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Learning from Productivity Commissions

A Review of Analysis and Policy Recommendations

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Abstract

To inform work by Ivie's Observatory of Productivity in Spain, this paper reviews the recent analytical work and policy recommendations on productivity of eleven national productivity commissions, i.e., Australia, Belgium, Chile, Denmark, Finland, France, Germany, Ireland, New Zealand, Portugal and the United Kingdom. The paper finds considerable diversity in the work of the productivity commissions, reflecting differences in mandates, degree of independence and available resources, amongst others. Boards have much more in common in their analytical and policy work. This likely reflects common challenges, such as the overall slowdown in productivity and the recent COVID-19 crisis; broader underlying trends affecting productivity such as digitalisation and changes in globalisation and global value chains; and a shared understanding of the main drivers of productivity, notably investment, skills and human capital, as well as innovation, technological progress and creative destruction. National contexts and priorities differ, and what may be considered important in one country is not necessarily central to discussions in another. Comparing experiences with those of other countries can help provide context and generate ideas for further reflection in the work of other commissions or for countries, e.g. Spain, that may be considering the establishment of a productivity commission in the future. The rise of productivity commissions across the OECD area and the European Union provides a rich source of analysis and policy learning that should be drawn on by academics, policy makers and others interested in productivity. Countries that have not yet established their own board, such as Spain, may therefore wish to set one up to benefit from this new and important source of policy learning on productivity, a core driver of economic and social wellbeing. Moreover, such countries may wish to draw on lessons learned in establishing these institutions, e.g., in ensuring their analytical independence and in providing access to all the necessary data to inform proposed policies and interventions with sound evidence.

Key words

Productivity, productivity commissions, country studies, economic growth, productivity policies.

Resumen

Con el fin de contribuir al trabajo del Ivie sobre el Observatorio de la Productividad en España, este documento revisa el trabajo de once comisiones nacionales de productividad: Alemania, Australia, Bélgica, Chile, Dinamarca, Finlandia, Francia, Irlanda, Nueva Zelanda, Portugal y el Reino Unido. Los datos muestran una gran diversidad en dichas comisiones, lo que refleja diferencias en liderazgo, nivel de independencia y recursos disponibles, entre otras factores, si bien en su trabajo analítico y político tienen mucho más en común. Esto puede reflejar desafíos comunes, como un descenso general de la productividad y la reciente crisis de COVID-19; tendencias potenciales más amplias que afectan a la productividad, como la digitalización, la globalización y las cadenas de valor mundiales; así como un entendimiento común sobre los principales motores de productividad, especialmente la inversión, las habilidades, el capital humano, la innovación, el progreso tecnológico y la destrucción creativa. Los contextos y prioridades difieren según el país, y lo que un país considera importante puede que otro no. La experiencia de otros países puede ayudar a proporcionar un contexto e ideas para una mayor reflexión del trabajo en otras comisiones de productividad o en países que estan considerando crear una comisión, como por ejemplo España. El aumento de comisiones de productividad en la zona de la OCDE y Unión Europea proporciona una rica fuente de análisis y aprendizaje de políticas que deberían ser aprovechadas por académicos, responsables políticos y otras personas interesadas en la productividad. Países que aún no han establecido una comisión, como España, podrían beneficiarse de esta nueva e importante fuente de aprendizaje de políticas sobre la productividad, un motor fundamental del bienestar económico y social. Además, estos países podrían aprovechar la experiencia adquirida en la creación de tales instituciones, por ejemplo, a la hora de garantizar la independencia del análisis y de proporcionar acceso a todos los datos necesarios para respaldar con evidencia sólida las políticas e intervenciones propuestas.

Palabras clave

Productividad, comisiones de productividad, estudios por países, crecimiento económico, políticas de productividad.

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Introduction[1]

The important role of productivity for economic performance has been recognised for many years. But it is only recently that many governments have decided to establish institutions focused on providing policy advice related to the pursuit of productivity growth, in the form of policy-oriented productivity commissions or productivity boards. Australia's Productivity Commission is the oldest and best established of these Commissions, officially created in 1998, although its history goes back further. From 2010 onwards, several other countries also established commissions, initially notably in Chile (2015), Denmark (2012), Mexico (2013), New Zealand (2010) and Norway (2014). Following a recommendation of the EU Council in September 2016, a growing number of EU countries have started to establish productivity boards as well, implying that there are currently some 20 productivity commissions in operation across the OECD area. Not all Eurozone and EU countries have established productivity boards, although Eurozone countries were invited to establish them, and non-Eurozone countries were encouraged to do so.[2] Among Eurozone countries, Austria only established a board in 2022, while Estonia, Italy and Spain have not yet done so. Among non-Eurozone countries, only Denmark and Hungary have thus far established productivity boards.

While the work of most of the productivity commissions started only recently, the wide-ranging body of work that is now emerging points to many drivers and policies that are generally considered to affect productivity. To inform work on productivity at Ivie's Observatory on Productivity and in Spain more generally, this paper reviews what productivity commissions have thus far found in their work, both as regards the drivers of productivity and the policies that can strengthen productivity. The paper focuses on eleven countries that are likely to provide the greatest insights for the

[1] This paper provides an overview of a large body of work by eleven productivity commissions. Out of necessity, this has required a selection among the themes examined with only those considered most important covered in the paper. In most cases, the review covers the annual reports of European productivity commissions between 2019 and 2022, and between 2016 and 2022 for Chile. For Australia and New Zealand, where no annual reports are produced, the review covers key work on productivity conducted between 2017 and 2022. In some cases (e.g., Denmark, France, Germany and Portugal), the review draws partly on (official or non-official) translations of reports prepared in the national language. Comments by Bart van Ark on an earlier draft are highly appreciated, as are comments by Matilde Mas, Francisco Pérez, Rodrigo Knell, Frances Ruane, David Hegarty, Chantal Kegels, Joost van der Linden and participants in seminars at TPI, the Austrian National Productivity Board, Arena Idé, the OECD and the New Zealand Productivity Commission. Any errors of substance or interpretation are mine. A different and slightly longer version of this paper is available as a TPI Insights Paper, see Pilat (2023).

[2] The EU Council Recommendation on the establishment of National Productivity Boards pointed to the importance of analysis and policy advice for both productivity and competitiveness. Productivity and competitiveness are closely related concepts, but this paper is primarily focused on productivity, given its central role for economic growth and prosperity. See https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/national-productivity-boards_en for more detail on the EU Council Recommendation.

productivity debate in Spain, i.e., Australia, Belgium, Chile, Denmark, Finland, France, Germany, Ireland, New Zealand, Portugal and the United Kingdom.

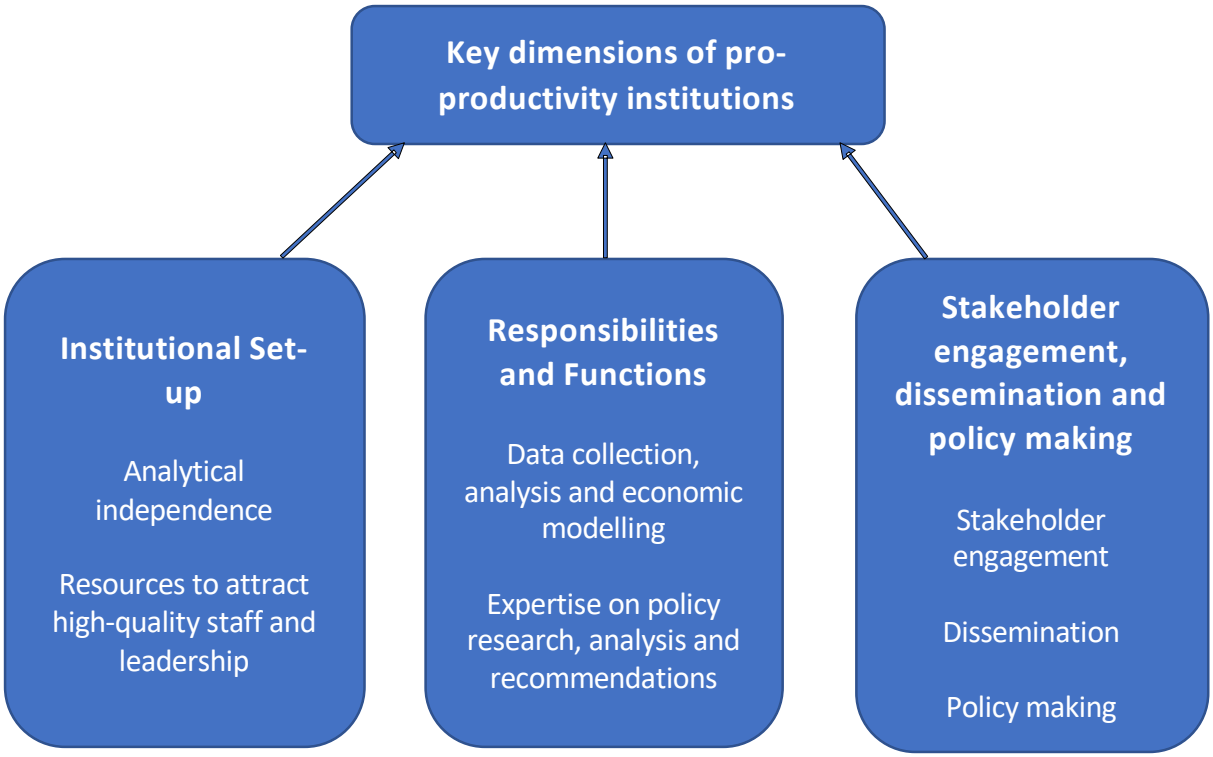
The paper is organised as follows. The next section briefly frames the policy debate on productivity and the role of productivity commissions. Sections 2 and 3 review what the various productivity commissions highlight as the drivers of productivity in their country, distinguishing between direct and indirect drivers and aims to identify some common factors. They also review the policies that seek to influence these drivers and strengthen productivity in their country. To assist the reader, sections 2 and 3 both include a short concluding section and overview table that summarises the findings. Section 4 summarises the overall findings of the paper and draws some broader conclusions.

1. The role of productivity boards and some framing

1.1 The role of productivity boards

In reading this paper, it is important to understand the role that productivity commissions play, and how this differs across countries. Broadly speaking, productivity commissions and boards have been set up to highlight the importance of productivity for economic performance, to explore the drivers of productivity and to provide policy guidance to governments.[3] Their institutional set-up differs considerably across countries, however, affecting the role they can play. Some key features affecting their role are shown in Figure 1, drawing on a recent OECD review of Slovakia's National Productivity Board (OECD 2022; Cavassini *et al.* 2022).

Figure 1. Building blocks of the OECD's Analytical Framework



Source: OECD (2022) and Cavassini, *et al.* (2022).

[3] Productivity-related institutions were also set up in several European countries in the context of the Marshall plan and were mostly aimed at providing technical advice to business on productivity. Several such institutions continue to operate in Asian countries, e.g., the Japan Productivity Centre, see: https://jpc.jpc-net.jp/eng/. Many of these institutions work together in the Asian Productivity Organization, see: https://www.apo-tokyo.org.

This framework draws on earlier work to assess productivity boards (Renda and Dougherty 2017) and what makes them effective (Banks 2015). It considers three core elements, notably: a) institutional set-up, including analytical independence and available resources; b) responsibilities and functions of the board, including its expertise and analytical capacity; and c) outreach, including engagement with stakeholders, dissemination and influence on policy making. As noted in the OECD work, the effectiveness of productivity boards does not only depend on these internal factors, but also on governments' commitment to support the board, and its capacity to review and implement any policy recommendations generated by the board (OECD 2022; Cavassini *et al.* 2022).

The productivity boards covered in this paper differ considerably across countries (Table 1). Some commissions, like Australia and New Zealand, are well established and have a long history of work on productivity, although they both have a broader mission with productivity only part of their mandate. Both undertake relatively long and deep productivity-related projects, however, and Australia's five-year reviews (Productivity Commission 2017, 2022a) or New Zealand's review of frontier firms (New Zealand Productivity Commission 2021) are by some margin the most comprehensive reports covered in the paper. Chile's board also has a broader mandate that includes a new role in policy evaluation.

In some EU countries, commissions have recently been created based on existing economic or competitiveness councils that were given additional mandates, as in Denmark, Germany, and Ireland. In yet other EU countries, such as Belgium and France, the boards are newly established, with a high level of independence enabling a role in both policy analysis and policy advice. And in a third group of EU countries, i.e., Finland and Portugal, the boards are closely linked to existing government institutions and mainly providing analytical work.[4]

An important difference can also be seen in the composition of the commissions. Some, as in Chile, France, Germany and the United Kingdom, mainly consist of academics. Others, as in Denmark and Ireland also include representatives from business and trade unions. And yet others mainly include government officials, e.g., Australia and New Zealand. These differences may affect the analysis and policy advice that is emerging. For example, Ireland's work on business costs (see section 4) may reflect a business perspective on productivity. Moreover, the reporting of the various boards differs. Australia's and New Zealand's boards also report to parliament, whereas most others only report to government. An interesting exception is Belgium's board, that also reports to trade unions and employer's organisations.

[4] A useful overview of the work of EU boards was recently prepared by the European Commission (EC 2023). This paper also provides detail on the institutional arrangements of the EU national productivity boards.

Table 1. Overview of the Productivity Boards Reviewed in this Paper

Institution	Established	Type of Institution	Mission	Location
Australia Productivity Commission	1998	Standing inquiry body	Promoting productivity-enhancing reforms	Independent, reports to executive and Parliament
Belgium National Productivity Board	2019	Independent advisory body	Examine development of productivity and competitiveness	Independent structure, reports to trade unions and employer's organisations
Chile National Commission for Evaluation and Productivity	2015	Independent advisory body based on presidential decree	Analyse & recommend on policies for productivity and wellbeing; evaluate regulations and policies	Independent (tacit), reports to the president and government
Danish Economic Council	2017*	Independent advisory body (multi-stakeholder)	To analyse productivity and competitiveness	Independent, provides advice to Danish policy makers
Finnish Productivity Board	2021**	Independent expert body	Monitor productivity and competitiveness & conduct independent evaluations	Independent expert body linked to Ministry of Finance, reports to government
French National Productivity Council	2018**	Independent advisory body of academic economists	Analyse productivity and competitiveness and policies that affect them	Independent, non-partisan advisory body reporting to the Prime Minister and Minister of Finance.
German Council of Economic Experts	2019*	Independent academic advisory body	Analyse developments in the field of productivity and competitiveness	Independent, provides advice to German policy makers
Ireland National Competitiveness and Productivity Council	2018*	Independent council established by government (multi-stakeholder)	Analyse policy and developments in the field of productivity and competitiveness	Independent council, reports to prime minister and government
New Zealand Productivity Commission	2011	Standing inquiry body	Improved wellbeing, improved productivity	Independent, reports to Parliament
Portugal Productivity Council	2018**	Joint temporary structure	Monitoring public policies in the field of productivity and support discussion on the subject	Joint economic structure of Ministry of Finance and Ministry of Economy
United Kingdom Productivity Commission	2021	Independent body, established by NIESR and The Productivity Institute	Understand research and evidence related to productivity, provide policy advice and develop policy recommendations	Body operating independently of government, working closely with policy makers

Notes: * Productivity Boards established based on existing advisory councils.
** Boards linked to existing governmental institutions

Source: National sources and Renda and Dougherty (2017), see also: https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/national-productivity-boards_en for EU countries.

The variety in institutional arrangements shows that governments have taken different decisions on what the work of productivity commissions should entail and the advice they want to receive from these bodies. This variety in institutional arrangements could provide an interesting source for further policy learning.

1.2 Framing the discussion on productivity

The growing role of productivity commissions reflects the growing importance that many countries attach to productivity, and concerns about the sharp slowdown in productivity over the past decades. An extensive literature has emerged about explanations for the slowdown and the limited impact (thus far) of new technologies.[5] Several productivity commissions have undertaken their own work to identify factors that could be addressed through (national) policy action. Some of the boards have also attempted to distinguish between structural factors affecting productivity, some of which might not be amenable by national policy action, e.g., the slowdown in technological progress or the shift from manufacturing to services, and national factors, e.g., skills shortages, that could be addressed by national policies.

Productivity is a complex phenomenon, driven by many factors and policies. To facilitate the discussion in sub-sequent sections, this section provides a simple framework for the rest of the paper, drawing on OECD work (OECD 2015; Albrizio and Nicoletti 2016). It distinguishes between two types of drivers of productivity and two areas of pro-productivity policy:

- **Direct drivers of productivity.** These correspond to the main production factors driving economic growth, i.e., a) investment and capital formation; b) human capital and skills; and c) technological progress, as driven by innovation, digitalisation, and entrepreneurship. Pro-productivity policies in this area aim to influence these drivers directly, e.g., through investment policies, education and training policies, innovation and digital policies, or policies related to entrepreneurship and business dynamics. Thus far, the bulk of the work of most productivity commissions has been focused on these drivers and the related policies.

- **Indirect drivers of productivity.** These drivers and the related policies affect productivity indirectly, mainly by influencing markets and the incentives for firms to improve productivity growth, e.g., through trade, competition, regulation, and industrial policies, but also policies related to labour market pressures or resource constraints. Productivity commissions have thus far explored a diverse range of issues in this area.

This framework is mainly intended to help structure the remainder of the paper and is not intended to be precise or exhaustive.[6] Direct drivers of productivity and the related policies will be discussed in section 3, and indirect drivers and their related policies in section 4.

[5] See Goldin *et al.* (forthcoming) for a recent review of the literature.

[6] For example, the paper will examine issues related to entrepreneurship and firm dynamics under the direct drivers of productivity, although firm dynamics is also shaped by indirect drivers, such as competition.

2. Direct drivers of productivity

This section reviews what the various productivity commissions highlight as the direct drivers of productivity in their country. It does not seek to summarise all the economic arguments made in the extensive body of work produced by the commissions. Rather, it points to key findings that reflect the focus of work of the boards and that may be of broader interest. The section covers five issues, i.e., investment in tangible and intangible capital; human capital and skills; R&D and innovation; digitalisation; and entrepreneurship and business dynamics. A short concluding section summarises the work and draws some conclusions.

2.1. Investment in tangible and intangible capital

Investment and capital formation are typically considered among the most important drivers of (labour) productivity and can also have spill-over effects on multi-factor productivity. Productivity commissions have looked at a range of issues in their work, such as the slowdown in business investment in many countries, as well as the respective roles of tangible and intangible capital and of ICT and non-ICT capital. Several productivity commissions have also examined the role of public investment for productivity, notably investment in infrastructure, that is often considered to have a catalytic effect on private investment and on productivity.[7]

Australia's pointed to the decline in business investment as a share of GDP (Productivity Commission 2022a). It noted that costs and availability of capital as well as profitability levels did not appear to affect investment, but that the opportunity cost of capital, perceptions of risk, and the degree of market power of individual firms did play a role. Structural factors were considered to play a relatively limited role, although the shift from manufacturing to services may have reduced the share of investment in tangible capital and increased the share of intangibles. Moreover, size differences between firms may affect aggregate investment, with a relatively small group of large firms accounting for about 40% of total investment. Smaller firms continue to have more limited access to credit than larger firms, although new sources of funding have become more important. The review recommended that government should not promote investment at any cost but that public investments should always be rigorously assessed for their net social benefits, thus avoiding allocating resources to low value activities or encouraging rent seeking behaviour. It also pointed to the potential impacts of certain policy settings on investment, such as pressures for greater self-reliance in the wake of the COVID-19 crisis and geopolitical disruptions. It underscored the need for productivity-enhancing reforms to improve expected risk-adjusted returns.

[7] The role of foreign direct investment is explored in section 5.1.

Belgium explored the link between macroeconomic policy, investment and productivity. It noted the importance of growth and productivity for tax revenues, which in turn would allow for government spending in different areas (National Productivity Board 2019). It also noted that higher productivity growth could widen the range of political choices for government. Moreover, sufficient productivity was considered a precondition for enabling a budgetary policy that can react to recessions and asymmetric shocks. Policy-wise, the board pointed to the growing role of budgetary policies, as foreign exchange rate policies and monetary policies are no longer available to policy makers. It also noted that a stable, balanced, well-performing economy creates trust, encouraging investment. It argued that a favourable environment offers the government financial room for manoeuvre, enabling it to influence the behaviour of companies and individuals with direct and/or indirect incentives.

The 2020 report noted that sound public finances were important, but that these should provide room for public investment (National Productivity Board 2020). It pointed to the importance of investment in high-quality infrastructure; investment to support the digital and green transition, e.g., in areas such as energy efficiency, sustainable transport, climate adaptation, and digital infrastructure; as well as R&D, though while improving the efficiency of investment in public R&D. It also noted the need to improve the efficiency of public spending, engage in public-private partnerships, and remain attractive for foreign direct investment. The 2021 productivity report examined the expected impacts of the country's National Recovery and Resilience Plan (National Productivity Board 2021). It noted that simultaneous recovery plans in other EU countries may have important spill-over effects on Belgium. Moreover, it noted the importance of complementary structural reforms that in its view could have been used better to strengthen the impacts of the plan.

Chile explored productivity in the construction sector and made recommendations to improve it, which it considered particularly important for the provision of public infrastructure and residential buildings (Comisión Nacional de Productividad 2020).

Denmark evaluated several targeted measures taken by the government to strengthen investment in small and medium-sized firms (De Økonomiske Råd 2019). It noted that such measures were only justified in the presence of strong market failures, as they might otherwise bias investment towards areas with a low social return. The 2020 report explored the benefits of public investment in transport infrastructure on economic activity and productivity (De Økonomiske Råd 2020). It pointed to the importance of cost-benefit analysis but noted that some benefits will be hard to capture due to spill-over effects. It noted also that most studies do find positive impacts of public investment in infrastructure. It concluded that policy makers should consider all impacts of investment in public infrastructure and continue to improve methods to calculate these impacts.

Finland pointed to changes in capital intensity, both ICT and non-ICT capital, as important drivers of labour productivity growth (Ministry of Finance 2020). However, partly linked to the sharp slowdown in productivity from 2008 onwards, the contribution of capital intensity to labour productivity growth over the period 2001-2015 was smaller in Finland than in several peer countries. It also explored the link between macro-economic factors, investment and productivity, pointing to the influences of demand and the business cycle on productivity. This includes changes in the rate of capacity utilisation as well as demand shocks, that may reduce value added in the short run, without a simultaneous decline in hours worked.

Germany pointed to the importance of investment for productivity and pointed to lagging investment in ICT equipment, including digital infrastructure, and complementary intangible assets such as software, databases and R&D, as areas where it is lagging (Sachverständigenrat 2019). It noted the importance of a reliable business and regulatory environment, including a competitive tax system, for investment. At the same time, it noted that fiscal policy needs to provide space for investment in public infrastructure and growth-promoting spending, e.g., in areas such as energy supply, digital infrastructure, transport infrastructure and public services, while noting that such investment should not undermine the responsibilities of private businesses and households. As regards overall investment and the lack of equity financing in Germany, the Council reiterated its call for a tax allowance for corporate equity, to help balance the current privileged tax treatment for borrowed capital.

Ireland pointed to shortcomings in infrastructure and noted that several international reports considered this a key weakness in its performance (National Competitiveness and Productivity Council [NCPC] 2020). It noted that austerity following the 2008 economic crisis had led to considerable underinvestment in infrastructure in several areas, including transport, health, public housing, communication and education. It pointed to a need for more spending, but also to actions to improve the quality of infrastructure spending, including by improvements in the planning, allocation and implementation of investment projects. It recommended to improve support for public bodies in meeting their requirements in evaluating, planning and managing public investments; and address challenges to regions and cities to learn from best practice across the country on ways to maximise the efficiency of public spending. It also provided more specific recommendations for digital connectivity and transport. The report also urged taking a long-term perspective on infrastructure spending.

The 2021 report focused on housing, noting that affordable housing is important for competitiveness as it can indirectly affect enterprises' costs and influence the competitiveness of goods and services, the quality of life of people living in the country, and could potentially also affect the attractiveness of Ireland as a location for investment (NCPC 2021). The report also noted that adequate housing can facilitate labour mobility and help economies adjust to adverse shocks, such as in recovering from the COVID-19 crisis. It argued for a structural shift in housing policy,

with prioritisation and resources directed to areas where real change could be achieved. It also argued for the establishment of reporting and evaluation mechanisms. Moreover, it recommended the provision of adequate resources to planning authorities to avoid delays in the approval of housing and other critical infrastructure.

The 2022 report noted that while public investment in infrastructure had increased in recent years, it was important to ensure effective and timely delivery of this investment (NCPC 2022). It called specific attention to investment in energy systems, including a clear path to decarbonisation; investment in digital infrastructure; housing, as well as social infrastructure. It noted the importance of an efficiently functioning planning system for the timely delivery of infrastructure and pointed to growing labour market pressures that are affecting the capacity to deliver on the investments required. It recommended actions that would increase innovation in the construction sector, as well as the upskilling of construction workers. It also recommended actions to improve planning, including the ongoing review of the planning code, as well as the resourcing of planning authorities and judicial systems. It also recommended actions to speed investment in green generation capacity and energy storage solutions.

New Zealand found that its firms are typically capital-shallow and that workers lack equipment and other capital goods (New Zealand Productivity Commission 2021). It attributed this to the high off-the-shelf price of capital goods, past periods of high long-term interest rates, and fast population growth. Low returns to investment, low wages and ready access to low-cost immigrant labour were also considered as contributing factors.

Portugal called for a more detailed assessment of changes in investment dynamics following the 2008/2009 economic crisis (Conselho para a Produtividade 2019). The 2020/2021 report noted that it had had higher investment rates than its European peers between 1995 and 2000, but that investment already started to decline before the economic crisis, with intellectual property the only asset not experiencing a decline, and a particularly strong decline in infrastructure (Conselho para a Produtividade 2021). It found that reductions in debt levels and labour market regulation had a positive effect on aggregate investment, while uncertainty, financial constraints and the level of interest rates had a negative effect.

The United Kingdom pointed to low levels of investment as a factor that had contributed to the UK's poor productivity performance (The UK Productivity Commission 2022). It pointed to a range of contributing factors, including lack of growth finance; the overall business environment, including taxation, the cost of capital and the degree of public investment; economic uncertainty including linked to Brexit and the COVID crisis; as well as a labour market environment that may have favoured hiring of labour over capital. It also noted the importance of investment in public infrastructure for productivity, pointing to the importance of transport, housing and broadband for productivity and the agglomeration of activities. It made several

suggestions for policy action, including a long-term infrastructure plan that might catalyse additional private investment; reductions in the cost of capital driven by tax breaks; improvements in the tax environment; and faster growth in UK exports resulting from new trade deals.

2.2. Human capital, skills, management and attracting talent

Together with capital formation, human capital is typically considered among the most important drivers of productivity, also because it is complementary to investment in fixed and intangible assets. Productivity commissions have explored a wide range of issues in their work, from the role of education, including STEM education; skills formation and skills mismatch; the role of management and managerial capital; and the contribution of migration to productivity.

Australia pointed to a wide range of challenges, including in schools, vocational education and training, informal forms of learning, higher education, the relevance of skills in the existing workforce, and supportive labour markets (Productivity Commission 2017). It set out key policy settings on the supply and demand side of skills development, as well as key policies linked to participation in the labour market; job matching and mobility; as well as business and employment conditions (e.g., workplace relations, occupational health and safety, and workers compensation). It recommended to improve educational outcomes of students; the development of tools for proficiency-based assessment of skills, rather than just competencies; frameworks to facilitate the independent accreditation of skills; the coverage of universities under consumer law; and improvements in the supply and access to information about career and education options, including career changes later in life.

The 2022 review pointed to the importance of education in increasing people's capabilities and pointed to a range of societal benefits (Productivity Commission 2022a, 2022e). It estimated that rising skills accounted for about 19% of the growth in output per hour in the market sector from 1994-95 to 2020-21, but also noted that one in five Australians still have low basic skills, limiting their opportunities and future earnings. It noted the importance of both general and foundational skills, e.g., literacy and numeracy, but also critical thinking, and more specific skills, e.g., digital skills. The review noted that it could not predict future jobs or skills, but that an adaptable skills system can be resilient to the inevitable changes.

The review recommended several actions to improve school productivity, including more evidence gathering and diffusion of best teaching practices; the appropriate use of digital technologies; better use of teacher's time, focused on quality teaching and learning rather than administrative tasks; and greater scope for innovation. On tertiary education, it recommended stronger incentives for providers to deliver courses adapted to changing skills needs; less use of rationing places; more efficient and equitable allocation of government subsidies; better setting of prices to reflect course delivery costs; increased competition for funding across education providers;

expanded loan access for vocational education and training; and a rebalancing of funding to reflect the growing importance of lifelong learning. It also provided recommendations on how to improve teaching quality in tertiary education, including improved incentives to invest in teaching quality; better adapted use of technology; continuous improvement in teaching quality; and actions to reduce non-completion rates.

Belgium reflected on the impact of the COVID-19 crisis on skills, noting that the existing mismatch in skills risked becoming even wider because low-skilled people were hit hardest by the crisis (National Productivity Board 2020). It noted that the digital transformation was being accelerated due to the crisis, further changing skills needs. In a context of an ageing population, it noted that it was crucial that as little talent as possible was lost and that lifelong learning need to be strengthened to facilitate labour market transitions. It argued for a comprehensive approach to life-long learning, addressing both the supply and demand side. This includes training adapted to economic development, e.g., in STEM subjects and ICT-related disciplines; more training aimed at increased intersectoral mobility; greater participation in lifelong learning; and specific attention to the training needs of smaller businesses. It also noted that all actors (employees, employers and training providers) should assume their responsibilities, but that government must provide a framework that encourages investment in training. The 2022 report regarded the shortage of STEM skills (and ICT skills, in particular) as a having a significant adverse effect on productivity (National Productivity Board 2022). It suggested that policies aimed at promoting the adoption or new technologies or business practices would only lead to sustainable productivity growth if combined with measures to increase the supply and mobility of human (STEM) capital.

Chile explored new challenges for skills and training, in the context of an economy characterised by low diversification, high concentration in extractive sectors, and low investment in R&D and innovation (Comisión Nacional de Productividad 2018). It noted that Chile currently does not have an integrated skills system comparable with international best practice, as it currently transfers knowledge without a sufficient link to markets and economic needs. It analysed the skills system and made recommendations on how to strengthen the system of vocational education and training, aiming at the development of suitable skills. It made several structural recommendations, aimed at major reforms for a future system of vocational technical education; as well as functional recommendations aimed at the adoption of international best practice. It also explored the effects of the COVID-19 crisis on human capital and found that it affected the education of students from more vulnerable sectors more strongly, which could lead to deepening inequalities (Comisión Nacional de Evaluación y Productividad 2022). It found that the share of remote education was significantly higher in schools with low socioeconomic characteristics, linked to more limited access to the Internet, lower skills, a fall in access to education and a drop in school attendance. It also calculated the long-term impacts of these developments, notably on the future wages of students. It also found that immigrants have a higher level of labour force participation than local

workers, that they have accounted for a large share of labour force growth in Chile, and that they have – on average – a higher level of education than local workers (Comisión Nacional de Productividad 2018). However, there is a high level of job and skills mismatch for migrants, notably for those with higher levels of education. While immigration overall is generating positive effects on the economy and has much potential, there are frictions in the labour market, which hinder the assimilation of immigrants and negatively affect productivity.

Denmark noted that inflows of foreign labour can increase productivity by providing access to new knowledge, improving skills use, and encouraging reallocation (De Økonomiske Råd 2022). However, it might have negative impacts on jobs and wages of domestic workers. Results of research in Denmark are ambiguous, with some studies finding negative impacts on domestic workers and others positive. It explored proposed policies to attract foreign labour, in response to labour shortages in the economy. This includes (temporarily) reduced thresholds for pay of foreign workers, an expanded list of persons eligible, and greater access to fast-track procedures. It argued that the reduced thresholds should be made permanent as it would constitute a structural improvement in improving access to foreign labour. It also discussed employment policies for refugees and found that a set of so-called industry packages that were introduced by municipalities in the 2013-2018 period had been effective in improving their employment prospects, increasing their employment rate by 50%.

Finland noted that changes in the structure of the labour force, due to new and better trained employees entering the labour force, had made a positive contribution to labour productivity growth, although less than in some other OECD countries (Ministry of Finance 2020). It noted that the average quality of management in Finland is quite good. On the other hand, as is also the case in other countries, the quality of management practices varies widely across the economy, with many poorly managed firms in the economy. It noted that this suggests scope to further improve the quality and productivity of management in Finland.

France identified relatively low skills of the workforce as one of the specific factors that might help explain a more pronounced slowdown in productivity in France than in other countries (Conseil National de Productivité 2019). It also identified a significant skills mismatch between workers' skills and those required for their job as an important challenge. Moreover, it noted that French firms seem relatively less efficient in the human dimensions of management relative to their performance in production. The 2021 report pointed to the mediocre level of skills in France compared with other European countries, both for the working age population and for children and youth in school (Conseil National de Productivité 2021). It also noted that France's schooling system is less successful in reducing inequalities than systems in other countries. This implies that France has greater inequalities between adults, and that the level of skills is particularly low for those with few skills. It also noted that although labour productivity is high, its poor performance in initial skills acquisition has a negative impact on labour market participation. It noted that, until

recently, there was a lack of focus on lifelong learning and vocational training, and a lack of targeting on those who need skills the most, such as the unemployed and least qualified. Moreover, France's high structural unemployment rate translates into a loss of skills for those not participating in the labour market. The report also pointed to an ongoing polarisation in the labour market, with a decline in the share of middle-skilled jobs, a strong increase in highly skilled jobs and a more modest increase in low-skilled jobs. It also pointed to a change in skills needs, with growing demand for highly cognitive skills and non-routine, non-cognitive skills such as autonomy, management, and communication.

The 2021 report noted that the country faces two policy challenges: a) reducing educational inequalities from an early age; b) increasing lifelong learning and targeting the least qualified individuals. For the latter, it argued for a well-functioning, well-targeted and agile lifelong learning system, that can help meet demand for emerging skills. It also noted the significant risk of loss of human capital linked to closures due to the COVID-19 crisis. It found that this is most likely to affect the most fragile students and that this gap is unlikely to be addressed unless specific policy measures are implemented. It also pointed to difficulties in integrating young people into the labour market following their training, combined with reduced opportunities and increased unemployment during the COVID-19 crisis, which will have implications for productivity unless targeted measures are undertaken.

The 2022 report found that about half of the long-term slowdown in productivity growth in France can be explained by a slowdown in the growth of human capital, where it noted the close links between human capital and other within-firm factors such as management, innovation and the uptake of digital technologies (Conseil National de Productivité 2022). The slowdown was explained by slower growth of education levels as more and more young people completed upper secondary and tertiary education. Improvements in women's education levels contributed most to productivity growth, but these were now converging on those of men. It concluded that, given high levels of schooling, increasing the quality of education will now be a key lever for productivity growth, noting that France still has considerable room for improvement in this area. The report also emphasised the role of soft skills such as teamwork and creativity for innovation, and the role of diverse and complementary teams as well as trust and shared goals. It also found that almost one third of the productivity gaps between frontier and median firms can be explained by human capital, and that the concentration of high-skilled workers in the best performing firms has increased over time. It pointed to the important role of managers for firm productivity and found that frontier firms tend have a more diverse workforce, in terms of gender, origin and age. It also noted the complementary nature of human capital to other tangible or intangible assets.

As regards policies, the report noted the key role of human capital for productivity, and the need to increase its supply and quality. It pointed to several options for specific policy levers, including improved quality of initial education; increased use of lifelong learning and apprenticeships and actions to raise their quality; better training

for managers; the promotion of diversity; and the facilitation of both residential and professional mobility. It also called for better recognition of the role of soft skills in promoting innovation and transformation. It recommended training and support for individuals in the awareness, mobilisation and legitimisation of soft skills; support for management and work groups in the process of integrating a diversity of profiles; and helping organisations develop an organisational environment that allows the development of cross-cutting skills.

Germany pointed out that lifelong learning can help older workers adjust to new technologies and increase society's capacity to innovate (Sachverständigenrat 2019). It also pointed to the need to improve equality of opportunity, noting that there is a strong correlation in Germany between children's education level and that of their parents. In this context, it pointed to the importance of early childhood education and greater flexibility in educational pathways. It noted that management skills were particularly important for Germany's "hidden champions", fast-growing SMEs with high global market shares. Management skills were also considered important for ICT adoption, as firms needed to make complementary changes to organisational structure and corporate culture to exploit the full potential of ICT.

Ireland pointed to growing demand for new skills, including digital and managerial skills (NCPC 2020). It recommended intensification of efforts to increase the number of ICT graduates from the education and training system; further efforts to increase the share of workers with basic digital skills; actions to address the lack of awareness among SME managers on available management development opportunities; increased cooperation between management training providers, focused on the sharing of data, knowledge and good practice; and further efforts to examine the impact of COVID-19 on skills needs to inform and design targeted industry-led responses.

The 2021 report noted that digital and managerial skills were particularly important in the context of the ongoing digitalisation of the economy, including teleworking, and the organisational changes linked to that process (NCPC 2021). It noted that Ireland is doing well in the EU context as regards ICT specialist skills and is also above the EU average for those with above basic digital skills but lags for those with basic digital skills. It pointed to the challenge of management in the context of remote working, with many managers indicating that they had not received adequate training from their organisation. The report also noted that the reopening of the economy would challenge managers further, in having to deal with blended working arrangements of office and telework. It recommended that training and skills initiatives identified in key government initiatives be fully implemented and adequately resourced, to provide workers with the skills, including digital skills, needed for the future world of work. It also recommended further actions to ensure that SME managers are equipped with the necessary skills to navigate the post-pandemic recovery and enable more widespread flexible working.

The 2022 report noted that Ireland scored well in several international rankings on the skilled labour market but pointed to some challenges (NCPC 2022). This included possible skills mismatch in the labour market; key skills gaps, notably in construction, the green economy, and digital skills; as well as gaps in lifelong learning and apprenticeships as a route to upskilling. It recommended the development of AI-related skills and skills for the zero-carbon economy, and development of the government's action plan for apprenticeships.

New Zealand noted that high-quality management and leadership are important determinants of firm productivity, but that many firms lack leadership skills (New Zealand Productivity Commission 2021). Moreover, it noted that despite large inflows of immigrants over the past 10 years, it still faces skills shortages, suggesting an ongoing skills mismatch between the supply of labour through education, training and immigration, and the business needs of firms. It pointed to the significant use of temporary migrant labour in New Zealand to meet seasonal employment needs. It also suggested scope for a more systematic approach to building and retaining talent and leadership. It recommended stronger collaboration between research institutions and industry to develop skills for innovation. It also recommended the evaluation of existing programmes for building management and leadership skills before any roll-out of new programmes. It also recommended a review of migration policy to consider the optimal mix of permanent and temporary migrants; assess the role and objectives of migration policy; consider how migration policies can best contribute to attracting and retaining skilled migrants; and how to reduce inflows of low-skilled and temporary migrants over time. It also recommended working with industry to reduce reliance on seasonal migrant labour. Finally, it recommended more empirical studies and evidence building to support policy making related to migration.

Portugal pointed to the great disparity in qualifications of the workforce, including for managers, as a factor limiting productivity growth (Conselho para a Produtividade 2019). At the same time, it noted important improvements in qualifications of younger generations, as well as improvements in the quality of education. These improvements are reflected in a growing contribution of human capital to GDP growth. However, it noted that there are still significant disparities in the level of qualifications, and that it still has a higher proportion of workers with lower education levels compared with the euro area. The level of schooling of managers is substantially below the European average, especially in small firms, affecting the ability of firms to adapt to technological change and competition. It also pointed to high segmentation of the labour market, which affects equity and efficiency, but also labour mobility and incentives to improve workers' skills. It called for further work to evaluate the role of human capital for productivity, focused on the components of skills development as well as their complementarity. Assessing the financial literacy of entrepreneurs was considered important, given its role for access to credit and business investment.

The 2020/21 report noted that the growth of telework following the COVID crisis could improve the mobility of work, expand access to talent and increase competition

(Conselho para a Produtividade 2021). On the other hand, it might benefit higher skilled workers most, thus potentially increasing inequality. It also pointed to school closures as a factor that might inhibit up-skilling, and to skills mismatch as an important labour market distortion. The board also found that firms with more entrepreneurial human capital are larger at entry and exhibit higher growth throughout their life cycle (Queiró 2022).

The **United Kingdom** pointed to several factors influencing levels of human capital that required attention, including skills gaps; lack of high-quality training; a gender gap between boys and girls, notably for STEM skills; limited agility of the skills system; lack of incentives for upskilling and reskilling; lack of good management practices and leadership; and of employee engagement (The UK Productivity Commission 2022). It also pointed to declining labour mobility, which contributed to a growing skills mismatch between the supply and demand of skills. Options for policy change included increased government funding to reduce the skills gap; the provision of high quality training; better targeting of educational interventions, partnering with local authorities; improvements in the agility of the skills system; a stronger focus on lifelong learning and incentives for reskilling and upskilling, including through the tax system; better utilisation of women in the economy, including by greater attention for upskilling and training; and greater attention for management, employee engagement and leadership skills.

2.3. R&D and innovation

Innovation and technological progress are the third key driver of productivity in most economic theories of growth, and as confirmed by much empirical analysis. The work of productivity commissions has touched on several aspects, including the role of public and private investment in R&D and the role of public support; the role of innovation systems; and the role of technology and knowledge diffusion.

Australia pointed to the importance of an enabling innovation culture and key elements for a high-tech society, notably a well-educated workforce, good infrastructure and a strong research base (Productivity Commission 2017). It stated that improving access to, and the availability of data, and making sure that firms can operate in an environment of intellectual license was a game changer for innovation. It argued governments need to be more responsive and willing to experiment in creating a more innovative eco-system. It made recommendations to establish consumer rights over their own data; the removal of barriers to greater use of public data; adopting a copyright law with fair use exceptions; and removal of the competition law exemption for intellectual property.

The 2022 review noted that 'new-to-the-world' innovation relates to only one to two per cent of Australian firms, but that diffusion has the scope to lift the performance of millions of businesses (Productivity Commission 2022c). Among the drivers of diffusion, it pointed to a) a lack of performance assessment and low

management capabilities in many businesses, reducing the adoption of best practice; b) a weaking of diffusion linked to declining labour mobility, firm exit and entry, and reduced investment in capital that embeds new ideas; c) low diffusion of best practice regulation. It recommended: a) policies to link Australian firms to foreign firms through trade and FDI; b) skills and migration policies, with a focus on transferable skills, including digital and management skills; c) policies to improve information flows to firms, including through public data and benchmarking services.

The review also pointed to the importance of knowledge diffusion in non-market services but notes that innovation in these services is often slow, piecemeal, disorganised, and inconsistent across jurisdictions. It noted that this reflects unique aspects of the public sector and that many of the approaches to strengthening the diffusion of new processes and approaches in government services are well-known but underexploited. This includes new funding and procurement models; better service benchmarking, data collection and program evaluation to uncover inefficiencies and strengthen adoption of best practice; fewer restrictions on the hiring of migrants in the public sector to inject new talent; reforms to standard, data access and intellectual property to enable the diffusion of good ideas; greater diffusion of best practice; and better coordination across levels of government.

Belgium noted that investment in R&D had increased since 2005, but that this was mainly due to some large firms and some industries (pharmaceuticals, and IT goods and services) (National Productivity Board 2021). It also noted that 40% of patents are from just 10 economic entities. It attributed the increase in spending partly to partial tax exemptions on wages for R&D staff. However, the 2022 report noted that efficiency gains could be achieved by better aligning direct and indirect support (National Productivity Board 2022). The 2021 report pointed to the importance of a complete eco-system for innovation, including strong universities and research laboratories open to collaboration. The 2022 report noted that the transition to a digital and knowledge-based economy has increased barriers to diffusion and called attention to policies that can strengthen diffusion and for more exploration of the topic (National Productivity Board 2022). It suggested focusing on the capacity of firms to adopt technology, incentives for adoption and policies to ensure the reallocation of resources.

Chile explored innovation and technology adoption in the financial sector aimed at promoting its development and increasing its competitiveness (Comisión Nacional de Productividad 2021). It focused on three issues, namely: a) the process of corporate innovation in the sector, including barriers, internal and external problems that could be addressed through regulatory changes; (b) the relationship with Fintech; and (c) the development of open finance models that give access to customer data to increase competition and innovation.

Denmark evaluated an increase in the tax deduction for R&D, arguing that the overall effects were not clear from the evidence available in Denmark, and that more analysis of the proposal would be needed (De Økonomiske Råd 2019).

Finland noted that multi-factor productivity growth was the main driver of labour productivity growth in the market sector between 2001 and 2015, with higher MFP growth than in most peer countries (Ministry of Finance 2020). A 2021 report noted that R&D spending in Finland had been remarkably weak since 2009, leading to the country falling behind peers such as Germany and Sweden (Stenborg *et al.* 2021a). It found that this was mainly due to a strong decline in business spending, and the result of the collapse of the electronics industry in Finland and Nokia's difficulties. Moreover, this shock delayed the reallocation of R&D resources to other business sectors that were not as badly affected. The report also suggested that the productivity of R&D inputs has declined, implying that the same R&D inputs generate fewer innovations than before. To strengthen R&D spending, it pointed to the role of possible instruments such as increased public funding for R&D, and stronger incentives for private firms to invest in R&D. It also pointed to the importance of skilled labour in strengthening R&D, including through education policies and attracting global talent through immigration policies. It also noted the importance of a well-functioning innovation system, with strong cooperation and effective division of labour between firms and universities, noting that direct public support through grants for such cooperation may be a more effective policy instrument than R&D tax incentives. A second 2021 report noted that a lack of high-productivity firms implies a need for more radical innovation projects (Stenborg *et al.* 2021b).

France identified performance in innovation as a factor that might help explain its more pronounced slowdown in productivity (Conseil National de Productivité 2019). It pointed to relatively low investment in R&D from the private sector, and structural features such as a relatively limited role of industry. It also pointed to possible differences in the efficiency of R&D in France, and a lack of interaction between public and private research.

Germany questioned whether the growing complexity of research and innovation might have pushed up the costs of innovation in Germany and at the global level, possibly affecting productivity growth (Sachverständigenrat 2019). The 2020 report pointed to the importance of innovation for MFP growth, noting that business spending on innovation in Germany is highly concentrated among large firms with relatively little spending by small and medium-sized firms (Sachverständigenrat 2020). The report pointed to barriers to accessing skilled labour and innovation funding, including low availability of venture capital funding that could affect the formation and growth of innovative start-ups. Its analysis pointed to the respective role of different actors in the German innovation system, including public research institutes, private firms and innovative start-ups. The report provided several recommendations, notably to a) improved incentives for SMEs to invest in innovation; b) expansion of the European Research Area; c) improved transfer and diffusion of knowledge and technology; d) improved access to public sector data; e) better embedding of innovation criteria in the public procurement process; and f) increased availability of private venture capital.

Ireland noted that it was considered a "strong" innovator in the EU (NCPC 2021). The report pointed to the decline in R&D intensity as a share of GDP (and GNI) since 2012 and pointed to the ongoing process to develop a renewed innovation strategy in 2021. The 2022 report noted the challenges for Ireland and the release of a new research and innovation strategy. The strategy is composed of five pillars and accompanied by a range of key metrics. The report recommended adequate resources and immediate implementation of the government's innovation strategy and recommended that the proposed new research bill be passed without delay. This included the establishment of a new research and innovation funding agency which will bring together the functions and activities of the Irish Research Council and Science Foundation Ireland to drive and fund research, and in particular interdisciplinary research.

New Zealand explored the role of innovation policy in a 2021 report (Crawford 2021). The report noted how New Zealand is lagging other small advanced economies (SAE) in several areas and suggested that government should learn from the experience of other SAEs in establishing a high-level multistakeholder strategy body to help set strategic directions for its focused innovation policy (Crawford 2021). Moreover, it recommended that the government commit substantial long-term funding to support the strategy and devolve governance in chosen areas of focus to independent multistakeholder bodies. The report noted that in learning from other SAE countries, New Zealand should tackle areas where there are binding constraints to growth performance and make more focused investments in areas such as skills and innovation. The report also noted that New Zealand's past and present attempts at focused innovation policy have lacked scale, resources and durability to be effective and that firms face a wide choice in programmes and points of contact if they seek government assistance. Moreover, it noted these have been based on government-driven processes, and not on design and governance involving multiple stakeholders which could have generated greater momentum and made better use of available capabilities.

The 2021 inquiry into frontier firms built on these results and made many recommendations (New Zealand Productivity Commission 2021). It recommended that the government and relevant agencies carry out a stocktaking of the operation of the country's R&D tax incentive scheme. It also noted that the government should adequately resource and support public sector procurement professionals and local firms to build innovation capacities. Moreover, it recommended allocating a significant part of the budget for the research, science and innovation strategy to support the development of linkages in the innovation eco-system. In addition, it recommended reviewing the programmes designed to assist firms with innovating and exporting, aimed at reducing and consolidating their number; simplifying processes; and making it easier for firms to identify and access relevant programmes.

The 2021 inquiry also recommended the development of a focused innovation policy aimed at areas with high potential to complement its broader innovation policy. It noted that government should partner with stakeholders to confirm the choice of a small number of areas to focus such efforts and support these areas with a substantial and enduring resource commitment, conditional on matching resources from the private sector. It noted that this would require the development and implementation of transparent arrangements for the governance, implementation, monitoring and evaluation of such policies, as well as the development of skills and capacities in the public sector to implement such policies. It also recommended a review of funding for key agencies and efforts to strengthen the innovation ecosystem. It also recommended that the government update and confirm its existing research, science and innovation strategy to signal its intended innovation effort and direction over the next 5 to 10 years; that the government engage with stakeholders to development a transparent implementation plan for its strategy; and the government commission a comprehensive independent review of New Zealand's innovation policies.

Portugal noted that despite progress in many areas, a gap remains with other European countries in R&D and innovation (Conselho para a Produtividade 2019). While investment in R&D has grown, much of this is concentrated in the public sector, notably universities, with an insufficiently strong link to business needs. Moreover, collaboration in R&D and innovation, both between firms and between firms and research institutions, is relatively low and concentrated in large firms. It noted that the OECD had recommended to reform the R&D tax incentive scheme, as this currently favours profitable firms, not necessarily the most innovative firms (Conselho para a Produtividade 2019). It recommended further work to evaluate the effectiveness of policies to encourage investment in R&D and innovation. The 2020/2021 report demonstrated the effectiveness of the system of R&D tax credits in promoting business investment, both as regards expenditure and personnel involved in R&D (Basto, Martins and Noguiera 2021; Conselho para a Produtividade 2021). It also noted that these impacts were persistent and found no crowding out between public and private investment. It also noted the particularly strong impacts of the programme on micro and small firms, as well as the services and ICT sector. Finally, it found very significant impacts of the programme on firms that have repeatedly used the programme.

The **United Kingdom** pointed to the importance of knowledge hubs, collaboration and open innovation for innovation (The UK Productivity Commission 2022). It also pointed to the lack of technology diffusion from leaders to laggards, the lack of collaboration between business and universities, and a lack of absorptive capacity in many businesses. As regards policy, the report pointed to public support for innovation; the involvement of firms in networks and collaboration, including open innovation; as well as the creation of new global centres of excellence.

2.4. Digitalisation

Issues related to digitalisation and the contribution of digital technologies to productivity are related to the discussion on innovation and technological change and are a growing theme in the work of several productivity commissions. This work has addressed the uptake and diffusion of digital technologies, but also relatively new topics in the productivity literature, such as the role of data as an asset and the potential contribution of telework to productivity.

Australia recognised the potential of data and digitalisation to improve productivity, by reducing production costs and by improving productivity quality and consumer choice (Productivity Commission 2022b). It also acknowledged that the COVID-19 crisis has accelerated digitalisation. It pointed to the large variety of digital uptake across the economy, e.g., with large firms more likely to adopt advanced technologies than small ones; businesses in remote regions less likely to use certain digital technologies; and differences across industries. It noted that Australia is doing well on many basic measures of digital technology uptake, but lags on more advanced use, e.g., artificial intelligence (AI) and data analytics. It pointed to several barriers affecting the uptake of digital technologies, notably inadequate access to the Internet linked to poor connectivity in regional and remote areas; lack of skills; limited awareness and uncertainty about benefits; as well as costs and legacy systems, that were mainly considered a barrier for medium and large firms. It also pointed to specific issues linked to the digital environment, such as insufficient clarity about rules related to data access and rights, as well as costs related to cybersecurity. To support greater technology uptake and greater benefits from digitalisation, it recommended: a) infrastructure funding arrangements that provide greater flexibility and offer reliable Internet solutions for remote areas; b) enhanced access to data by providers of government-funded services; c) actions to meet skills needs, including skilled migration policies aimed at meeting employers' needs; d) attention to the secure use of technology and data; e) consideration of government's role in the ethical use of data; f) better coordination of digital-related policies to reduce overlap and inconsistencies and lower uncertainty for business.

Belgium noted that the COVID-19 crisis had given an extra stimulus to the digitalisation process (National Productivity Board 2020). Digitalisation was considered to support productivity and contribute to solutions for several complex challenges, e.g., health care, carbon neutrality, the transition to renewable energy generation, etc. It noted that it was important to take advantage of the momentum of the COVID-19 crisis to further accelerate the digital transition by encouraging investment in these technologies, and focusing on complementary investments in skills (such as digital and management skills), organisational innovation and management capacities, a fast, secure and reliable broadband infrastructure, a new digital culture, e-government, and regulation aligned with the digital economy (National Productivity Board 2020). It also pointed to the potentially negative consequences of digitalisation, e.g., linked to security and privacy, and the need for a just transition.

Chile is exploring the role of telecommunications for productivity in a forthcoming study (Comisión Nacional de Evaluación y Productividad 2022). It aims to identify the main barriers to productivity growth and benefits to households following an increase in the provision of telecommunications services and proposes actions to improve performance. It seeks to identify the main barriers to the deployment of high-speed networks and overcome the digital divide. It also examines enabling factors for the development of telecommunications networks such as radio spectrum and physical infrastructure, as well as the possible deployment of satellite internet.

France identified the lag in ICT adoption and diffusion as a factor that might help explain the more pronounced slowdown in productivity in France (Conseil National de Productivité 2019). It noted that this gap might be linked to other factors, including management and organisational practices, strong rigidities in the French labour market, and regulatory barriers in the product market. The 2022 report noted the strong growth in teleworking during the COVID-19 crisis, from 4% of all employees in 2019, to up to 37% of all workers during the period from March 2020 to January 2021, on a regular or irregular basis (Conseil National de Productivité 2022). It found that firms that increased their telework in 2019 were on average more productive and had been more resilient during the crisis. Extrapolating the results of this study would suggest that increased telework could increase productivity in France. The report concluded that teleworking is likely to have a varied impact on the attractiveness of jobs, working conditions, the split between full and part-time work, with uncertain impacts on aggregate productivity. It also pointed to possible impacts through greater co-investment in digital technologies; the spatial reorganisation of work; increased access to human resources; as well as impacts on existing inequalities between occupations and sectors.

Germany discussed the productivity paradox and ICT use and pointed to German studies that ICT had two offsetting impacts in Germany (Sachverständigenrat 2019), suggesting that the increase in labour productivity due to ICT use was offset by greater demand for labour with lower average productivity due to diminishing marginal returns. It also pointed to the delayed adoption of ICT in Germany and low levels of investment that might explain the limited observable productivity impacts of ICT thus far. The 2020 report noted that Germany is a leader in the European Union in digitalisation but lags global leaders such as Korea and the United States (Sachverständigenrat 2020). It noted that further action is needed to ensure the diffusion of digital technologies across firms and the public sector and support the development of digital and data-driven business models. It also explored the impact of the COVID-19 crisis on digitalisation. It provided recommendations along two areas: a) to improve framework conditions for digital services and business models, and b) to address deficits in the digitalisation of public administration, healthcare and education. Specific actions under the first area included investment in digital infrastructure, including through addressing lengthy approval procedures; increased teaching of key digital skills and better lifelong learning opportunities; and reforms to competition rules, including data interoperability and portability. It also noted that the digitalisation of administration could provide demand stimulus and that the

European digital single market should be deepened to support innovative start-ups. It also pointed to the growing importance of cyber and data security.

The 2021 report noted that the COVID-19 crisis has significantly advanced digitalisation and boosted demand for data-driven services (Sachverständigenrat 2021). It pointed to three key trends: a) the growing importance of data in creating value added and changing value-added processes; b) the emergence of platforms as the dominant business model in the data economy; c) the importance of cloud ecosystems as the technological underpinning for the data economy. It argued that the development of the digital economy in Germany is hampered by several barriers, including skills shortages for digital innovation, and security concerns linked to the storage of sensitive information by cloud providers. It provided five recommendations: a) encouraging greater data access and sharing in Germany and the EU; b) strengthened competition in the online platform economy; c) strengthening of consumer protection; d) consideration of developing technological sovereignty as an area of economic policy; e) better coordination of initiatives to enhance cyber security.

Ireland explored the various channels through which telework could improve productivity and noted that it would take time before the full impacts on productivity became apparent (NCPC 2021). It reported evidence from a survey where 68% of respondent employees agreed that remote working had increased their self-reported productivity. Moreover, another survey of Irish human resources managers found that three-quarters said that productivity either increased or remained steady once remote working had become the norm. The report noted that new opportunities for more flexible working have the potential to convey a range of economic, social and environmental benefits, including a better quality of life for those living and working in Ireland. It pointed to several priorities, notably further improvements in digital infrastructure; digital and managerial skills; and digitalisation policies more generally. On remote working, it recommended the drafting of new legislation on the right to request remote working. It also recommended simplification of the process of claiming expenses to working from home and clarifying the expenses that could be claimed. On digital infrastructure, it argued for greater certainty for individuals and businesses as regards the roll-out of the National Broadband Plan. The 2022 report noted a relatively low use of advanced digital technologies by the business sector compared to European front-runners (NCPC 2022). It noted the release of a new digital strategy for Ireland, which sets out a high-level plan for Ireland to become a digital leader. The report recommended adequate resources and immediate implementation of the strategy, with annual reporting on progress and transparent identification of all barriers affecting the implementation process.

Portugal pointed to the growing productivity divergence between sectors and firms linked to the COVID-19 crisis as the most productive firms and those investing most in intangible assets were better able to use new digital technologies (Conselho para a Produtividade 2021). It noted that this could point to distortions related to the diffusion of knowledge and technologies.

The **United Kingdom** did not devote specific attention to the role of digitalisation for UK productivity performance but noted the growing importance of working from home following the COVID crisis, and the resulting potential for increased productivity growth (The UK Productivity Commission 2022).

2.5. Entrepreneurship, business dynamics and resource allocation

While entrepreneurship and business dynamics have long been considered important drivers of productivity, it has only recently become an important element in the analytical toolbox of productivity commissions, thanks to greater access and availability of microdata. Key issues that have been considered by productivity commissions are the contribution of entry, exit and firm growth to productivity; productivity convergence and divergence, including the role of leaders and laggards, including so-called zombie firms; the role of frontier firms for productivity; and the contribution of resource allocation to aggregate productivity growth.

Belgium pointed to several structural features its economy limiting productivity growth, notably a low rate of resource allocation compared to other EU countries, a very low rate of new firm creation, and the lowest rate of firm exit among EU countries, suggesting that some "zombie firms" were artificially kept alive due to relatively abundant finance (National Productivity Board 2019). It also pointed to a very low share of high-growth firms. The report also pointed to a growing divergence in productivity growth between leaders and laggards, while noting that the country has several global productivity leaders. Many of these firms were engaged in international trade, and those not directly engaged were often exposed through supply chains to firms that were engaged (National Productivity Board 2019). The 2021 report pointed to new research showing that many innovative start-ups struggle to reach a sufficient scale (National Productivity Board 2021). Moreover, young firms appear to have greater difficulties than before to catch up with the average level of productivity of incumbents. The 2021 report did not yet find evidence that the COVID-19 crisis had led to excessive firm exit, or to a sharp decline in new firm creation. Policy-wise, the 2020 report noted the importance of favourable conditions and incentives for young innovative start-ups, including in helping them scale (National Productivity Board 2020). This includes providing greater certainty about demand through public procurement, support for innovation that is better adapted to young and small firms; appropriate financing for start- and scale-ups, and the stimulation of an entrepreneurial culture. It also pointed to the need to reduce administrative burdens, improve the quality of regulation and provide better digital public services to businesses. The report also pointed to the need to remove exit barriers for unviable businesses when governments are supporting such businesses financially, as it considers this an implicit tax on healthy businesses (National Productivity Board 2020). The 2021 report pointed to recent reforms to bankruptcy legislation and to judicial reorganisation procedures as policies that might facilitate exit (National Productivity Board 2021).

Chile explored the role of SMEs, including "gazelles" for productivity (Comisión Nacional de Productividad 2017). It found that the gap in productivity with OECD countries is high and increases with the size of a firm. On the other hand, productivity in the largest firms has grown faster than in the smallest over the past ten years. It also found that "gazelles", firms with the highest increase in sales, accounted for between 40% and 88% of MFP growth. It concluded that analysing and promoting public policies that allow Chile to increase the number of "gazelles" in the economy should be a central objective of productivity-related policies. It also explored the impact of demand interactions between customers and suppliers on productivity (Comisión Nacional de Productividad 2021). It found that increases in the productive capacity and productivity of suppliers are key to maintaining commercial relationships between suppliers and sellers. It suggested that changes in the demand faced by companies generate significant changes in their productive structure. It also found that firms that benefit most from growth in demand are those with high productive capacities that have a strong capacity to expand their production in response to increased demand.

Denmark noted that the economic support packages that the government had introduced in the COVID crisis were designed to protect existing firms, not new ones, risking an entrenchment of the prevailing business structure (De Økonomiske Råd 2021). The 2022 report provided recommendations on how to design support packages in the case of future economic crisis situations (De Økonomiske Råd 2022). It responded to recommendations by a working group on principles for such packages. It agreed with some, notably as regards the use of such packages in crisis situations. It disagreed with the working group on its preference for general support schemes over more targeted schemes, as it found that general schemes might weaken structural adjustments in the economy.

Finland noted that creative destruction has been weaker in Finland than in Sweden, although it has improved in recent years in private services (Ministry of Finance 2020). It suggested that greater investment in R&D and greater use of ICT services inputs might have contributed. It pointed to the key role of creative destruction and resource allocation in the context of global competition and changes in technologies. It also pointed out that taxation and business subsidies can cause distortions to resource allocation that can affect productivity. It pointed to several policies that can strengthen creative destruction (Ministry of Finance 2020). This includes innovation policies and policies to disseminate information and know-how. It also includes successful competition policies that encourage firms to engage in innovation and support the reallocation of resources to the most productive firms. Moreover, education and training policies can be used to improve the efficiency of knowledge creation and its productive utilisation and diffusion across firms. The report also pointed to labour mobility in the process of creative destruction and pointed to housing and regional policies, as well as labour market policies and labour market flexibility as important policy levers. The reallocation of capital to its most productive uses can also be supported by policy action, including by well-functioning

and versatile capital markets, and policies related to taxation and corporate subsidies that do not hinder the reallocation of resources between firms.

A 2021 report showed that, unlike in other countries such as the United States, business dynamics in the manufacturing in Finland did not decline over the past three decades (Stenborg *et al.* 2021a). Moreover, business dynamics in private services increased to a level above that in the United States. The report noted that access to funding does not seem to be the main problem for SMEs and business dynamics (Stenborg *et al.* 2021a). It found that lack of skilled personnel and competent management may be more important, requiring attention for education and migration policies. Moreover, while general funding may not be a constraint, access to funding for R&D by young innovative firms was considered a factor. A second 2021 report found a high diversity of productivity among firms, and that the problem is not so much many low-productivity firms, but a lack of high-productivity firms (Stenborg *et al.* 2021b). It also noted that resource allocation is poor, with the most productive firms operating on too small a scale considering the size of the national economy. Moreover, the report found that resource allocation has worsened, with a slight improvement in recent years, with labour moving away from the most productive firms to the less productive ones.

The 2022 report noted that competition and business dynamics are not the causes of poor productivity growth in Finland, with studies showing that the reallocation of labour has generally boosted productivity in Finland (Huovari *et al.* 2022). It noted that many firms were operating with too high a level of capital intensity, but that high-productivity enterprises do not receive a large enough share of the labour force, whereas low-productivity firms receive too large a share.

France pointed to the significant decline in bankruptcies as emergency and recovery measures linked to the COVID crisis ensured the survival of many firms, some of which might be unviable (Conseil National de Productivité 2021). The report pointed to two key risks; a) bankruptcies of productive or systemic firms that might have knock-on effects on value chains; b) overprotection of unviable firms, leading to so-called "zombie" firms with possible impacts on reallocation of resources towards more productive firms. The report considered the first risk larger than the second. It also discussed the unwinding of government support measures following the COVID-19 crisis and its impact on business dynamics, resource allocation and productivity (Conseil National de Productivité 2021). It noted that support measures have kept many firms in "hibernation", which has increased their debt levels which will put these companies (and aggregate growth and productivity) at risk when the situation returns to normal. The report set out several options to unwind support, reduce debt levels and ensure a separation between viable and non-viable firms, involving different levels of state involvement and support. It argued for better quality information on business difficulties so company restructuring can be monitored in real time, and for a detailed monitoring of different types of corporate debt. This would help to better target support, prepare for the unwinding of emergency measures and identify necessary debt reductions.

The 2022 report found that the overall slowdown in productivity is more pronounced for firms at the productivity frontier, suggesting a declining contribution of technological progress to productivity (Conseil National de Productivité 2022). The simultaneous slowdown in productivity growth of lagging firms suggests a slowdown in the rate of diffusion of productivity from the best performing firms. The report noted that the renewal of firms at the frontier has slowed down, which may point to reduced competitive pressures, and found an increase in productivity divergence between frontier and lagging firms. It found differences across industries in reallocation, with a lower reallocation rate in industries with a high share of ICT and lower reallocation in import-intensive sectors. It also found that dispersion declined in high-tech services, while it increased in low and medium technology services.

Germany noted that slow population growth may be among the factors explaining its low start-up rate (Sachverständigenrat 2019). It also pointed to growing market concentration, though noting that this might not be due to a weakening of competition or competition policy but could be linked to new technologies and the growth of intangible assets in the production process that are enhancing the importance of economies of scale. It also pointed to the high fixed costs of regulation that could benefit large firms over small firms, and crowding-out effects linked to globalisation. It also pointed to regulation in the labour market and market access barriers in the services sectors as areas where improvements might be possible. It also noted that certain recent policies had increased market access barriers, e.g., in postal services. The 2021 report found that the number of job losses and business closures during the COVID-19 crisis was lower than in previous recessions, leading to a decline in reallocation dynamics (Sachverständigenrat 2021). It did not expect a substantial catch-up effect to this development and attributed it to a range of government policies, such as support measures for firms, the extension of a short-term working scheme, and the suspension of the obligation to file for insolvency, all aiming to bridge the temporary shock of the crisis and protect viable firms and jobs. It noted that, in the follow-up to the crisis, it is important to improve the efficiency of market-based allocation mechanisms. It advocated: a) reforms to insolvency and restructuring laws to improve market exit; b) actions to reduce debt levels of small firms by transforming existing liquidity support; c) better support for innovation and growth-oriented start-ups; d) more targeted support for the reallocation of workers.

Ireland explored the indigenous SME sector that includes both high- and low-productivity SMEs (NCPC 2021). It suggested further research and pointed to opportunities for closer links between the strong MNE sector in Ireland and indigenous SMEs, for example through trade links, labour mobility and innovation cooperation, and to closer links between research institutions and SMEs.

New Zealand found that productivity levels in its frontier firms are considerably below those in other small advanced economies (New Zealand Productivity Commission 2021). However, it also found that the productivity gap between its frontier and non-frontier firms did not change significantly between 2003 and 2016, in contrast with many European countries where the gap increased. This could

indicate that technology diffusion in New Zealand has been relatively effective but could also reflect the relatively low productivity levels of frontier firms and low growth rates, which makes it easier for non-frontier firms to keep up. The report also noted that non-frontier firms in European countries benefited from productivity growth in frontier firms in other countries. This effect could not be identified in New Zealand, which likely reflects its distant location, which acts as a barrier to the diffusion of tacit and non-codified technologies. The report also noted that European frontier firms are more capital intensive than New Zealand's firms, reflecting the relatively low capital intensity of New Zealand's economy, and employ more people than firms in New Zealand. The report also devoted special attention to the challenges faced by Māori firms.

Portugal pointed to the experience of previous international crisis situations as regards the potential emergence of so-called "zombie" firms, that could affect resource allocation in the economy (Conselho para a Produtividade 2021). It examined the role of resource allocation in more detail in a separate study (Simões and Azevedo 2019). This work identified firms and sectors where misallocation was the most severe, evaluated the contribution of productivity growth in achieving a more efficient allocation of resources, and explored the literature of frictions that might affect the allocation of resources. It noted the need to better understand productivity divergence in the economy, which would help identify the potential contributions of better resource allocation and improvements in mechanisms that affect the diffusion of technologies across the economy.

The **United Kingdom** noted that it had done relatively well compared with many other OECD countries in reallocation, with most resources going to the most productive firms (The UK Productivity Commission 2022). However, some research points to declining labour mobility. It also noted that the UK evidence on productivity leaders and laggards differs from that in most OECD countries, with the UK productivity problem concentrated among the leading firms, rather than the laggards.

2.6. Summary and concluding remarks on direct drivers of productivity

As noted already in section 2 of this paper, there is considerable diversity in the work of the various productivity commissions. Some mainly provide analytical insights for use by policy makers, e.g., Finland and Portugal; others also provide relatively high-level policy recommendations, e.g., Belgium and France, whereas a third group are more prescriptive, e.g., Australia, Denmark, Germany, Ireland and New Zealand. Despite these differences, and with a few gaps, the eleven productivity commissions reviewed in this paper have generally all explored the five direct drivers of productivity discussed in this section, i.e., investment, human capital, R&D and innovation, digital transformation and entrepreneurship and business dynamics (Table 2). Some differences can be observed, though.

As regards investment, some boards have explored the slowdown in business investment and low levels of capital intensity in macroeconomic terms, e.g., Australia, Finland, New Zealand and Portugal. Others have mostly focused more on specific components of investment, e.g., investment in intangible assets and ICT capital, e.g., Germany and the Netherlands. Chile and France have thus far devoted relatively little attention to investment-related issues in their work,[8] while Belgium, Denmark and Ireland have had a strong focus on the role of public infrastructure in their annual reports, with Denmark focusing on transport, and Ireland on public infrastructure more generally, including energy and broadband. Ireland is the only country that has taken a broad perspective on infrastructure, in also examining housing and its links to productivity.

Considering its importance, productivity boards have devoted relatively little attention to addressing the slowdown in aggregate investment, possibly since they consider it a structural factor, not easily influenced by national policy. Only some boards (notably Belgium and Finland) explicitly explored the links between macroeconomic policy, investment and productivity in their work, while Portugal was the only country emphasizing financial markets.

Human capital and skills are among the most consistently covered topics by productivity commissions, with some countries focusing on general education and skills levels (Australia, Chile, Finland, France, Portugal), with others focusing more on specific skills, such as digital and managerial skills (Australia, Belgium, Finland, France, Germany, Ireland, New Zealand, Portugal and the United Kingdom). How to foster lifelong learning is another core question addressed by several boards (Australia, Belgium, Germany). Attractiveness to foreign talent and policies linked to migration have also been addressed by some boards, e.g., Chile, Denmark and New Zealand. Several countries have also explored skills mismatch (Belgium, France, Ireland, New Zealand, Portugal and the United Kingdom). Research by France suggests that the role of human capital for productivity growth is much larger than suggested by growth accounting.

[8] Although a study on the role of the permit-granting process for investment projects has just started in Chile.

Table 2. Key themes in the work by productivity boards on direct drivers of productivity

	Tangible and Intangible Capital	Human Capital	R&D and Innovation	Digitalisation	Entrepreneurship & business dynamics
Australia	Macro drivers of business investment, Structural factors, Social Benefits	Foundational and Specific Skills, Life-long Learning, School Productivity	New to the World Innovation versus Diffusion, Non-Market Services	Uptake Advanced Technologies Data economy, Intellectual Property, Infrastructure	
Belgium	High-Quality Infrastructure, Digital & Green Transition and R&D, Public Budget, FDI	Skills Mismatch, Retaining Talent, Lifelong Learning, STEM skills	R&D Concentration, Tax Credits, Innovation System, Diffusion	Digitalisation and COVID, Complementary Investment, Just Transition	Firm Dynamics & COVID, Zombie Firms, Scaling, Productivity Divergence
Chile	Productivity Construction and Provision Infrastructure	Skills System, Impact COVID on Education	Innovation in the Financial Sector	Telecommunication s Sector, Platform Regulation	Firm Size and Productivity, Customer-Supplier Links
Denmark	Public Infrastructure, Cost-Benefit Analysis, Targeted Support for SMEs	Relocation of Education & Training, Foreign Labour	R&D Tax Credits		COVID and Firm Dynamics, Support Schemes
Finland	Capital intensity, Role Demand and Business Cycle	Structure Labour Force Management Skills	Incentives for Private R&D, Productivity of R&D, Radical Innovation		Creative Destruction, Growth SMEs, Resource Allocation, High-Productivity Firms
France		Quality of Education, Soft Skills, Management and Diversity, Inequalities, Skills Mismatch	Investment in R&D, Structural Factors, Efficiency of R&D, Public-Private Links	Telework and Productivity, Co-investment in Digital Technology, ICT Diffusion	Business Dynamics & COVID, Unwinding Support, Productivity Divergence, Frontier Firms
Germany	Infrastructure, Intangibles, Fiscal Policy, Equity Finance	Lifelong Learning, Equality of Opportunity, Management Skills	Innovation System Concentration, Costs and Complexity of Innovation	Impact COVID, Data economy, Platforms, Cloud, Sovereignty, Digital Infrastructure	Firm Dynamics & COVID, Allocation, Support Policies, Market Access, Demography
Ireland	Digital, Transport & Energy Infrastructure, Housing, Planning	Digital and AI Skills, Green Skills, Management Skills Skills Gaps & Mismatch	R&D Intensity, Innovation Strategy, Research and Innovation Funding Agency	Broadband Plan and Advanced Technology Use Telework and COVID	Indigenous SMEs, links to MNEs and Research Institutions
New Zealand	Capital Intensity, Macro Drivers of Investment	Talent, Management and Leadership, Immigration, Skills Mismatch	R&D Tax Credits, Procurement, Focused Innovation Policy		Frontier Firms, Productivity divergence, Technology Diffusion
Portugal	Investment Dynamics, Financial Constraints of Firms	Disparity in Qualifications Skills Mismatch, Entrepreneurial Skills	Collaboration, R&D Tax Credit Scheme, Innovation System, R&D Concentration	Digitalisation and COVID, Technology Diffusion	Productivity divergence Zombie Firms, Resource allocation, Diffusion
United Kingdom	Investment Policies, Tax Breaks, Infrastructure Plan	Skills, Training Management, Skills Mismatch	Innovation, Diffusion, Collaboration, Centres of Excellence	Homeworking	Reallocation, Frontier firms, Labour mobility

Source: Section 3 and reports of national productivity commissions (see references).

R&D and innovation are also covered by most productivity commissions in their work, often in the context of enhancing understanding of the slowdown in multifactor productivity over the past decades. Important areas of focus are how to strengthen private investment in R&D, e.g., through R&D tax credits (Belgium, Denmark, Finland, France, Ireland, New Zealand, Portugal), the diffusion of innovation (Australia), and how to strengthen the national innovation system (Australia, Belgium, France, Germany, Ireland, New Zealand, Portugal and the United Kingdom). More specific issues include innovation in non-market services (Australia) and financial services (Chile), data access and availability (Australia), concentration in innovation activities (Belgium, Germany and Portugal) and the productivity and costs of R&D (Finland, France and Germany). Surprisingly, given its prominence in the debate on productivity, only few boards, except for Australia and Belgium, have explored how to strengthen technology diffusion.

Digitalisation has explicitly been addressed eight out of eleven productivity boards in their recent work, linked to the ongoing digital transformation, but also focused on specific topics, such as the role of digitalisation and telework following the COVID crisis (Belgium, France, Germany, Ireland, Portugal and the United Kingdom), the contribution of diffusion and advanced technology use to productivity (Australia, France, Germany, Ireland and Portugal), the role of data in enhancing productivity growth (Australia and Germany), and platform regulation and productivity in the telecommunications sector (Chile).

Entrepreneurship, business dynamics and resource allocation are the final topics that have recently been addressed by most productivity boards, reflecting a growing understanding of the role of business dynamics for productivity and growing data availability, as well as its high relevance in the context of the COVID crisis (e.g., in the work in Belgium, Denmark, France and Germany). Understanding the productivity divergence between leading and lagging firms, and the role of creative destruction (including the role of so-called "zombie" firms) for productivity are core components in much of the work. Relatively few boards, except for Chile and Ireland, have focused specifically on the role of SMEs for productivity. New Zealand has had a specific policy focus on frontier firms, whereas some other boards have focused more on laggards, i.e., the so-called zombie firms (Belgium, Portugal). Barriers to entry, exit and creative destruction are another recurring policy theme (Belgium, Finland, France, Germany).

3. Indirect drivers of productivity

This section explores work by productivity commissions on the key indirect drivers of productivity and the related policies, i.e., globalisation (trade, FDI and engagement in global value chains); the business environment, including competition and regulation; structural features and industrial policies; the regional dimensions of productivity; the role of energy and environmental factors for productivity; the role of labour markets for productivity; and some other issues that have been explored by productivity commissions. As noted before, these drivers and the related policies affect productivity indirectly, for example by influencing the functioning of product, labour and financial markets and the resulting allocation of resources; by providing access to international markets, and by affecting the incentives for firms to improve productivity growth. A final section summarises the work and draws some conclusions.

3.1. Trade, FDI and global value chains

Trade and foreign direct investment have long been considered important drivers of productivity linked to their impacts on competition, specialisation and economies of scale, amongst others. Productivity commissions have looked at issues related to trade and trade policies, including trade in services; attractiveness to foreign direct investment; and engagement in global value chains for productivity growth.

Australia noted how reforms to trade and investment policies over many decades had opened its economy to international competition, and allowed it to benefit from globalisation, e.g., through efficiency gains by domestic producers and shifts in comparative advantage (Productivity Commission 2022a). It pointed to a range of uncertainties that have affected trade in recent years, including the COVID-19 crisis, protectionism and trade disputes, export bans linked to domestic shortages, growing geopolitical influences on trade, as well as possible policy changes linked to the climate transition. It pointed to several policy actions that could increase the benefits of trade and investment for growth and productivity. This includes adjustments to the screening regime for FDI, ensuring that these appropriately account for national security concerns, but don't disincentivise investment. It also noted that application fees for foreign investors are increasingly used as a tax base. It also recommended the removal of remaining tariffs to reduce costs for importing firms and facilitate engagement in global value chains. A third area was the use of multiple policy levers to draw greater benefits from growing trade in services, including by removing barriers at and behind the border, improving migration and FDI policy settings, and reforming licensing regulations.

Belgium pointed to its small open economy nature, and the importance of integration in value chains, not only for firms directly engaged, but also their

suppliers (National Productivity Board 2019). It noted a substantial decline in export market share from 2000 onwards, larger than in key competitors and suggested that Belgium was too much focused on slowly growing markets, notably the EU, rather than highly dynamic markets. The 2020 report reflected on the impact of the COVID-19 crisis on trade, firm strategies and global value chains, noting how trade and global value chains had been severely disrupted by the crisis and that – together with growing trade tensions – this could affect Belgium's position in global value chains (National Productivity Board 2020). It noted that the main policy responses for these challenges need to be found at the European level, e.g., actions to strengthen Europe's position in global value chains and strengthen multilateralism.

France found that production costs, notably labour costs, co-location effects and the fiscal environment, both as regards corporate taxes and tax incentives for R&D, played an important role for multinationals' decisions to locate production (Conseil National de Productivité 2022). It also found that relatively high labour costs, production and corporate taxes have held back the location of production sites in France, whereas a generous R&D tax credit system had a positive effect. It recommended that France continue to develop its tax system so that it weighs less on the factors of production (i.e., labour and capital) than in other countries. It also pointed to recent measures to reduce corporate tax rates and production taxes as policies that could help improve competitiveness.

Germany pointed to the importance of strengthening the multilateral trading system and avoiding protectionist trade and competition policies (Sachverständigenrat 2019). It recommended that Germany should be made more attractive as a place to do business, notably for foreign investors. It also pointed to the importance of economies of scale for productivity and noted the importance of coordination at the European level, including for the creation of a digital single market; the reallocation of resources to fundamental research; better alignment of climate and energy policy, notable deeper integration of the electricity market; and the expansion of the European capital markets union. The 2022 report made a call to reduce dependencies and increase the resilience of global value chains by greater diversification (Sachverständigenrat 2022). While it considered this mainly a responsibility for the private sector, government could provide targeted support for diversification, help develop strategic partnerships, and provide loan and investment guarantees to ensure the long-term supply of raw materials and support diversification. It noted that protectionist tendencies and trade-distorting practices should be countered by the EU.

New Zealand found that part of the explanation for New Zealand's poor productivity performance is the combination of its small domestic market and its distance to international markets (New Zealand Productivity Commission 2021). It noted that these disadvantages affect several key features of the economy, including low international flows of trade, capital and knowledge; high risks and low returns to investment in exporting; low participation in global value chains; lack of distinctive, specialised products and complexity in New Zealand's export mix; and weak

competition in domestic markets. On the other hand, the review noted that the existence of a few firms in New Zealand that are at or close to the global frontier showed that it is possible to overcome these disadvantages. The report also noted the importance of foreign direct investment to innovation and exporting, and that it can provide spill-over benefits to the local economy. However, it noted that New Zealand has struggled to attract such high-quality FDI, which tends to be attracted to locations by several factors, notably the strength of national innovation ecosystems. The inquiry recommended that the country take a more proactive and deliberate approach to attracting FDI that is innovative, export-oriented, long-term and likely to provide spill-over benefits. It recommended including policies related to attracting FDI within a more focused innovation policy and an upgrading of New Zealand's innovation eco-system. It noted that such an approach would require careful monitoring, evaluation and adaptation to New Zealand's circumstances. It also recommended that New Zealand Trade and Enterprise, the country's trade and development agency, regularly commission independent evaluations of its services.

The **United Kingdom** pointed to the constrained demand for UK exports, which has limited the number of firms benefitting from economies of scale, competition and integration in global value chains (The UK Productivity Commission 2022). It noted that firms that engaged in exporting were typically already performing better than domestic firms, but that trade is also beneficial to productivity. As regards the constrained demand for exports, it pointed to the high costs of UK exports as a possible factor, with Brexit also being mentioned as a factor that could have increased the frictional costs of trade and increased supply side gaps for key workers. The report also pointed to the important role of FDI for productivity, and the possible positive spillover effects associated with FDI linked to knowledge diffusion from multinational firms and increased competition. Brexit was considered to affect the potential benefits associated with FDI as "new trade deals require firms to acquire information and adjust to new standards, regulations, and rules. The cost of acquiring such information is high and only larger firms tend to have the capacity to access new markets" (The UK Productivity Commission 2022).

3.2. Business environment, competition and regulation

The role of the business environment, including competition and the role of regulation is another theme that has been explored by several productivity commissions. Empirical research has typically found that sound competition is a positive factor for productivity growth, whereas too much or inappropriate regulation can hold back productivity growth.

Australia noted that competition and business dynamism appear to have declined (Productivity Commission 2022a). This includes an increase in overall concentration in the economy; a decline in firm entry and exit rates; as well as an increase in mark-ups. It noted that these trends do not necessarily have clear policy implications, as

they may be due to structural changes in markets. Moreover, it is not clear how these developments have affected consumer choice in specific markets. It recommended to examine specific sectors and markets where consumers face limited product choice, where contestability is lacking, and where policy changes, such as government regulation and funding, could improve market outcomes (Productivity Commission 2022a, 2022d). It also noted that competition laws need to remain fit for purpose in the current environment, and that good regulatory design can help ensure that policy reforms promote productivity.

Chile noted that competition in the economy is low compared to other OECD countries, resulting in low incentives for entrepreneurship and low reallocation of resources to the most efficient companies (Comisión Nacional de Productividad 2018). It noted that this was due, in part, to excessive product market regulations, which act as a barrier to the development of new companies and potential exporters. It noted recent improvements, such as a reduction in the costs of starting a business, a new bankruptcy law, and reforms to competition laws. It found that a higher level of competition has positive effects on the productivity of firms that are far from the productivity frontier. Based on the Boone index, it found low competition in several sectors in the economy, including mining and forestry, as well as machinery, electricity and engineering sales. It also explored the regulation of digital platforms, aiming to analyse how public policy can maximize the benefits of disruptive technologies, and reduce negative externalities linked to their use (Comisión Nacional de Productividad 2019). It explored several policy issues linked to digital platforms, including consumer protection, personal data, taxation and labour market regulation. It noted that the emergence of digital platforms and new technologies required modernisation of regulations and the state, including through new forms of regulation and control.

Denmark found that markups of Danish firms increased from 5 percent above costs in 2000 to 18 percent in 2018, suggesting that competition had become weaker (De Økonomiske Råd 2022). The increase in markups was greatest in the manufacturing sector, but there were also increases in the service sector. At the same time, the spread in mark-ups increased, pointing to greater differences between the market power of individual firms, which may contribute to a less efficient distribution of labour and capital among firms. The report also explored possible drivers for the decline in competition and found the following:

- Danish firms increased their productivity and market share when they were given better opportunities to import semi-finished products or goods for resale.
- Increased demand for export goods may have increased Danish firms' productivity and mark-ups, with demand for the types of goods produced by Danish firms increasing from 2000 to 2018. Such demand could increase productivity and markups, e.g., due to knowledge spillovers associated with trade, but mainly benefited firms that did experience higher demand for their goods, enabling them to increase market power.

- Firms benefiting most from new technologies might also be able to increase their market power, e.g., in benefiting from economies of scale in the development of software. The report found no evidence of this being the case in Denmark.

- The report found no evidence that regulation had become more anti-competitive in Denmark and noted that this cannot explain the increase in markups.

Finland found that profitability in the business sector had improved and found that reallocation from inefficient low-profitability firms to efficient high-profitability firms had played an important role (Stenborg *et al.* 2021a). The effect was particularly strong in high-tech manufacturing, less so in medium-high technology sectors, and not visible in low-technology manufacturing sectors. It suggested that less effective competition policies may have contributed to a weakening of business dynamics. It noted that Finland is a small and sparsely populated country, and that there is a risk of firms gaining a dominant position in some local markets. It noted that lack of competition can not only push up prices, but also reduce innovation and business dynamics. A second 2021 report argued that promoting competition, market entry and investment will encourage high-productivity firms to increase their production and obtain a larger share of resources (Stenborg *et al.* 2021b). Regulatory policies and policies affecting business investment would need to be reviewed with this perspective in mind.

Germany argued for a strengthening of European competition policy with a focus on standardised regulation and lower barriers to entry, noting that this would boost the benefits of the European single market (Sachverständigenrat 2019). It also recommended not to promote or create national or European champions.

Ireland explored insurance costs, legal costs, banking costs and social protection legislation and how these affect productivity and competitiveness (NCPC 2021). It noted that these are all areas where Irish firms are faced with exceptionally high costs compared with other countries and made several recommendations, including further assessment of newly adopted personal injury guidelines, an assessment of the introduction of fixed legal fees, and a review of banking in Ireland, noting the low levels of competition in Ireland's banking sector. It welcomed new initiatives to extend social protection in the economy and noted that these could support equity and help attract talent. At the same time, it suggested that the costs of these initiatives would need to be balanced with the impact they have on businesses. The 2022 report focused on the high costs of energy, credit, insurance and legal services, noting that these are longstanding issues and particularly important for SME's operating in the domestic market (NCPC 2022). It noted that enhancing domestic competition across the key services is essential to reduce input costs for enterprises and boost competitiveness and productivity. It supported ongoing reviews of retail banking and the administration of civil justice. It also recommended actions to ensure that firms are made aware of the financing options available to them as government support introduced during the COVID crisis is withdrawn. Moreover, it recommended

that the government consider the implementation of a new government backed SME loan scheme.

New Zealand noted that regulation often does not keep pace with innovation, creating costly barriers to innovation and productivity (New Zealand Productivity Commission 2021). It pointed to several areas where regulation could be further improved and provided several recommendations on innovation-friendly regulation, including to prioritise keeping regulations up to date with technological and other changes, notably in areas related to innovation. Moreover, where such changes require new or updated regulations, it recommended that their design and operation should allow for flexibility in achieving the desired regulatory outcomes, without compromising adequate monitoring and enforcement. The inquiry also provided recommendations on several specific regulatory issues.

Portugal noted that, despite progress, firms still face considerable administrative barriers to their functioning, including complex licensing systems and a slow judicial system (Conselho para a Produtividade 2019). It also pointed to high costs of certain factor inputs, notably electricity. Moreover, it noted that despite progress in removing barriers to competition, some services continued to face high barriers to entry, including professional services such as legal, accounting, architecture and engineering services. The report also noted that Portuguese firms still face strong financing constraints following the economic crisis, limiting capital accumulation. The small average size of firms, compared to other European countries, adds to this constraint, and limits their ability to achieve economies of scale.

The **United Kingdom** argued for growth finance and investments in innovation, and more generally for a business environment that provides incentives for investment (The UK Productivity Commission 2022). Issues related to the regulatory environment and competition were also briefly discussed. Apart from policies aimed at innovation, the report called for reforms to the UK system of governance, which was considered too highly centralised and too much focused on the short term, e.g., in areas such as industrial policy. It suggested a more effective institutional framework based on expertise, central-local interaction and institutional memory.

3.3. Structural change and industrial policies

The structural dimension of productivity is also a well-known theme in productivity analysis and has been explored by several productivity commissions. Key themes include the role of structural change for aggregate productivity growth, notably the shift from manufacturing to services; as well as the relative contribution of manufacturing and services, or of ICT-producing and ICT-using industries to productivity. Building on this analysis, some countries have also explored the role of industrial policies.

Belgium's 2022 report found that production sources are shifting towards the least dynamic activities in terms of productivity, although it pointed to a positive role of industry over the past decade, unlike in several other EU countries (National Productivity Board 2022).

Chile explored productivity in several sectors, including construction (Comisión Nacional de Productividad 2020) and copper mining, a key sector for aggregate productivity growth in Chile (Comisión Nacional de Productividad 2017). The work on construction explored productivity in the sector compared to other countries and examined the main barriers to productivity. It made a range of recommendations to improve productivity performance of the sector, which it considered particularly important for the development of public infrastructure and residential building. The study on copper mining compared productivity in Chile's 12 main copper mines with that in mines considered best practice in Australia, Canada, United States and Peru. It found an important gap in capital productivity with international practice, a large dispersion of capital productivity between Chilean firms, and even larger differences with respect to labour productivity. The study pointed to several factors contributing to the gaps, some relating to issues manageable by firms, and others due to inadequate public policies and regulations, such as low spending on exploration, the prevailing system of concessions and lack of human capital. The study resulted in over fifty recommendations in the areas of public and regulatory policies; sectoral policies requiring joint action by those involved in the sector; as well as suggestions reflecting good management practice.

Denmark explored the role of support policies in the context of COVID-19 and reflected on a report from a government working group on the use and design of such policies (De Økonomiske Råd 2022). It agreed with the working group that support policies should only be used in situations with significant activity-limiting measures, not in case of ordinary economic downturns. However, it did not agree that general support schemes were preferable to more targeted schemes, arguing that general schemes have higher costs, tend to slow down structural adjustment, and could have a significant moral hazard problem in not encouraging adjustment by firms. It suggested that more targeted schemes should be the preferential way forward for future support packages. Moreover, it noted that Denmark had provided extensive liquidity to firms, including through changes in tax schemes and interest-free loans. It argued that such schemes are appropriate under exceptional circumstances, but that borrowing on market terms should now be the preferred option.

France noted that the French production system may have certain features that hold back productivity growth (Conseil National de Productivité 2019). For example, the gap between firms at the technological frontier and others is more pronounced in low-skilled services sectors that are not exposed to international competition. Moreover, the productivity level of the most efficient firms in these sectors is lower than in the best performing countries, which is not the case in manufacturing and skilled services sectors. The 2022 report found that intra-sectoral dynamics are the

main source of productivity growth, and that employment is shifting to sectors with slightly higher productivity levels, but lower productivity growth (Conseil National de Productivité 2022). This will tend to increase aggregate productivity levels in the short run, but lower productivity growth in the long term. It also found that growth and divergence in labour productivity is mainly driven by the services sectors, due to their large weight, and that the decline in manufacturing employment since the early 2000s has contributed negatively to aggregate productivity growth. It suggested that policies aimed at developing certain activities, e.g., linked to green innovation, could help address the structural factor in productivity growth. It noted that France has had a slower development of high-growth sectors relative to leaders such as Sweden and the United States. It also suggested that policies should seek to reinforce productivity dynamics within growing sectors, which would need to be complemented by measures to facilitate worker mobility.

Germany recommended not to promote or create national or European champions (Sachverständigenrat 2019). The 2022 report noted that growing dependencies on supplies of energy and raw materials pose new challenges to Germany's economic model (Sachverständigenrat 2022). It argued that these dependencies can be reduced by increasing European production capacities in strategically important areas, such as renewable energy and the domestic extraction of critical raw materials. It recommended to strengthen strategic autonomy, including by stockpiling of strategic raw materials; removing tax discrimination against such stockpiling; and supporting the EU concept of "open strategic autonomy".

The **United Kingdom** noted that the UK's productivity problems were in two sectors, finance and manufacturing (The UK Productivity Commission 2022). At the same time, it noted that the industrial structure of the UK economy was not considered the main challenge, but rather performance within sectors. It noted that industrial policy making in the UK had been affected by a short-term approach to policy making and argued for more effective institutional frameworks.

3.4. Regional dimensions of productivity

Several productivity commissions have looked at the regional dimensions of productivity, in exploring the contribution of different regions to aggregate productivity growth; the role of capital cities or dominant regions; and the diffusion of technology and knowledge across regions. Building on that analysis, they have also explored the role of regional or location-specific policies.

Australia noted the important role of cities in Australia, with 80 per cent of GDP produced in cities and 40 per cent in Sydney and Melbourne alone, as well as two-thirds of employment (Productivity Commission 2017). It pointed to migration policies and land use and planning policies as important areas for policy consideration. It also focused on improvements in public infrastructure provision and use, notably roads, planning and land use policies, and conveyance duties on

properties that affect labour market mobility. The review also explored the respective levels of policy responsibility in cities. It made recommendations on governance arrangements for public infrastructure; reforms to improve road prevision, including the establishment of road funds and road user charging pilots; the application of competition principles to land use policies; the implementation of best practice in development assessments; and the removal of stamp duties and the transition to a land tax.

Belgium undertook a regional diagnostic of productivity (National Productivity Board 2022). Compared to a reference group of European regions, labour productivity growth rates for Belgium's regions are around the average, with the Flemish region towards the higher end of the scale and the Walloon region towards the lower end. The diagnostic pointed to some sectoral differences, with the decline in productivity growth in Brussels and Flanders driven by all sectors, and notably market services, whereas the Walloon region had a positive contribution from manufacturing over the second decade of the 2000s.

Chile explored the benefits and challenges of metropolitan areas and pointed to the attractiveness of high-growth metropolitan areas, including better job opportunities and a good quality of life (Comisión Nacional de Productividad 2021). It pointed to several challenges that can affect their ability to grow and remain competitive, including high housing prices, a growing housing deficit, as well as insufficient access to urban public goods. It noted that Chile's ongoing regional decentralisation process offers new opportunities and proposed a range of measures and reforms in planning instruments, powers in urban management, transport and mobility, sources of financing, citizen participation and intergovernmental relations to promote better planning, investment and management. It noted this would lead to improvements in the quality of urban life, mitigation of costs and strong prospects for further development.

Denmark explored the role of cities for productivity and modelled the impact of certain policies, notably an increase in the supply of property, e.g., due to changes in regulations or the supply of new land; and a reduction in commuting costs, for example linked to better opportunities for working from home (De Økonomiske Råd 2021). This showed that increasing the supply of property in Copenhagen would have positive effects on productivity and welfare, as more space would be available for businesses and because more jobs would be moved there. A similar increase in property supply across the country was estimated to influence productivity approximately 50 percent less. The board noted that the model highlights the benefits of increased property supply, but not the costs. The model was also used to examine the impacts of increased work from home, focusing on the productivity effects that arise from lower commuting costs and found only limited effects, noting that there are many possible effects of working from home on productivity that were not included. The report found that regulations, e.g., planning regulations, that reduce space for businesses have implications for productivity in large cities. On the other hand, it noted that these costs may be well justified due a range of positive

externalities linked to such regulations. It also found that the use of commercial and non-commercial properties is distorted by a tax that is imposed by some municipalities on commercial use, aiming to finance business-related expenses (e.g., infrastructure) by the municipality. The board argued that a better approach would be to impose a tax on the use of infrastructure directly and use broad-based taxes for the financing of public goods, such as roads.

France noted that it is the EU country with the highest geographical concentration of productivity growth, with only one region (Île-de-France) having had productivity growth over 1% annually, compared with many more in other EU countries (Conseil National de Productivité 2022). Excluding Île-de-France, the French regions are more homogeneous in terms of productivity levels and growth than those in other EU countries.

The **United Kingdom** pointed to the large gap in productivity performance between the Greater Southeast region (which includes London) and the rest of the country (The UK Productivity Commission 2022). It noted that the UK is the most inter-regionally unequal major high-income country among the OECD advanced economies. It pointed to a wide range of complex and diverse factors explaining this inequality, including the allocation of human capital and investment across the economy. It also pointed to agglomeration mechanisms as driving the differences between regions, and the role of infrastructure in affecting such mechanisms. Among the possible policy priorities, it included empowering local leadership in towns and local communities; improvements in housing choice, quality and supply to attract and retain talent and support private investment; and efforts to tackle key structural problems affecting the levelling up agenda, notably overcentralisation; weak, ineffective institutions and high levels of policy churn; institutional and policy silos; and short-termism and poor policy coordination.

3.5. Energy, the green transition and productivity

In recent years, some productivity commissions have also started to explored issues linked to energy, environment, climate change and the green transition and their link to productivity.

Australia noted that climate change is likely to have large impacts on its near-to-long term productivity performance (Productivity Commission 2022a). It is expected to directly impact productivity in several sectors, e.g., agriculture, fisheries, tourism, and sectors relying on physical labour in outside environments. Apart from these direct physical impacts, it noted that policy efforts to contain the cost of climate change will entail costs and that policy actions across the world could affect demand for Australian exports. It noted that least-cost mitigation and adaptation policies could help minimise climate-related risks for productivity growth (Productivity Commission 2022a). It argued for broad-based explicit carbon pricing, noting that Australia has thus far implemented many other policies that impose a wide range of

carbon prices across the economy. It noted that a reform of Australia's Safeguard Mechanism – a system of tradeable emission rights – could help move towards a less costly and more equitable approach to emissions reductions. It recommended greater coordination between levels of government and the development of an efficient adaptation policy.

Belgium noted that the impacts of the transition to a low-carbon economy on labour productivity were somewhat ambiguous, but that climate change itself is a serious threat to labour productivity (National Productivity Board 2022). It pointed to the energy crisis as another urgent reason to accelerate the transition to a low-carbon economy and noted the importance of price signals and innovation in making the transition. It also noted that short-term interventions should not create new lock-ins that could jeopardise the future.

Denmark explored government policies to reduce greenhouse gas emissions by 70% by 2030, noting that most of the policies are expected to be costly in economic terms, as they are based on subsidies and other measures, rather than a uniform greenhouse tax as advocated by the council (De Økonomiske Råd 2022). However, if the measures are effective, they could reduce the level of tax required in 2030. It noted that to achieve the necessary reductions in agriculture, the tax should also include methane and nitrous oxide emissions, not just CO2. It also commented on the report of an expert group on green tax reform, arguing that tax rates should be uniform, without reduction requirements and tax rates for individual industries.

Germany noted its growing dependencies on energy and critical raw materials and set out a range of policies to increase diversification and resilience and develop greater strategic autonomy in the European context (Sachverständigenrat 2022).

Ireland explored how the business sector can decarbonise its activities in the most efficient manner, with the aim to remain competitive, while benefiting from possible opportunities linked to climate action (NCPC 2020). It considered several actions that can be taken in the short term, linked to existing policies such as carbon taxation; a levy charged to all electricity consumers to support the generation of electricity from sustainable, renewable and indigenous sources; and the EU emissions trading system. It argued that firms should be liable for their carbon emissions, but also need to be supported to decarbonise their activities. It argued for greater efforts to identify suitable abatement opportunities and technologies that would enable businesses to decarbonise their activities. It also recommended an assessment of available carbon mitigation incentives and supports to determine whether these were fit for purpose. Moreover, it argued for the establishment of a one-stop-shop environmental hub that would allow businesses to assess their carbon footprint and find information about available supports. The 2021 report noted that Ireland has had a relatively poor record to date in tackling greenhouse gas emissions, with other EU member states having been more successful in reducing emissions (NCPC 2021). It noted that the current commitment to reduce emissions by 7% annually will be very challenging and require major efforts across sectors, with two sectors,

agriculture and transport, accounting for over half of all emissions. The 2022 report noted that well-designed environmental policies do not have large negative effects on the economy, but that the climate transition will generate winners and losers (NCPC 2022). It noted that it is therefore vital that adequate supports are in place to assist enterprises and displaced workers adjust to the changes. The report also noted that Ireland's new climate action plan provides new opportunities for enterprises. It recommended ongoing monitoring and evaluation of government supports to ensure that adequate progress is being made and that Ireland's targets remain appropriate compared with actions in other EU countries.

New Zealand explored how it could meet its national goals and international commitments in achieving net-zero emissions by 2050 (New Zealand Productivity Commission 2018a). It noted that achieving this goal required efforts on two fronts, namely a fundamental reduction in high-emissions sources, and improving the emissions efficiency of production and consumption. It noted the key importance of stable and credible policy settings and recommended that the government make a strong and long-term commitment to the transition and provide transparency about policies to achieve this, supported by laws and institutions that underpin these policy settings. It recommended the use of emissions pricing to send the right signals for investment, innovation and mitigations. It also recommended to harness the full potential of innovation by making it a priority and devoting significantly more resources to low-emissions research, and to the deployment and adoption of low-emissions innovations. It further recommended to put other supportive regulations and policies in place, aimed at addressing non-price barriers and accelerating the transition. Finally, it recommended that government support investment in low-emissions technology, infrastructure and activities, including by mobilising new sources of finance.

3.6. Labour markets and migration

Besides the focus on human capital, productivity commissions have also looked at the link between labour markets and productivity, including the role of migration. The impacts of working from home have also become an important theme since the COVID-19 crisis.

Australia noted that a well-functioning labour market is critical to productivity, notably by the matching of jobs to people with appropriate know-how and skills (Productivity Commission 2022f). It noted that barriers or disincentives to labour supply could affect productivity growth by affecting jobs and skills matching and limiting the pool of available skills. It also noted that the design of its migration system and occupational licensing could act as barriers to labour allocation towards its most productive uses. It also pointed to the role of labour markets in helping reduce the underutilisation of available skills. The review also pointed to the relevance of Australia's workplace relation system to productivity, noting that

employers and employees should – in principle - have strongly aligned interests in improving productivity to increase both profits and wages. It argued that, as labour markets and the economy evolve, it will be important to ensure that regulations and institutional arrangements, as well as the workplace relation system, remain fit for purpose. The review also called for reforms to Australia's skilled migration system, away from restrictive skill shortage lists towards a system that better enables employer-sponsored skills migration. It noted that this will help Australia compete in global markets for skilled workers and help attract workers whose skills meet local demands. It also pointed to the need for better options for job mobility of sponsored migrants to improve matching skills to jobs. It argued for improved recognition of qualifications to promote the efficient utilisation of scarce skills, arguing for a more balanced approach to occupational licensing. It also recommended further simplification of Australia's award system – to set pay and working conditions – to improve the flexibility of employment conditions, better meet employer and employee needs, and reduce compliance costs and barriers in starting new businesses. It also argued for reforms to the enterprise bargaining system, which it considered unnecessarily complex and inefficient, and noted this could improve resource allocation and innovation. Finally, it noted that government should address the regulatory challenges associated with platform work.

Chile explored how to increase female participation, noting that Chile has amongst the lowest participation of women at many levels in Latin America, including at senior levels and in the political system (Comisión Nacional de Productividad 2017). The report provided fourteen recommendations to increase female labour participation, reduce occupational gender segregation and empower women economically, including by reducing cultural biases that affect gender inequalities. The recommendations included socialising the cost of care, independent of gender; increasing the adaptability of the labour market to female participation; addressing gender bias in the school system; and encouraging the inclusion of women in STEM degrees.

Finland argued that improvements in the mobility of the labour force, including the immigration of skilled workers, can improve resource allocation and noted that labour market regulations should be considered with this perspective in mind (Stenborg *et al.* 2021b).

Germany pointed to actions to leverage untapped labour market potential to increase the trend growth rate (Sachverständigenrat 2019). This includes bringing more people into the labour market, notably women and older workers; reducing long-term unemployment; encouraging the immigration of skilled workers; reforms to the tax system to increase incentives for those not currently in employment; and a more flexible retirement age.

Ireland noted that tighter labour market conditions were leading to skill shortages (NCPC 2022). It explored several approaches to increase labour supply, including increased labour market participation, notably of women; older workers; and workers

with disabilities. It also explored the role of net migration in enhancing Ireland's labour supply and the role of permits. It recommended further measures to increase labour market participation among underrepresented groups, such as women, older workers and the disabled, and recommended actions to bring "returnees" back into the labour market. It also recommended a comprehensive, independent evaluation of the impact of proposed measures to improving working conditions, comparing the situation with other EU countries.

New Zealand found that the relationship between productivity and immigration requires a balance of trade-offs, and a consideration of both short- and long-term impacts (New Zealand Productivity Commission 2022; Fabling, Maré and Stevens 2022). While migrants may increase the productive capacity of the economy in the long run, this may take time to bear results and require complementary investments in infrastructure, and in training and workforce development. It noted that immigration has played an important role in its economic development, with the loss of skilled workers by outward migration being more than offset by the immigration of skilled workers from other countries, contributing positively to firm productivity. It also noted that, on average, immigration is not driving down wages of replacing local workers. However, it noted that the immigration system currently uses a range of tools that may supress wages, job creation and productivity. Moreover, it found that the supply of infrastructure in New Zealand has not kept up with population growth. The review recommended the publication of a policy statement to improve the quality and transparency of immigration policy. This would instil long-term thinking in this area of policy making and address the current reactive stance and sometimes conflicting priorities. It also recommended that government engage with the Māori community in good faith and reflect the existing partnership in immigration policy and institutions. It also recommended the development of stronger links between immigration policies and education and training policies and noted that immigration should not be restricted to prevent potential job displacement, but that rather the prospects of local workers should be improved.

Portugal found that two-third of firms insufficiently raised wages given their growth in productivity (Mergulhão and Azevedo 2018). It noted that increased flexibility in the labour market increased segmentation and provided incentives for non-standard contracts. These factors, together with higher board compensation, trade and training weakened the link between productivity and wages. It pointed to the need to assess the impact of labour market segmentation on productivity, noting that the Portuguese labour market has a very high level of segmentation, with groups of workers covered by very different levels of employment protection (Conselho para a Produtividade 2019). This segmentation is likely to affect mobility and incentives for training, and ultimately productivity.

The **United Kingdom** pointed to some issues related to the labour market that were considered relevant to productivity performance (The UK Productivity Commission 2022). This included lack of labour mobility across the economy, in addition to challenges linked to the quality of human capital.

3.7. Other issues

Beyond the themes discussed above, that reflect the mainstream debate on productivity and its drivers, productivity commissions have occasionally explored some additional issues.

Australia explored several issues beyond the typical focus of productivity-related analysis (Productivity Commission 2017). This included performance of the health sector, where it noted that health inequalities present large opportunities for the country to improve lifetime outcomes for people. It noted that ill health directly affects social and economic participation with people in poor health less likely to be employed, tending to be less productive and working shorter hours. It recommended better funding arrangements at the regional level; actions to reduce "low value" health interventions; actions to make the patient the centre of care; improvements in the use of data; and greater use of technology to change the current community pharmacy model. It also recommended changes to the system of alcohol taxation.

The 2017 review also devoted attention to the need for more effective governments in the context of productivity-enhancing reforms (Productivity Commission 2017). It noted that the effectiveness of government is critical for standards of living. It explored a range of issues, including intergovernmental relations and national reform; the management of public finances; capabilities of government, and the role of local government. It recommended establishing a joint reform agenda across national and state governments; joint tax reform to support a more efficient provision of public services; improvements in fiscal strategy disciplines; the renewal of intergovernmental relations; greater focus on ensuring that accepted public services reforms are implemented; the strengthening of internal capabilities within government to strengthen policy development and delivery; and greater support for local government performance, including through more meaningful performance reporting.

Belgium briefly discussed benchmark revisions in the national accounts introduced in 2019 that affected a range of industries, notably in the services sector and changed some productivity trends (National Productivity Board 2020). It also noted the difficulties in measuring output and productivity in certain non-market services, such as education and health, and called for more attention to such industries.

Chile explored its new role in policy evaluation linked to a broadening of its mandate and a change in name (Comisión Nacional de Evaluación y Productividad 2022). It also explored the role of statistical institutions and access to public data, noting that public data contribute to the development of informed technical debate, enhance research and improve the quality of public policies (Comisión Nacional de Productividad 2019).

Denmark reported a new measure of productivity in the Danish primary and lower secondary school sector, based on the OECD's PISA tests (De Økonomiske Råd 2019). This measure was intended to help assess the amount of learning per student and is thus able to capture certain quality changes. The work was part of a wider effort to develop better productivity measures for the public sector.

Ireland explicitly recognised the importance of better evidence and research for productivity-related policies (NCPC 2021). It recommended further robust and policy relevant research in the Irish context and noted that government should continue to monitor international research and evidence as regards changing work practices, including increased digitalisation, on productivity.

New Zealand undertook a large study on how to improve productivity in the public sector in 2018 (New Zealand Productivity Commission 2018b). It argued that state sector productivity is among the most important contributions government can make to national productivity and wellbeing, due to the benefits it provides to communities and individuals through better outcomes and services, and to the government through less pressure on public finances. It found that there is resistance to the notion of productivity and efficiency in public services, and that New Zealand's state sector is intolerant of failure, which tends to stifle innovation. It pointed to systemic and cultural challenges in many agencies and noted that traditional approaches to commissioning limit customer input and the scope for innovation and productivity growth. It also pointed to several factors that hold back innovation, including overly prescriptive funding models, skewed incentives in the budget system, lacking use of data and evidence in designing policy and allocating resources, and inadequate monitoring, review and evaluation. It made extensive recommendations to address these challenges.

The **United Kingdom** called attention to some factors affecting productivity that are not clearly addressed by most other commissions (The UK Productivity Commission 2022). A first of those is governance, which not only concerns the respective roles of national and local governments for productivity, but also the high level of "policy churn" in the UK that limits policy effectiveness, notably in areas such as regional policy, digital and industrial strategies. A second factor is the role of health, and notably mental health, for productivity, with a large part of the population inactive due to ill health, affecting wages, jobs and productivity. It also explored measurement issues related to productivity growth.

3.8. Summary and concluding remarks on indirect drivers of productivity

Compared with the relatively standard analysis of direct drivers of productivity discussed in section 3 of this paper, there is much greater variety in the work of the productivity boards on indirect drivers of productivity. Some themes, such as the business environment for productivity, including competition and regulation, and

labour markets have been explored by several boards (Table 3). Others, such as structural factors and industrial policy, and the regional dimensions of productivity have thus far been explored by far fewer boards.

On trade and foreign direct investment (FDI), a few boards have examined the uncertainties linked to trade and GVCs following the COVID crisis and explored how to strengthen resilience (e.g., Australia, Belgium and Germany). Others have looked at the trade and FDI environment for their own country and how to enhance attractiveness (France, New Zealand and the United Kingdom). Some European countries highlighted the importance of European and multilateral approaches for international trade (Belgium, Germany). Germany's latest report focused on dependencies, GVC resilience and trade distortions.

Issues related to the business environment, e.g., competition, costs, finance and regulation, have been explored by most productivity commissions. Many have explored issues related to competition and business dynamism, including the analysis of industry concentration, mark-ups and other indicators of market power (Australia, Chile, Denmark, Finland, Germany, Netherlands, Portugal). Ireland has had a strong focus on the high costs of doing business, while Portugal has explored issues related to financing of firms. Issues linked to regulation were also addressed by several commissions, e.g., Chile, Denmark, Finland, New Zealand and Portugal. Australia and New Zealand also explored issues related to consumer rights.

France was the only country that had a strong focus on structural features of the economy, i.e., manufacturing and services, in exploring productivity-related issues. Chile undertook several sectoral studies of productivity. Germany's latest report examined questions linked to strategic autonomy and production capabilities at the European level. The United Kingdom noted the challenges with past industrial policies.

On regional policies, Australia, Chile and Denmark explored the role of cities for productivity, whereas France and the United Kingdom looked at the strong concentration of productivity growth in the country. Belgium also undertook a regional diagnostic of productivity growth.

Australia, Belgium, Denmark, Germany, Ireland and New Zealand are among the countries that have engaged in work on the relationship between climate change and environmental issues and productivity growth.

Table 3. Key themes in the work by productivity boards on indirect drivers of productivity

	Trade, FDI, value chains	Business environment	Structural issues	Regional dimensions	Energy, green transition	Labour markets	Other issues
Australia	Trade in Services, FDI Screening, Tariffs	Concentration, Competition and Consumer Laws		Cities, Planning, Infrastructure, Governance, Tax	Carbon Pricing, Tradeable Permits, Impacts Productivity	Reform Migration, Mobility, Workplace Bargaining System	Health Sector; Effective Government
Belgium	GVCs, Growth Markets		Sectoral Shifts	Regional Diagnostic	Climate Change & Productivity, Energy		Measurement of Productivity
Chile		Competition, Platform Regulation	Sectoral Studies of Productivity	Metropolitan Areas and Productivity		Female Participation, Immigration	Statistical Institutions, Data, Evaluation
Denmark		Competition, Mark-ups, Regulation	Review Support Policies, Targeting	Cities, Planning Rules, Tax Policies	Carbon Taxes, Tax Reform, Other GHGs	Foreign Labour	Measurement of Productivity
Finland		Competition, Regulatory Policies				Mobility, Regulations, Immigration	
France	Attractiveness FDI, Location Factors, Tax Policies		Sectoral Shifts, Industrial Policies	Regional Concentration of Productivity			
Germany	GVC Resilience, Dependencies, Trade Distortions	European Competition Policy	Open Strategic Autonomy, EU Production		Renewable Energy and Critical Raw Materials	Labour Market Participation, Immigration	
Ireland		Cost Factors & Domestic Competition			Interaction Climate & Competitiveness, Support Policies	Labour Market Participation, Role of Returnees, Migration	Evidence for Productivity Analysis
New Zealand	Market Size, Distance, FDI Attractiveness	Innovation-Enabling Regulation, Data Rights			Emissions Pricing, Innovation and Regulatory Policies	Review Immigration Policies	Public sector productivity
Portugal		Regulation, Costs, Competition, Barriers to Entry				Labour Market Segmentation, Incentives Training	
United Kingdom	Trade, FDI, & Ownership, Export Demand		Structure & Sectors, Firm Size, Industrial Policies	Inter-Regional Gaps, Levelling Up, Governance		Reallocation & labour mobility	Governance, Health, Measurement

Source: Section 4 and reports from national productivity boards, see references for further detail.

The link between labour markets and productivity has also been explored by several boards. They range from issues related to labour supply and participation (Australia, Chile, Germany and Ireland), migration (Australia, Chile, Denmark, Finland, Germany, Ireland and New Zealand), workplace relations (Australia), labour

market segmentation, flexibility and wages (Portugal), and labour mobility (United Kingdom).

Finally, several other issues have been explored by some boards. Australia and New Zealand have had an explicit focus on productivity in public services and the public sector, including its role for the broader productivity agenda, with Australia also focusing on health services and productivity. A few boards have also explored measurement issues related to productivity (Belgium, Denmark, United Kingdom) or called attention to the importance of statistical institutions and access to data (Chile) and evidence and analysis for the development of productivity-related policies (Ireland).

4. Main findings and conclusions

The rapid rise in the number of productivity commissions across the OECD and EU area – from 6 in 2015 to over 20 today – is helping to put productivity (back) on the policy agenda in many countries and is adding to the global evidence base on productivity and related policies. While there is considerable variation in institutional arrangements, composition and focus on analysis or policy advice, the boards broadly appear to pursue a common agenda. This likely reflects common challenges, such as the global slowdown in productivity and the recent COVID-19 crisis; broader underlying trends affecting productivity such as digitalisation and structural change; as well as a shared understanding of the main drivers of productivity based on ongoing analytical work at the national and international level, including work based on new analytical tools. For example, many productivity commissions have started to move beyond aggregate and sectoral-level productivity in their analytical work to also examine the role of firm dynamics, the role of reallocation for productivity growth, and the productivity divergence between leaders and laggards.

Several commissions also draw on cross-country work at the international level, from both academic sources and national or international institutions, such as the OECD. To understand better whether a factor identified in one country is country-specific – and can be addressed by national policy – or part of a broader global trend, international comparisons can be of great value, notably if such work also considers policy variables. Moreover, international analysis, such as the OECD's work on productivity (Berlingieri, Blanchenay and Criscuolo 2017), can also inspire national work, which may be able to go into more detail than international comparisons. Stronger cooperation between the various productivity boards to engage in such comparative work, either directly or in the context of the EU or OECD, could be very valuable.

While most boards have only limited resources for their analytical work, some interesting findings are emerging, e.g., research from France on the role of human capital in explaining the productivity slowdown, or from New Zealand on the role of frontier firms. Some central questions in the productivity debate have received relatively little attention in the work, however, such as the global slowdown in aggregate investment or in technology diffusion.

Sections 3.6 and 4.8 of the paper already reviewed what the work of the boards has in common. Most boards have addressed all five of the direct drivers of productivity in their work, i.e., investment, human capital, innovation, digitalisation, and business dynamics, although with differences in their precise focus. The similarity in this aspect of their work is not surprising, as these drivers directly determine the contributions of fixed and intangible capital, human capital, and multi-factor productivity to aggregate growth performance. Consequently, many boards also cover the main policy issues related to these drivers in their work. There are differences in the work on these drivers as well, however. For example, some

countries (e.g., Germany) have explored several specific issues linked to digitalisation, such as the role of data, whereas others have only engaged in a general exploration of the topic. And while many countries have explored the role of laggards and zombie firms for productivity, others, such as New Zealand have also explored the role of frontier firms.

There is much greater variation in the work of the boards on the indirect drivers of productivity. While some issues, such as trade and FDI policies; business, competition, and regulation policies; and labour market policies have been addressed by several boards, far fewer have explored industrial and regional policies. Differences in (perceived) mandates may play a role here, for example in the extent to which commissions are expected to examine the regional dimensions of productivity or only national ones. Institutional arrangements at the national level may play a role too, e.g., the role of productivity commissions relative to other national authorities, e.g., competition, monetary or financial markets authorities. Moreover, most productivity commissions in EU countries have only explored some dimensions of trade, presumably since the main responsibility for trade policies rests with the European Union.

New issues are also emerging in the work. For example, many boards have undertaken work to examine the impact of the COVID crisis on productivity through channels such as telework and firm dynamics, and some (e.g., Belgium, Denmark, France, and Germany) have also played a role in exploring COVID support schemes or recovery packages. Many of the policy recommendations emerging from the boards reflect the results of long-standing work on productivity and structural reform. However, new policy questions linked to productivity, such as the rationale for a more targeted innovation policy (New Zealand); increased strategic autonomy (Germany); or policies linked to data and artificial intelligence (Australia, Germany) are now starting to be tackled by some boards. This suggests that several commissions do not take a narrow view of their mandate and are willing and able to tackle a wide variety of factors and policies that may affect productivity. Some boards, e.g., Chile also regularly assess the impact of their work on policy (Comisión Nacional de Productividad 2019, 2020).

Despite the many similarities, it is not always clear how the boards set their agenda. In some, like Chile, Finland, France, and Portugal, the first reports by the boards established an underpinning for further analysis and subsequent reports deepened the analysis and policy reflections. But political considerations also matter for agenda setting as boards are asked to respond to emerging policy issues and political realities. Moreover, the composition of the boards – academic, government or multi-stakeholder – may play a role.

Apart from reviewing what the productivity commissions have addressed in their work, it is also interesting to look at areas that have thus far not received much attention in their work or have only been explored by a few boards. Without being exhaustive, some areas can be highlighted:

- The impacts of climate change on productivity, and more generally measures of environmental or resource productivity. The bulk of the work thus far has focused on exploring the productivity of labour and capital and their joint (multi-factor) productivity. Productivity commissions have not yet looked much at the growing importance of resource productivity, the relationship between productivity and climate change, or measures of productivity adjusted for environmental impact (Cárdenas, Haščič and Souchier 2018). Some boards, such as Belgium, Germany and Ireland, have started to reflect on the implications of climate change for competitiveness, however.

- The role of intermediate inputs for productivity. Apart from some work in France's 2022 productivity report (Conseil National de Productivité 2022), few productivity commissions have taken a so-called KLEMS perspective on productivity, accounting not only for capital (K) and labour (L), but also for the role of intermediate inputs, i.e., energy (E), materials (M) and services (S). Given growing concerns about supply chains, security and resilience related to resources and the availability of intermediate inputs, more work on this topic might emerge in the future, as shown in Germany's latest report (Sachverständigenrat 2022).

- Wages, inequality, wellbeing and productivity. Most productivity commissions have focused on the contribution of productivity to growth and competitiveness and have not looked much yet at how the benefits of productivity are diffused to workers and across the economy through wages, and how this affects inequality in the economy (see e.g., Berlingieri, Blanchenay and Criscuolo 2017). Moreover, only a few, such as Chile and New Zealand, are looking beyond GDP in considering wellbeing or broader indicators of economic and social performance. Austria's new national productivity board has also indicated it will look beyond GDP.

- Productivity of the public sector and its impact on aggregate productivity. While this topic has been addressed in Australia and New Zealand, productivity commissions in EU countries have not yet focused much of their work on this issue.

- Productivity growth in specific sectors. Although several commissions indicate that their productivity problems are mainly located in specific sectors, only few have undertaken sector-specific studies, with Chile an important exception.

Policies for productivity are not only complex, but also wide-ranging, which means there remains a lot of work ahead for commissions to further disentangle the drivers of productivity and the policy levers that can be used to strengthen productivity and diffuse its benefits across the economy and society. The current experimentation by more than 20 commissions across the OECD and EU – in a variety of institutional arrangements – with analysis and policy advice on productivity is a new and important source of policy learning that should be drawn on in full by policy makers, researchers, and stakeholders. Cooperation between the commissions in various

international settings and engagement with the academic community and stakeholders can play an important role.

The brief review in this paper also suggests that the case for pro-productivity institutions remains as strong as ever. As noted by Banks (2015): "*Policies that promote productivity can be difficult for governments to devise and even more difficult for them to successfully implement, given uneven political pressures and fragmented administrative structures. There is accordingly a strong case for establishing public institutions that not only help governments identify the right policies, but that can also counter one-sided political pressure against reform and help educate the community about what is at stake.*"

Countries that have not yet established their own board, including Spain, may therefore wish to set one up to benefit from this new and important source of policy learning on productivity, a core driver of economic and social wellbeing. Moreover, such countries may wish to draw on lessons learned in establishing such institutions, e.g., in ensuring their analytical independence and in providing access to all the necessary data to inform proposed policies and interventions with sound evidence (Banks 2015; Cavassini *et al.* 2022).

Having its own dedicated institution aimed at the pursuit of productivity growth is particularly important for Spain given its persistent gap in labour productivity with the best performers in the OECD (2021). The development of pro-productivity policies based on sound evidence and good practice can help address sluggish growth, contribute to greater sustainability, allow wage growth without generating inflationary pressures, improve competitiveness, and underpin sound public finances. Having its own dedicated productivity commission will equip Spanish policy makers with the best possible evidence, analysis and recommendations for a wide-ranging agenda of pro-productivity policies to underpin Spain's future prosperity.

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