Country	***Recommendations***
	Digital skills
IE	• Increase the digital skills of the labour force; these are currently not adequate for the rapidly changing digital environment. • The National Competitiveness and Productivity Council recommends that the relevant entities lead, develop, and implement a coherent plan to address the recommendations. assigned by the Expert Group on Future Skills Needs in their AI Skills report to support the digital transition.
CY	• Strengthen education and training (all levels) for digital skills. • Improve the digital skills of teachers through training and early retirement schemes.
MT	• Provide support to firms that upskill their existing employees through digital transformation courses, at all levels, including management. • Support industry-led training to ensure that courses are in line with industry requirements. • Introduce a sectoral digital skills audit across firms and employees as part of the planned skills census. • Launch schemes and popularisation campaigns that incentivise students to follow STEM paths. • Leverage European funds, particularly the European Social Fund, to help employers and employees in their digital skills training requirements.
	Government support and digital framework

DE	• develop a coherent strategy and the setting of priorities, with steps to secure access to data and technologies.
IE	• Systematically implement the harnessing digital strategy, with annual reporting on progress made and transparent identification of all barriers.
CY	• Accelerate the digitisation of public services, in parallel with citizen training.
MT	• Enhance awareness surrounding digital transformation opportunities for specific sectors that are encountering challenges, such as the agricultural and construction sectors. • Establish a dedicated research centre for Gozo to support its potential of becoming a real-world testing hub for new technologies including drones, agritech, smart buildings and mobility technologies. • Launch a national Industry 4.0 strategy to leverage Malta's potential as a value added manufacturing centre of excellence, including areas such as 3D printing and additive manufacturing. • Together with the Local Councils' Association, start a process to develop a smart city vision for Malta's villages, and launch pilot projects. • Develop a national open data portal to spur evidence-based analysis and innovation. • Design and deliver digital public services. Specifically, regulators need to truly embed regulatory technology in their operations. • Review the legal framework and enforcement mechanisms to ensure that data governance is given due priority and focus by all public and private entities and authorities.
	Finance and incentives
CY	• Provide digitalisation incentives for key sectors of the economy.
MT	• Develop a digital transformation loan scheme together with Malta Development Bank to ensure access to financing for transformation projects. • Launch a multiannual EU-funded grant scheme targeting digital transformation for companies. • Continue the current support packages aiming to provide digital transformation technical advisory services and expertise to organisations.
	Infrastructure and security
MT	• Support the creation of testing environments for internet of things technologies, especially around the concept of smart localities. • Prioritise cybersecurity at national level, and treat it as a national security risk. • Create awareness of cybersecurity at firm level, and launch schemes to support security audits and capacity enhancement. • The government needs to engage with economic operators to understand whether any sector-specific infrastructure is needed to facilitate digital transformation in specific sectors. • Facilitate digital infrastructure audits for industry to assess its infrastructural capacity to embark on digital transformation.

Table 8. NPBs' policy recommendations for business environment and institutions

Country	*Recommendations*
FR	• Reduce the weight of the tax system on production factors (capital and labour) (Conseil National de Productivité (France), 2022).
CY	• Revise the legislation for university spin-offs to make them more appealing to investors. • Enhance Cyprus's image as a reputable place to conduct business by strengthening the regulatory oversight of institutions and avoiding activities that can damage (and have done so in the past) the country's reputation. • Reduce red tape and corruption, and improve the legal system (Cyprus Economy and Competitiveness Council (2021)).
MT	• Strengthen the insolvency framework to address a lengthy liquidation process, low recovery rates, weak creditor rights and an inefficient judicial system (Maltese NPB, 2021).

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