Making the most of public investment to address megatrends, regional inequalities and future shocks

1 March 2022

~Preliminary note~

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Executive summary

Public investment is a key policy lever to tackle the big challenges – climate change, demographic trends, digitalisation, and economic shocks – faced by society. Investment helps build the foundations for future economic prosperity and well-being in cities and regions. It can also help to reduce inequalities, adapt to megatrends, enhance resilience and mitigate the impact of economic shocks. As we emerge from the COVID-19 crisis, massive commitments of public investment to support a strong recovery provide a generational opportunity to 'build back better' – to address global and local challenges, not just for today, but for the future. Seizing this opportunity calls for effective public investment **by all levels of governmen**t.

The macro forces shaping public investment

Public investment is needed to support the economic recovery. The global economic recovery is progressing, but is easing and remains uneven across and within countries, sectors, firms and demographic groups. The OECD's latest *Economic Outlook* (2021[1]) projects global GDP to increase by 4.5% in 2022, before growth moderates to 3.2% in 2023 but uncertainty and downside risks remain, as highlighted by the recent outbreak of the Omicron variant and increases in inflation (which should wane as COVID-related restrictions ease). In this economic environment, governments at all levels are planning significant public investment to help support a strong economic recovery.

Current public investment should align with net zero objectives. Although significant spending is being undertaken to address long-term climate objectives, more can be done. For example, green measures only represent 21% of global recovery spending as of July 2021, and many recovery measures have a negative environmental impact (OECD, 2021[2]). Rapid decarbonisation of the economy will be required by 2050 to achieve the 2°C target in the Paris Agreement to avert catastrophic climate change, which requires alignment of current public investments to the net zero objective.

Over the longer-term, public investment will be shaped by digitalisation, the new global environment, demographic trends, and climate change. Digitalisation is beginning to change the way people and firms work, and is likely to accelerate, demanding new skills and infrastructure. Global supply chains are also beginning to reconfigure, driven by increased awareness of resilience. Demographic trends – in particular ageing populations in many OECD countries – could strain public finances. The effects of climate change create a need to increase the resilience of infrastructure and adopt net zero technologies. Investment is needed across all these fronts not just to tackle challenges, but also to seize opportunities.

The differentiated public investment challenges within countries

Megatrends create different public investment needs, challenges and opportunities across regions within countries. Reaching the objectives of the Paris Agreement will require tailoring actions and investments to the needs and realities of different localities and regions as mitigation and adaptation challenges and opportunities differ sharply across places. Demographic change, particularly population ageing and shrinking, will especially affect remote and rural regions across the OECD, but over 50% of

OECD regions will see population decline by 2050 (OECD, 2019[3]). Digital divides are emerging across regions, limiting access to the advantages from the digital transition, entrenching and exacerbating divides as the pace of digitalisation accelerates. Download speeds over fixed networks in rural areas, for example, are on average 31 percentage points below the national average, while download speeds in cities are 21 percentage points above (OECD, 2021[4]). Finally, regions differ to the degree they are embedded in global value chains, leaving some territories more prone to global economic shocks (e.g. COVID supply chain bottlenecks) than others, demanding a rethink of their regional strategies.

The impact of COVID-19 has not been equal across regions within countries. On average, across OECD countries, the region with the highest excess mortality had a 17-percentage point higher rate of deaths than the least affected region within the same country (OECD, 2021[5]). Furthermore, in the second quarter of 2021, unemployment was higher than pre-COVID-19 levels in more than 80% of OECD regions, with significant differences observed within countries. This may have worked to increase already large and persistent spatial inequalities, which are typically larger within than across OECD countries. The income gap among metropolitan and non-metropolitan regions, for example, has steadily increased since the 2008 financial crisis. In 2019, GDP per capita in non-metro areas was equivalent to GDP per capita in metropolitan regions two decades ago. Addressing existing investment gaps will prove critical in addressing inequalities, but so too will forward-looking place-based investment strategies.

Acting on asymmetries now may prevent higher costs and risks later. Territorial inequalities pose long-term risks for social cohesion, and these inequalities could deepen from megatrends and future economic shocks. Sustained and increasing levels of territorial inequalities may even bring instability to democratic systems. The costs to address economic inequality, climate change and the digital transition are particularly concentrated in some places. Not addressing these challenges now is likely to lead to significantly higher remedial costs in the future. Strategic foresight can help to better anticipate and adapt to potential and emerging challenges, future-proofing public investment in the new global environment.

Making the most of public investment across levels of government

Quality public investment requires effective multi-level governance. Public investment is a shared competence among levels of government, with subnational governments responsible for 55% of public investment in OECD countries in 2020. Yet, the benefits that arise from public investment depends on how different levels of government manage and coordinate this shared competence. Good governance, including effective coordination across and among levels of government, can support effective public investment to address pressing economic, environmental and societal challenges.

There are a number of key success factors to support effective public investment among levels of government. Delivering effective public investment is not easy. It requires understanding the investment needs of many stakeholders and aligning investment planning and delivery. Building on the *OECD Recommendation on Effective Public Investment across Levels of Government* (OECD, 2014[6]), a number of key success factors for effective long-term public investment emerge:

- Establishing strong and fruitful partnerships among levels of government;
- Effective collaboration between regions and cities to support investment at the right scale;
- Ensuring that governments at all levels have adequate capacities;
- Making use of innovative mechanisms to fund and finance public investment; and
- Strengthening public-private collaboration and engaging citizens stakeholders in the investment cycle, to build trust amongst different stakeholders.

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1 The macro forces shaping the future of public investment

Public investment for long term prosperity and wellbeing

The future of global public investment is being shaped by short- and long-term forces that need to be understood to in order to align current investment decisions with long-term policy objectives. Over the short-term, public investment will be shaped by the strength and structure of the economic recovery from COVID 19 and the related government responses, which have so far included some of the largest public investment packages since the Second World War. Over the longer-term, demographic change, climate change and digitalisation will increasingly drive investment needs and impact public finances. This section provides an overview of the current state of the global economy and highlights major megatrends. It then describes some of the possible macro-level implications for public finances and public investment.

Key messages

An uneven economic recovery

- The global economic recovery is progressing, but is easing and remains uneven across and within countries, sectors, firms and demographic groups.
- Uncertainty and downside risks remain, as highlighted by the recent outbreak of the Omicron variant and increases in inflation (which should wane as COVID-related restrictions ease and interest rates rise).

The megatrends shaping future public investment needs and public finances

- Rapid decarbonisation of the economy will be required by 2050 to achieve the 2°C target agreed at the Paris climate conference to avert catastrophic climate change, which implies significant net zero investments, but global warming is now inevitable and significant investments in mitigation measures against an increase in extreme weather events will also be required.
- Demographic change, in particular population ageing in many OECD countries, could strain public finances, change consumption patterns, and require different types of public investment.
- Digital technologies, including information and communications technology, automation, artificial intelligence and robotics, have immense economic potential and are profoundly changing the way people and firms work, and the skills and infrastructure required to succeed in the future.

Implications for public finance and public investment

- Public revenues and expenditures will be under pressure in many countries over the coming years due to ageing populations, although new economic opportunities may arise from digitalisation and the net zero transition that could support public finances.
- Public investment over the short and medium needs to align with long-term priorities and risks, including supporting the digital shift, adjusting to demographic changes, supporting the green transition and correcting decades of underinvestment in infrastructure.
- Public debt-to-GDP ratios rose sharply during the crisis, but fiscal balances are beginning to improve. In the wake of the COVID-19 crisis, public financial management may increasingly focus on the composition of public finances while supporting long-term sustainable growth and ensuring medium-term debt sustainability.

An uneven global economic recovery

The global recovery continues to progress, **but is easing and remains uneven across developed and developing countries.** The OECD's latest Economic Outlook (2021[1]) projects global GDP to increase by 4.5% in 2022 before growth moderates to 3.2% in 2023. There are different outlooks across and within countries, sectors, firms, and demographic groups (Table 1).

Monetary and fiscal policies were critical in buffering economies and societies from the worst impacts of the crisis. Macroeconomic policy support is now being withdrawn in many economies as output gaps close and in response to stronger-than-expected inflation. Nonetheless, enhanced global vaccination efforts, loose financial conditions, and lower household saving rates should all enhance demand and offset headwinds from the gradual unwinding of pandemic-related fiscal measures and gradual tightening of monetary policy in the United States and some other economies.

Uncertainty and downside risks remain, **as seen by the recent outbreak of the Omicron variant.** The economic impact of the variant appears relatively mild, although early signals from survey and mobility data currently point to softer growth in the early part of 2022. In addition, many countries have experienced sharp increases in inflation, driven by rising food and energy costs and exacerbated by growing supply-side bottlenecks and shortages. Health-related containment measures, particularly in China and other parts of Asia, are continuing to contribute to supply bottlenecks. While such tensions have proven more persistent than initially expected, they are expected to wane as COVID-related restrictions and outbreak-induced disruptions ease.

Table 1. Continuing global recovery is continuing, but remains imbalanced

OECD area, unless otherwise noted

	Average 2013-2019	2020	2021	2022	2023	2021 Q4	2022 Q4	2023 Q4
		Per cent						
Real GDP growth[1]								
World[2]	3.3	-3.4	5.6	4.5	3.2	3.8	3.9	3.2
G20[2]	3.5	-3.1	5.9	4.7	3.3	4.1	3.8	3.3
OECD[2]	2.2	-4.7	5.3	3.9	2.5	4.4	3.3	2.2
United States	2.4	-3.4	5.6	3.7	2.4	5.1	3.0	2.3
Euro area	1.9	-6.5	5.2	4.3	2.5	4.9	3.3	2.1
Japan	0.8	-4.6	1.8	3.4	1.1	0.0	3.1	0.9
Non-OECD[2]	4.3	-2.2	5.8	4.9	3.8	3.2	4.3	4.0
China	6.8	2.3	8.1	5.1	5.1	3.9	5.5	5.0
India[3]	6.8	-7.3	9.4	8.1	5.5			
Brazil	-0.3	-4.4	5.0	1.4	2.1			
Unemployment rate[4]	6.5	7.1	6.2	5.5	5.2	5.7	5.4	5.1
Inflation[1,5]	1.7	1.5	3.5	4.2	3.0	4.9	3.4	3.1
Fiscal balance[6]	-3.2	-10.4	-8.4	-5.2	-3.7			
World real trade growth[1]	3.4	-8.4	9.3	4.9	4.5	6.1	5.2	4.2

1. Percentage changes; last three columns show the change over a year earlier.
2. Moving nominal GDP weights, using purchasing power parities.
3. Fiscal year.
4. Per cent of labour force.
5. Private consumption deflator.
6. Per cent of GDP.

Source: OECD Economic Outlook 110 database.

StatLink https://stat.link/xk7usv

Most advanced economies are projected to return to their pre-pandemic output path by 2023, but with greater debt. Inflation is also projected to be higher than its pre-pandemic level in many countries, although generally remaining in line with central bank objectives. However, while a full recovery to pre-pandemic levels is expected in many larger emerging-market economies by 2023, in most lower-income countries, the process is expected to be slower, leaving sizeable long-term scars.

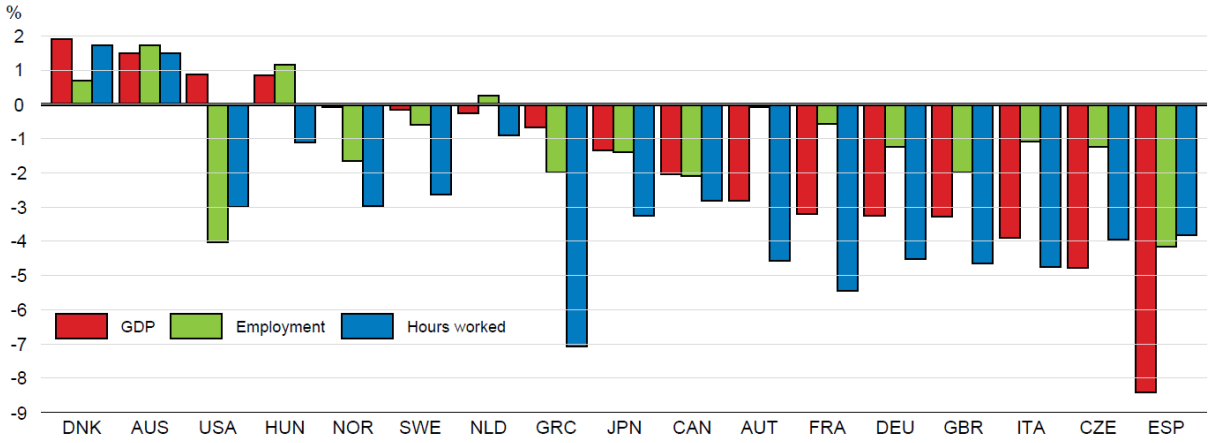
Labour markets have only partially recovered in most countries

Overall employment across the OECD has yet to recover fully from the pandemic. Although some care is needed in comparing across countries[1] given differences, in particular, of the treatment of furloughed workers among OECD countries, about 6 million fewer people were in work in the third quarter of 2021 than in the fourth quarter of 2019 (Figure 1). Many emerging and developing economies have also suffered declines in employment during the pandemic (ILO, 2021[7]) and poverty has risen. This, in part, reflects on-going recovery from the impacts of the crisis (including containment measures), supply-chain bottlenecks, and an acceleration of structural changes, including on-line sales, and automation. Labour shortages have also emerged in sectors and countries reliant on sizeable cross-border inflows, with permanent migration to OECD economies declining by around 30% in 2020, and temporary labour migration also falling sharply (OECD, 2021[1]). The crisis has also led to some people withdrawing from the labour force, including through early retirement.

[1] The crisis has also brought a number of measurement challenges (The OECD Statistics Newsletter, December 2020, Issue 73 by oecd-stat-newsletter - Issuu)

Figure 1. The labour market recovery is only partial in most countries

Percentage change between Q4 2019 and Q2 2021

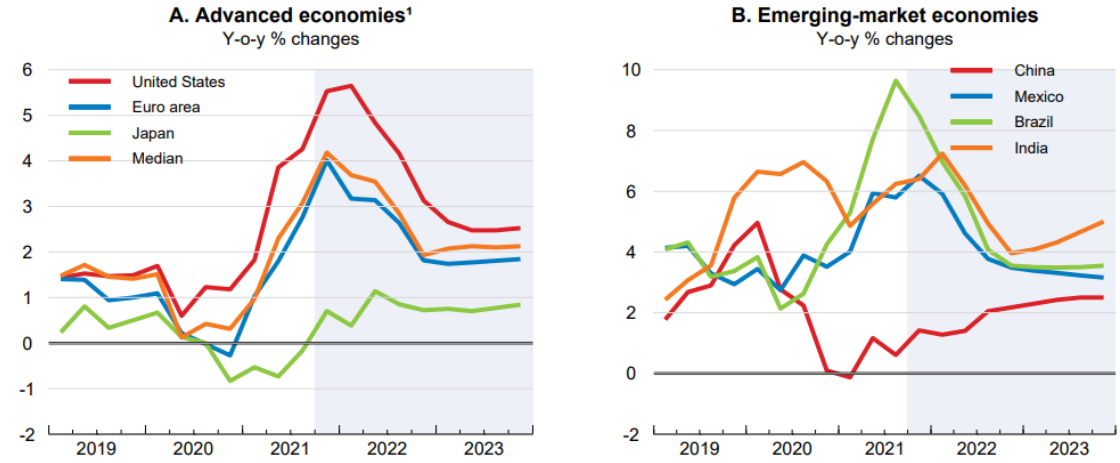


Note: National accounts based measure of employment for all EU member states, Norway and the United States, and labour force survey measure for remaining countries. Figure to Q2 2021 as hours data as data for Q3 and Q4 is not yet available.
Source: OECD Economic Outlook 110 database; Bureau of Economic Analysis; Statistics Canada; Australian Bureau of Statistics; Statistics Bureau, Japan; Eurostat; Office for National Statistics; and OECD calculations.

Inflationary pressures have been emerging

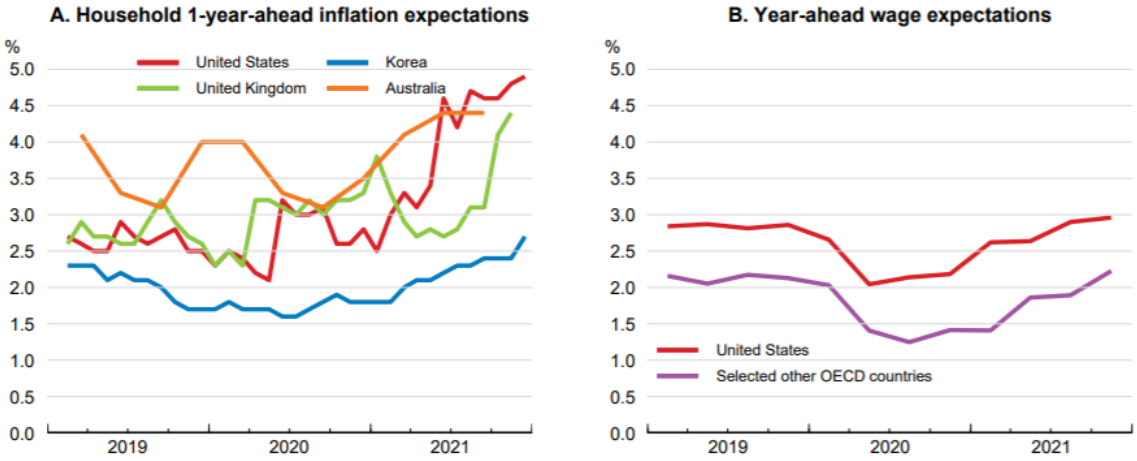
Stronger and longer-lasting inflation pressures have emerged in all economies at an unusually early stage of the cycle. This largely reflects the atypical nature of this cycle, with a sharp initial downturn largely reflecting a deliberate shutting down of part of the economy to control the outbreak, and a rapid rebound as the restrictions were lifted. With the pandemic also causing shifts in demand across sectors (e.g. less demand for some services and more demand for certain goods), shortages and bottlenecks emerged at an early stage. Analysis in the OECD Economic Outlook (2021[1]) suggests that as the health situation improves, demand growth stabilises and people who left the labour force for pandemic-related reasons return, supply bottlenecks should begin to fade. Also, the sharp shift in consumption patterns from services to goods observed in some economies, especially the United States, is expected to be unwound as pandemic effects dissipate, resulting in a reversal of the strong goods price inflation experienced over the past year. Inflation is now expected to peak at the turn of 2021-22 before receding gradually to around 3% in the OECD as a whole by 2023 (Figure 2). The need to re-hire workers as sectors like hospitality and travel progressively reopened put upward pressure on inflation, especially in countries like the United States where there was greater churning in the labour market. The main risk of a more sustained period of above-target inflation stems from the possibility of a wage-price spiral, in which workers expecting high inflation demand larger nominal wage increases, pushing up production costs and fuelling further inflation. Indicators of near-term inflation expectations have moved up, but up until now expected wage growth has remained similar to pre-pandemic norms (Figure 3).

Figure 2. Inflation is expected to peak by early 2022 in most countries but remain above pre-pandemic levels



Note: The harmonised consumer price index for the euro area; the personal consumption expenditure deflator for the United States; and the overall consumer price index for the remaining countries shown separately.
1. Advanced economies include OECD countries except Chile, Colombia, Costa Rica, Mexico and Turkey.
Source: OECD Economic Outlook 110; and OECD calculations.

Figure 3. Inflation expectations have moved up, but expected wage growth is little changed



Note: In Panel B, 'Selected other OECD countries' corresponds to a weighted average of other OECD countries for which comparable wage expectations data are available: Australia, Canada, New Zealand, Norway, Sweden and the United Kingdom. Countries are weighted by employment levels. The value for 2021Q4 is based on the October value for the United States, and is available only for New Zealand, Norway and the United Kingdom for the aggregate.
Source: OECD Economic Outlook 110 (2021[1]); Refinitiv; Chartered Institute of Personnel and Development; Bank of Canada; and OECD calculations.

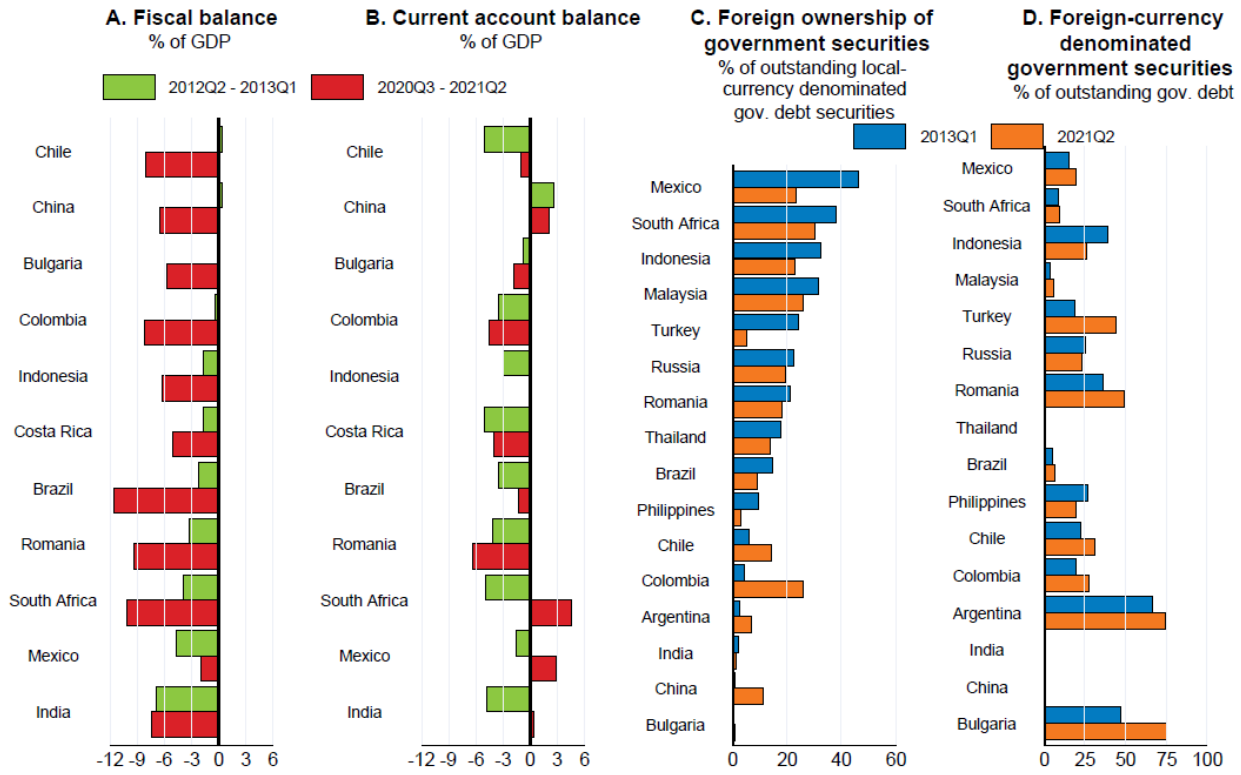
Essential public support to people and companies has increased public debt

The significant public support provided to many companies since the start of the pandemic, favourable credit conditions, and the global recovery are still keeping corporate bankruptcies in check. In Europe, bankruptcies are well below their historical averages, especially in France and Germany, and a similar picture emerges in other advanced economies (OECD, 2021[1]). Major banks in the United States and Europe also posted record profits in the first half of 2021, partly as a consequence of a reduction

in loan loss provisions. Overall, the wave of bankruptcies feared at the start of the COVID-19 crisis has not yet materialised. However, as support measures unwind, there is a risk, without the appropriate support, of a surge in insolvencies particularly in sectors (such as tourism) still significantly affected by the pandemic and SMEs with high debt burdens.

The pandemic has resulted in a further rise in debt in emerging-market economies. Fiscal balances have deteriorated considerably, due to a collapse in tax revenues and elevated spending in response to the pandemic (Figure 4, Panel A). Emerging-market economies issued USD 1.8 trillion of sovereign debt in the first half of 2021, 40% higher than the average amount issued in the first half of each year in 2017-19. Emerging Asia accounted for half of that total, with China accounting for around one-half of the region's issuance. The share of short-term obligations in non-investment grade debt issuance also rose, reducing average maturities, and foreign-currency-denominated debt issuance has declined, possibly suggesting more difficult access to foreign debt markets.

Figure 4. Indicators of fiscal and external vulnerabilities in emerging-market economies



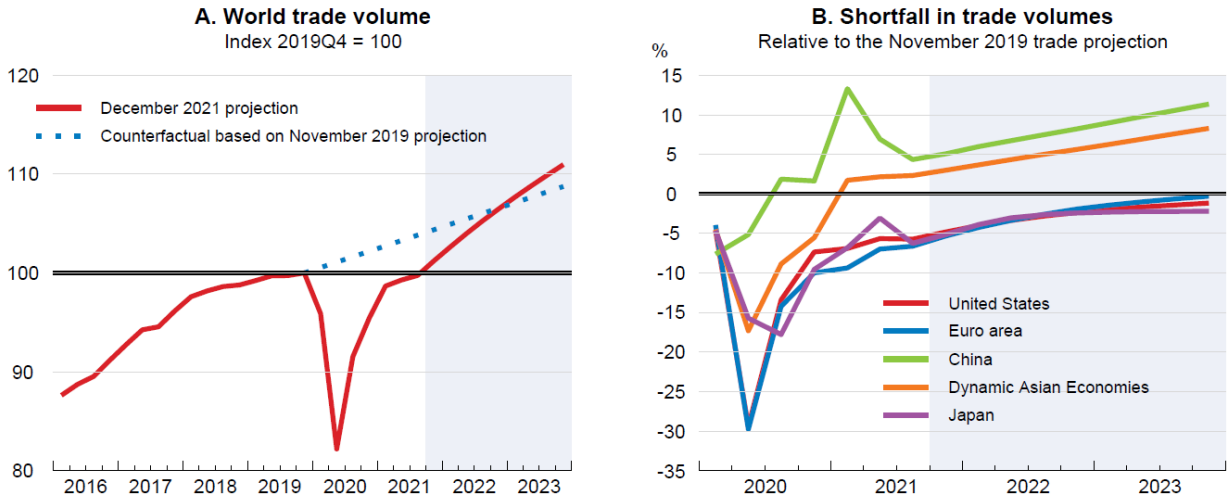
Note: Red bars in Panels A and B denote the average for 2020Q3-2021Q2. Green bars in Panels A and B denote the average of four quarters preceding 2013Q2, during which global financial markets volatility has increased. Countries in Panels A and B are sorted according to the average fiscal balance-to-GDP ratio during 2012Q2-2013Q1. Countries in Panels C and D are sorted according to the foreign ownership of local-currency government securities in 2013Q1.
Source: OECD Economic Outlook 110 database; IMF Sovereign Debt Investor Base for Emerging Markets database; and OECD calculations.

Global trade is recovering

After a strong pick-up in the first half of 2021, the volume of global trade in goods and services is projected to reach its pre-pandemic level by the end of 2021. Overall, the volume of world trade is estimated to have been about 9% higher in 2021 than in 2020 (Figure 5). Momentum is projected to soften over 2022 and 2023, with trade volumes rising by 5 and 4½ per cent respectively, in line with the expected

moderation of global activity. This implies that trade will also reach, and then exceed, its projected path prior to the pandemic by the end of 2022.

Figure 5. World trade is rebounding quickly, helped by strong growth in Asian trade



Note: The Dynamic Asian economies are Chinese Taipei, Hong Kong, China, Malaysia, Philippines, Singapore, Thailand and Viet Nam.
Source: OECD Economic Outlook 110 database; and OECD calculations.

The megatrends reshaping public finance and investment needs

Megatrends, including advances in technology, population ageing and the green transition, as well as shifts in global value chains, are combining to increase and transform the skills needed to thrive at work and in society. These long-term trends, coupled with the shock of the COVID-19 crisis, will shape the environment, economies, and societies for years to come. Remaining focused on these megatrends can help to make the most of the opportunities that they provide and mitigate the challenges that they create.

Increasing action to stop climate change, and mitigate its impacts

Global land and ocean surface temperature data show an average combined warming of 0.85°C between the period from 1880 to 2012. The greatest warming over the past century has occurred at high latitudes, with a large portion of the Arctic warming by more than 2ºC. The last 30 years were the warmest of the last 1 400 years in the northern hemisphere (IPCC, 2014[8]). Further global warming over the next few decades is now inevitable.

Policy action will be crucial to addressing rapid heating. Mitigating global warming requires much more ambitious strategies to reduce greenhouse gas (GHG) emissions. The IEA's New Policies Scenario, consistent with a long-term temperature rise of 4°C, requires significant changes in policy and technologies, but will still lead to dangerous levels of climate change. A more stringent scenario (2DS) that would meet the 2°C target agreed at the Paris climate conference requires a 40%-70% reduction in global GHG emissions by 2050. It will mean increasing the share of low-carbon electricity supply from 30% to more than 80% by this time (IPCC, 2014[8]).

A series of severe climatic changes are already unfolding in 2021. There have been a number of other significant disruptions in 2021, many of which are related to climate change. Huge wildfires (notably in Siberia – possibly the largest in recorded history – California and Turkey), unprecedented heatwaves and

droughts (e.g. in western North America), extreme cold weather events and destructive floods (e.g. in Germany, Belgium and western Canada) have collectively caused thousands of fatalities and major destruction of property and economic disruption. Hurricane Ida in late August and early September 2021 was one the costliest storms in US history and significantly restricted the output and transportation of oil and gas for many weeks, adding to upward pressure on global energy prices (OECD, 2021[1]). Such storms, along with other weather-related disasters, have become more frequent and severe as sea and air temperatures rise (World Meteorological Organisation, 2021[9]; IPCC, 2021[10]). The economic impact has increased correspondingly, especially on agriculture (FAO, 2021[11]), with the low-income countries being the worst affected.

Water security is a major challenge for the Asia-Pacific region. At present, 1.7 billion people lack access to basic sanitation in the region, with half of countries having piped access rates lower than 50% and 80% of wastewater is discharged with little or no treatment. In addition, from 1995 to 2015, 2.3 billion people were affected by floods and 1.1 billion by droughts (OECD, 2021[12]).

Significant demographic changes, particularly population ageing

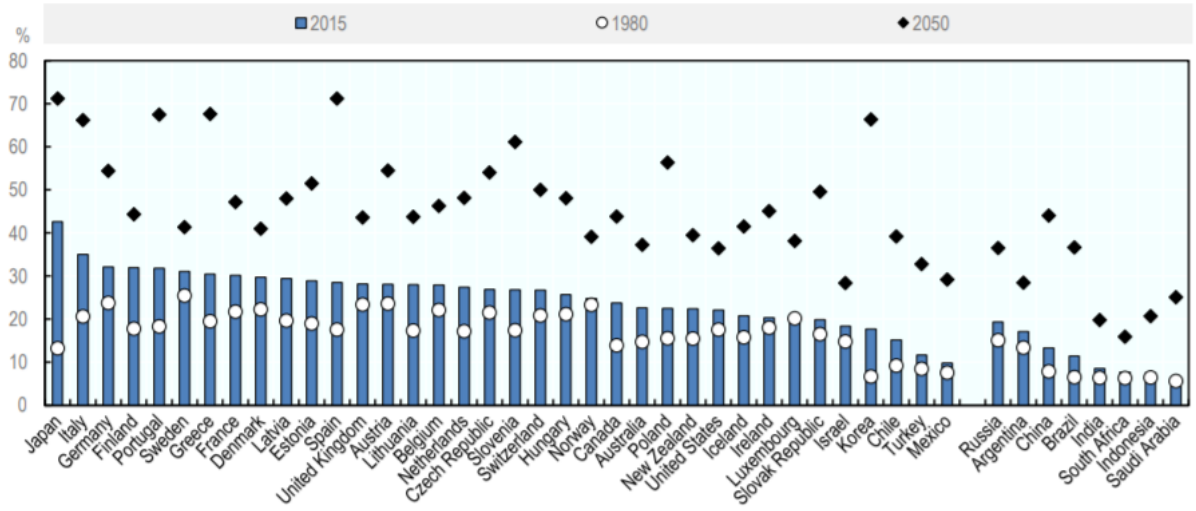
Declining fertility rates and increasing life expectancy are leading to population ageing in many OECD Member countries. A combination of low fertility rates and longer life spans will lead to ageing in all major regions of the world. At current rates, there will be almost global parity between the number of over-60s and the number of children by 2050. The old-age dependency ratio (the ratio of older people to the working-age population) is expected to increase significantly by 2050 in most OECD Member countries (Figure 6) shifting the composition of the workforce from young to older workers.

Ageing societies can increase the burden on public healthcare, pensions and aged care services. High old-age dependency ratios, together with more prevalent non-communicable diseases and increased disability among the elderly, will place considerable burdens on public healthcare and aged care services. Although some countries are looking to manage expenditures on pensions through for example increases in the retirement age, public expenditure on pensions is expected to increase in 21 OECD countries with an overall increase to 9.4% of GDP in 2050 (OECD, 2019[13]). The resulting fiscal pressures could draw public spending away from other areas.

Ageing also implies changes in lifestyle and consumption patterns, and this will have significant implications for the types of products and services in demand. Ageing societies could see slower economic growth, and a shift in consumption patterns. New markets will emerge as part of a flourishing “silver economy”, while more traditional ones may have to adapt or will even disappear. It will also create an increased need for aged and health care infrastructure in some countries.

Figure 6. Population ageing, 1980-2050

Old-age dependency ratio: Population aged 65 and over, relative to population aged 15-64



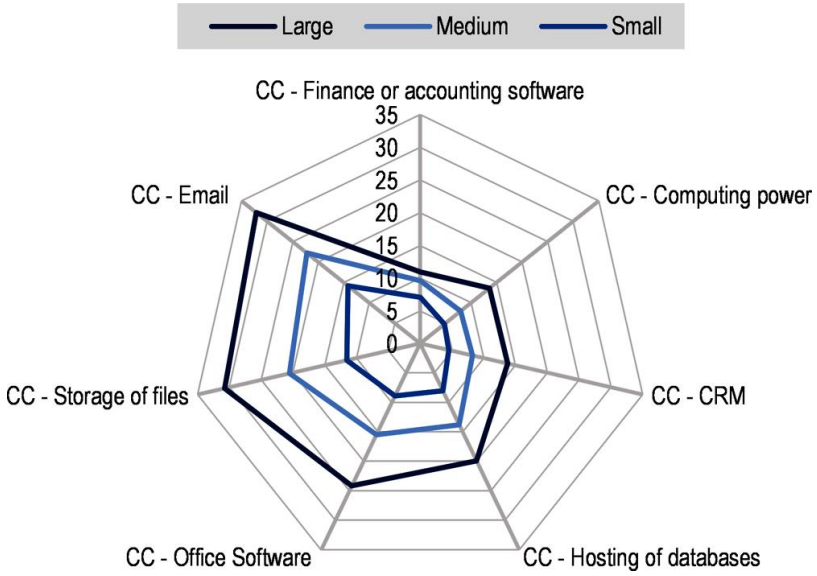
Source: United Nations (2018), World Population Prospects: The 2017 Revision

Digital transformation will affect people, companies and economies

Information and communications technologies (ICTs), advances in artificial intelligence (AI) and robotics are profoundly changing the way people work, communicate and live. Many people now regularly use digital tools such as computers, smartphones and tablets, at work, in school and for everyday life. In 2015, 57% of workers in the European Union (EU28) regularly used a computer or smartphone for work, a 20-percentage-point surge relative to a decade earlier (Eurofund; ILO, 2017[14]). The COVID-19 crisis has further accelerated the use of digital technologies, as highlighted by increased teleworking and the digitalisation of many government and business services. Use of digital technology, however, is not even across sectors, firm size, places, genders and age groups.

SMEs, for instance, lag in the digital transition, even if up to 70% are making more use of digital technologies due to COVID-19 (OECD, 2021[15]). In particular, small firms are three times less likely than large firms to adopt cloud computing (CC) services for financial management, communications, and information storage (Figure 7). Many factors impede digital uptake, including the challenges of cybersecurity and digital infrastructure. For example, cyber-attacks can wreak debilitating economic losses to small firms that have fewer resources to manage digital security. Also, SMEs outside metropolitan areas have less reliable access to the internet (OECD, 2020[16]). Taking these constraints into consideration, this means that many SMEs still are unable to fully harness the benefits of digitalisation.

Figure 7. Small firms are three times less likely than large firms to adopt cloud computing services



Note: Diffusion rate, median OECD, based on country average percentages of enterprises using the technology over 2015-18
Source: OECD calculations based on OECD (2020[17]), OECD ICT Access and Usage by Businesses Database, www.oecd.org/sti/ieconomy/ICT-Model-Survey-Usage-Businesses.pdf (accessed on 25 November 2020).

Digitalisation brings immense economic potential. Digital technologies can generate productivity gains, spurring growth and creating new jobs. They can enrich the content of some occupations by allowing workers to focus on non-routine tasks, such as problem-solving, and more creative and complex communications activities. Digital technologies can enable individuals around the world to bring their ideas into the marketplace much more easily, boosting opportunities for entrepreneurship. Digital technologies have also enabled the rise of the "platform economy", in which companies like Airbnb, Baidu, and Uber have introduced new ways to create value, work and socialise.

The COVID-19 crisis and the shift to remote working has led to substantial changes to the way people interact, and firms conduct their business. In OECD countries, teleworking grew from around 16% of employees before the crisis to around 37% during the first wave of the COVID-19 pandemic in April 2020. In Australia, France and the United Kingdom, 47% of employees teleworked during lockdowns in 2020. In Japan, which did not institute a nationwide lockdown, the teleworking rate increased from 10% to 28% between December 2019 and May 2020 (OECD, 2021[18]).Increasing digitalisation presents new opportunities and indeed challenges, including relating to where workers choose to live and firms locate. Adoption of remote working could incentivise the demand for places outside large cities that can offer affordable and suitable housing and office spaces with better access to environmental amenities. Many of these locations however will likely be located within close proximity to cities, which will remain important hubs of opportunity.

Even for those who do not use ICTs at work, the nature of their work is changing as more tasks are automated. As governments go digital to improve effectiveness and efficiency, people need digital skills to access even basic public services. Across the OECD, 14% of jobs are at a high risk from automation and 32% could be radically transformed (2019[19]). In addition, 15% of adults lack basic digital skills, and 13% lack basic digital, numeracy and problem-solving skills (OECD, 2019[20]). This skill gap creates a risk that citizens are left behind by the digital transformation.

A reshaping of global value chains

Since the 1990s, the world has entered a new phase of globalisation. Information and communication technology, trade liberalisation and lower transport costs enabled firms and countries to fragment production processes into global value chains (GVCs)[2], with products designed in one country, manufactured in another, and assembled in yet another on the basis of just in time stock management While the rise of globalisation was particularly strong in the 1990s and 2000s, it has stabilised since the 2008 recession (Rodrik, 2018 (OECD, 2018[21])).On average, in OECD Member countries, close to 40% of the value of manufactured exports and 20% of the value of business services exports reflects foreign content.

The longer-term impact of the COVID-19 crisis on global value chains is uncertain. Supply chain disruptions during the COVID-19 crisis and shortages of essential goods have the potential to lead to longer-term changes in global value chains. Although the gains from international specialisation in global value chains outweigh the risks of transmission of shocks, questions are still being asked about the possible re-localisation of GVCs (OECD, 2021[22]). While many organisations are increasing supply chain resilience, particularly through increases in inventories of critical products and dual sourcing of materials, the nearshoring of supply chain activities appears to be happening to a lesser extent so far. In a recent survey, only 15% of supply-chain leaders surveyed across all industries said they planned to nearshore production in the future, although this was 60% of professionals in healthcare industries (McKinsey, 2021[23]).

Long-term implications for public finance and investment

Governments have provided some of the largest government spending packages since the Second World War in response to the COVID-19 crisis. But unlike war relief – or the stimulus packages that addressed the 2008-09 economic crisis – this recovery provides an opportune moment for addressing the longstanding challenges from global megatrends (OECD, 2021[1]). Today's spending packages are looking to address key issues such climate change, digitalisation and demographic challenges. However, more needs to be done. The OECD Green Recovery Database, which tracks the COVID-19 recovery measures across 43 countries, shows green measures represented only 21% of recovery spending as of July 2021 (OECD, 2021[2]).

Understanding the possible impact of megatrends and the COVID-19 crisis on public finances and public investment can help policymakers to better prepare for future challenges (Table 2, see end Section 1)**.** Although these trends could reduce some forms of public revenue and lead to increases in public expenditure in some countries, they also provide opportunities for new sources of economic growth and government revenue.

Long-term public revenue pressures

Public revenue will be under pressure in many countries due to ageing populations. Demographic change presents the largest threat, with ageing and, in some cases shrinking populations potentially constraining public revenues while also increasing expenditure. Significant challenges on personal tax revenue systems are also posed by increased digitalisation, because of increased taxpayer mobility, as well as the rise of new forms of work and types of assets (OECD, 2021[24]).

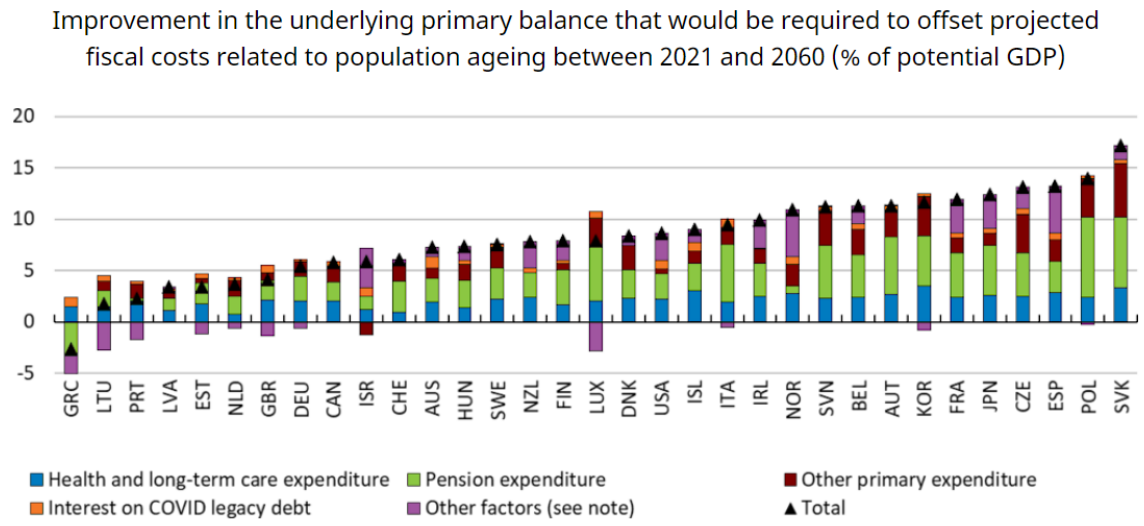
[2] See OECD Trade and Value Added (TIVA) for measuring GVCs (https://www.oecd.org/sti/ind/measuring-trade-in-value-added.htm)

Addressing climate change and growing the digital economy may provide opportunities to identify alternative revenue streams or use taxation to shape more sustainable consumption behaviours. The boost to productivity that digitalisation can provide – when equal access to technologies and digital skills are established as policy goals – could help firms and households recover quicker from the shock of COVID-19 and reduce inequalities (OECD, 2021[25]). This will require that tax systems evolve to capture revenue from new types of digital income and assets (e.g. crypto currencies, gig economy). Investment in the green transition will provide new growth opportunities for industry, such as in renewable and clean energy. Climate-related taxes also present an emerging revenue mechanism as with an additional benefit of shaping consumption patterns. The OECD estimated that 60% of energy-related CO_2 emissions are not currently subject to any form of carbon or excise tax (OECD, 2021[26]), even if reducing carbon emissions is central to achieving climate objectives. The OECD emphasises that carbon pricing policies will be most effective only when lower income households are compensated and energy affordability remains uncompromised (OECD/IMF, 2021[27]), which can mean that the net-revenue impact of climate taxation is limited. The challenge with both digitalisation and climate change is to ensure that fiscal policy responses are inequality-reducing and redistributive fairly to compensate those most adversely impacted by these megatrends.

Possible higher expenditure obligations

Demographic changes, particularly population ageing, and the relative rising price of associated services are expected to add pressure to expenditure in public budgets. Across the OECD, almost every country will need to undertake structural reforms or increase revenues to offset the fiscal implications of population ageing. The elderly dependency ratio is growing all across the OECD, causing increased pressures on health care expenditures and pensions. Another recent study outlined that without policy changes, maintaining current public service standards and benefits while keeping public debt ratios stable at current levels could increase fiscal pressure in the median OECD country by nearly 8 percentage points of GDP between 2021 and 2060 (see Figure 8), and much more in some countries (Guillemette and Turner, 2021[28]).

Figure 8. Fiscal pressures will continue to climb as populations age across the OECD



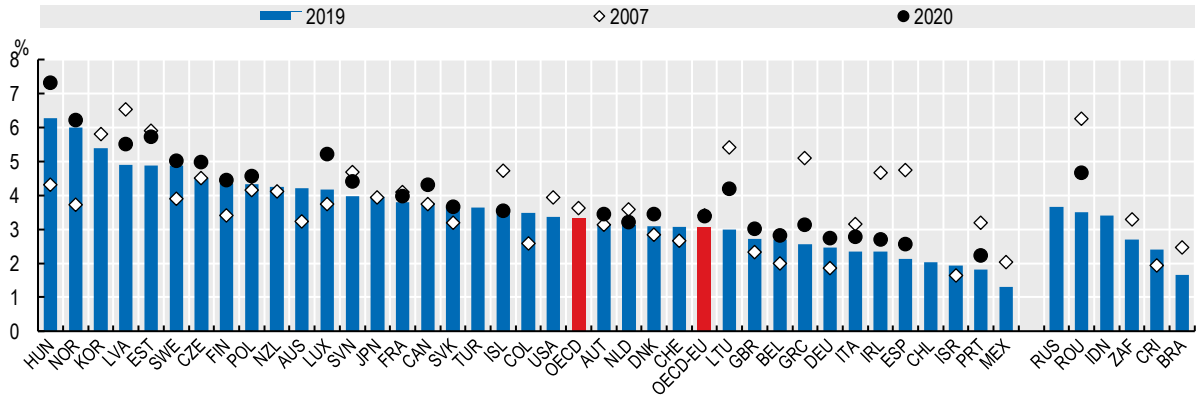
Note: The chart shows the projected required growth in public revenues in order to meet the demands of population ageing, averaging 8% of GDP across OECD countries.

Source: Guillemette and Turner (2021[41]), "The Long Game: Fiscal Outlooks to 2060 Underline Need for Structural Reforms", *OECD Economics Department Policy Papers n°29*, forthcoming.

Changes to public investment needs

Public investment constitutes 3% of GDP in the OECD, and 15% of total public and private investment. Total government investment varies across countries (Figure 9.), ranging from 1.3% of GDP in Mexico to 6.4% in Hungary in 2019 (OECD, 2021[29]). Government investment as a percentage of GDP decreased from 3.6% across the OECD in 2007 to 3.3% in 2019.

Figure 9. Government investment as a percentage of GDP, 2007, 2019 and 2020



Source: OECD 2021, Government at a Glance 2021, https://doi.org/10.1787/1c258f55-en; OECD National Accounts Statistics (database).

Public investment needs to align with long-term priorities and risk, including fostering the digital shift, adjusting to demographic change, the green transition and under-maintained infrastructure. The digital transition will require enhancing broadband connectivity and supporting people and firms to improve their digital access. Significant digital divides can exist within countries, which may limit economic opportunities. For example, download speeds over fixed networks in rural areas in G20 countries are 31 percentage points below the national average on average. Climate change also will requires new mitigation and adaption investments, including in clean energy, clean transport systems, and in protections against extreme weather events and sea level rise. To reach net zero emissions by 2050, for example, annual clean energy investment worldwide will need to more than triple by 2030 to around $4 trillion (IEA, 2021[30]) and new investments will be required to improve energy efficiency in existing building stocks. Quality infrastructure investments must include the maintenance and repair of existing infrastructure to withstand the effects of climate change. This is especially fundamental after decades of underinvestment in public infrastructure, and the fact that energy, transport, building and water infrastructure make up more than 60% of global greenhouse gas emissions (OECD, 2018[31])

Sustainable public infrastructure investment will be urgent in some urban areas and in developing countries, particularly in Asia and Africa. The global population is expected to increase by 1.5 billion people by 2050 (OECD/European Commission, 2020[32]). Almost 90% of the world's expected urban population increase is expected to happen in Asia and Africa, with 35% of the growth in urban areas in India, China and Nigeria alone (UN, 2018[33]). Growing regions will require substantial investment in new infrastructure, particularly for new housing, transport, utilities, hospitals and education facilities. Equitably undertaking sustainable infrastructure investment will be essential to ensure that the required new infrastructure does not exacerbate the long-term challenges from climate change.

Many countries are faced with a shrinking and aging population, which could change the type of infrastructure investment required. While across the OECD, the working age population is forecast to increase by approximately 10% by 2050, it will decline to less than 80% of its 2015 size in some countries, such as Korea, Italy and Japan (OECD, 2018[34]). The number of people over 65 for each working-age

person will at least double in most G20 countries by 2060, and the share of people over 80 in the world's population will triple (Rouzet et al., 2019[35]). In addition, nearly 30% of metropolitan areas are expected to be faced with shrinking populations, particularly in Europe and East Asian countries (OECD/European Commission, 2020[32]). A shrinking population could lower the need for some types of new infrastructure, such as housing, education and health facilities in some places. Regions will still need to invest infrastructure to address climate and digital challenges, and modernise existing facilities. An ageing population implies an investment additional aged care and health care.

A period of higher public debt

Public debt-to-GDP ratios rose sharply during the crisis, but fiscal balances are beginning to improve. The improvement in fiscal balances follows the steady rolling back of recovery programs and a rebound in GDP growth across much of the OECD (OECD, 2021[1]). OECD countries borrowed USD 18 trillion from the markets in 2020 to fund recovery programs, and an estimated USD 19 trillion in 2021, with the estimated debt-to-GDP ratio expected to have risen by 20 percentage points over the course of the pandemic in OECD countries (OECD, 2021[36]). While current interest payments on sovereign debt are manageable for most countries, due to low bond yields and debt interest costs , maintaining high debt increases vulnerability to future interest rate increases or growth slowdowns, and raises debt rollover risks. This calls for a rethink of tax and spending policies (OECD, 2021[24]) and credible frameworks that provide clear guidance about the medium-term path to sustainability. Rebalancing spending and ensuring debt sustainability will be a central component of fiscal policy in order to free up budget room for climate-related human capital and digital investments and higher demands from ageing populations. Recent trends in sovereign green bond issuance offer new solutions for financing these public investment priorities, particularly tor tackle climate change.

In the wake of the COVID-19 crisis, public financial management may increasingly focus on the composition of the public finances while maintaining support for long-term sustainable growth and ensuring medium-term debt sustainability. The much-needed support schemes rolled out across developed and developing countries have provided lifelines to firms and households when forced business closures and high unemployment pervaded economies. While these support programs have broadly helped to keep the economy afloat, the recovery has been slower in lower-income countries, which may make it more challenging to reduce public deficits (OECD, 2021[1]). The challenge for governments is to make the transition from short-term fiscal support (e.g. increased social transfers, job retention schemes, tax deferrals) to medium and long-term expenditures that promote inclusive and sustainable growth. It is important to learn from past recessions, when fiscal consolidation policies were implemented too hastily, particularly in the EU countries (Darvas and Wolff, 2021[37]). Fiscal consolidation resulted in an extended period of lower public investment, particularly at a subnational level (Allain-Dupré, 2011[38]). Following the 2008 financial crisis, there was an average annual decline in public investment of 0.9% in real terms across the OECD between 2008 and 2016 as fiscal consolidation strategies were pursued in many countries (OECD, 2019[39]). Restoring balance sheets will therefore require a careful rethink of which public expenditures and investments should be maintained to avoid any worsening of the economic outlook and to foster long-term sustainability and investment. The burden and the structure of the tax system will also need to evolve and modernize as structural changes to the economy are ushered in.

Table 2. Possible implications of megatrends on public finance and investment

Megatrend	Evidence	Economic implications	Public finance implications (revenues & expenditures excl. public investment)	Public investment implications
Demographic change				
Population growth	1.5 billion additional people by 2050	Need for new infrastructure and public service provision	Increased revenue and expenditure (linked to the age profile of population)	Need for significant new infrastructure investment in growing places.
Aging population	Growth in the old-age dependency ratio across the OECD	Smaller workforce; Larger retired population	Decrease in tax revenue Higher social and health care expenditure	Increase in aged-care facilities. Increase in hospital facilities.
Shrinking population	Globally, 30% of metropolitan areas are expected to shrink by 2050	Territorial imbalances in economic prosperity	Decrease in the overall tax base in some places	Possible reduction in the need for public investment. Increased focus on adaption and upgrade of existing infrastructure.
Urbanisation	The global urban population will increase by 1.5 billion people by 2050	Further concentration of people and wealth in cities.	Changes to jurisdiction of workers and tax revenues Increase in essential infrastructure spending, potential need for rent controls, social housing	Significant new urban infrastructure investment, especially in developing countries (housing, transport, education, water, electricity, communications, etc.)
Migration	Immigration is found to have a net-positive effect on public finances, reducing per-capita spending on old-age programs and increasing the working-age to total population ratio in OECD countries (Albisa, Boubtane and Coulibaly, 2019[40])	- Source of innovation and entrepreneurship - Vital for filling labour shortages and skills gaps in sectors and regions	Migrants are a source of tax revenues and generate economic activity across the OECD Social spending (including integration programs) may increase Can help to reduce growth in the old-age dependency ratio.	-
Globalisation				
Supply chain disruptions	According to IMF analysis, supply chain bottlenecks can explain the surge in headline inflation rates	Current supply chain bottlenecks add to inflation; Longer-term changes in the location of economic activities, with a location-dependent change (+/-) in price levels and efficiencies.	Lower corporate tax revenues Increased support to firms	Investments to improve logistics and transport infrastructure in order to reduce supply-chain bottlenecks

Megatrend	Evidence	Economic implications	Public finance implications (revenues & expenditures excl. public investment)	Public investment implications
Decreased overall trust in globalisation	Degradation in citizens' attitude towards globalisation and international trade between 2018 and 2020	In countries caught in 'distrust traps', there tends to be lower levels of growth, higher levels of corruption and higher – and ineffective – regulation (Aghion et al., 2010[41])	If the tax burden paid by the lowest-income earners is perceived to be too high, can threaten integrity of the system If the benefits of public expenditures are perceived to be insufficient compared to the taxes paid, can threaten the integrity of the system	Involves careful consideration of public investment choices to avoid decisions that erode trust in institutions and decision-makers
Climate Change				
Transition to net zero	IPCC estimates $2.4 trillion (USD) in investment needed by 2035 to keep temperatures below 1.5 C (2.5% of the world economy)	Strong potential upsides for new and emerging industries and jobs	Potential upsides as investments in adaptation generate employment Upside revenue potential through carbon taxation and emissions trading schemes (OECD, 2021[42])	Investment in net zero technology (energy, transport, housing, etc.)
Changing habitable space (with displacement of migrants)	Sea level rise; Increase in extreme weather events; average temperature rises (Singh et al., 2020[43])	Potentially devastating impacts on the economy if adaptation and mitigation policies are not acted upon	Mitigation taxes and mitigation subsidies will have a more positive impact on the general budget the sooner they are implemented (OECD, 2021[42])	New resilient infrastructure to mitigate the impacts of climate change. Social transfers may increase with surge in climate-based immigration and to households affected by extreme weather events
Digitalisation				
Potential loss of jobs to automation	While digitalisation is likely to present more opportunities than risks to employment, those working routine jobs will be impacted in the short-term (Eurofound, 2021[44])	Regions with a higher concentration of highly-digitalised firms and sectors (predominantly urban) stand to gain more employment than those regions with fewer (often rural)	Tax revenues will vary with the net change in employment and the growth and birth/death rate of firms. Modifications to the tax mix and tax base maybe required to maintain/enhance tax revenue. Increased spending on broadband connectivity and the digitalisation of firms and supply chains	Investment and support for the development of new industries.
Potential for remote working	Potential to increase labour bargaining power of workers in regions and countries with lower wages (Goodhart and Pradhan, 2020[45])	Long-term implications on labour market demand and supply. Short-term benefits accrued by regions with better digital infrastructure and more digitalised economy		Improved communications infrastructure (fibre optic, 5G, etc.)

Note: This is a non-exhaustive list of the various implications of megatrends on public finances and public investment

2 The differentiated public investment challenges within countries

Understanding asymmetries within countries

Public investment needs, opportunities and challenges vary significantly across places within countries. Not all regions have the same underlying assets and potential, and they are not being affected by megatrends and the shock of the COVID-19 crisis to the same extent. Over the coming decades, climate megatrends have the potential to exacerbate the structural factors driving regional inequalities, with potentially substantial consequences for society, the economy and the environment. Climate change, in particular, presents a major threat that will need substantial action at a global and local level to address. By helping to tackle asymmetries at a subnational level, public investment can help to improve well-being, address inequalities, and seize the opportunities created by megatrends. This section of the report outlines some of the main factors shaping public investment needs, opportunities and challenges at a subnational level, including economic inequality, megatrends and the COVID-19 crisis. It concludes by highlighting the potential cost of inaction on asymmetries within countries.

Key messages

The territorial dimensions of economic inequality

- Inequalities between smaller regions within countries can be larger than differences among OECD countries, meaning that it is important to understand the spatial dimension of inequality and its implications.
- Although the trends in regional inequalities between large TL2 regions are mixed, inequalities among small TL3 regions within countries increased after the 2008 crisis in GDP per capita in almost all OECD countries.
- The income gap among metropolitan and non-metropolitan TL3 regions has steadily increased since the 2008 financial crisis. GDP per capita in non-metro areas was in 2019 equivalent to where metro regions stood two decades ago.

The asymmetric impact of megatrends within countries

- Climate change is the most pressing global priority over the coming decades. Reaching the objectives of the Paris Agreement will require tailoring actions and investments to the needs and realities at different localities and regions as mitigation and adaptation challenges and opportunities differ sharply across places.

- The digital transition will bring significant economic opportunities for people and firms, but these opportunities are appearing uneven across regions, due to large territorial gaps in internet speeds, regional variations in the share of jobs at risk from automation and differences in digital skills.
- Demographic change, particularly population ageing and shrinking, will significantly affect many regions across the OECD, particularly remote and rural regions, which in turn, can create substantial fiscal challenges for some subnational governments.
- Globalisation has brought overall prosperity to OECD economies, but these opportunities have not reached all regions, leaving some regions behind. Place-based development strategies can help reap and share the benefits from globalisation that support the resilience of SMEs and identify regions' place in global value chains.

The asymmetric impact of the COVID-19 crisis on regions

- The health, economic and social effects of the COVID-19 pandemic and its fiscal impact have varied across places within countries, in particular regions with industries more exposed to lockdowns (i.e. tourism) faced sustained higher levels of unemployment.
- The pandemic is accelerating and reshaping megatrends, deepening their impact across different territories. In particular, the acceleration of remote working may lead to transform settlement patterns in cities and regions, and bring new priorities for public investments.

The cost of inaction on megatrends and regional inequality

- Territorial inequalities pose long-term risks for social cohesion, and these inequalities could deepen by megatrends and future economic shocks. Sustaining and increasing high level of territorial inequalities risks bringing instability to democratic systems.
- The cost to address economic inequality, climate change and the digital transition are particularly concentrated in some places, and these costs can compound year on-year, meaning that inaction now can lead to larger challenges in the future.
- Future-proofing public investment for the new global environment requires adopting a region approach that takes on board existing territorial inequalities and strategic foresights on emerging and anticipated risks.

The territorial dimensions of economic inequality

Inequalities within OECD countries can be larger than those between countries. Although inequality in GDP per capita across large OECD regions (TL2 regions) decreased over the last two decades, many countries have seen increases. Convergence across OECD countries has been the driving force in reduced inequalities for the OECD as a whole. Indeed, inequalities within countries, for the OECD average, saw little overall change over the period. However, nine countries (Czech Republic, Italy, United States, Lithuania, Spain, Germany, Greece, Denmark and Austria) saw inequalities increase. (Figure 10, Panel B).

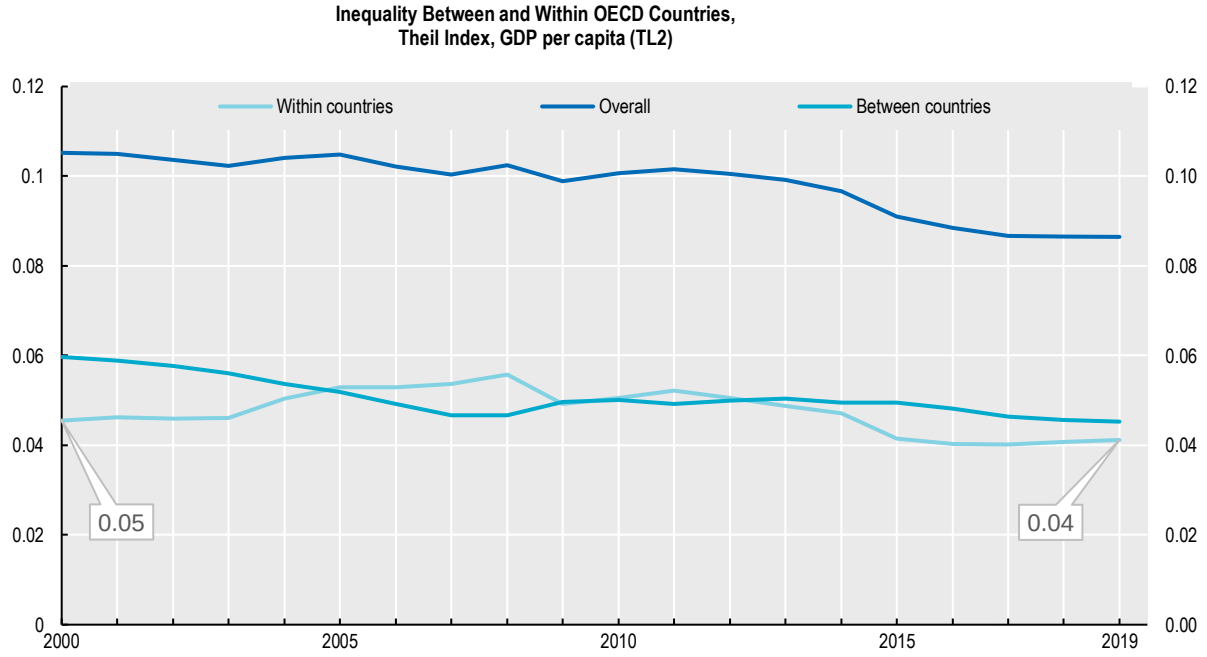
Inequalities in GDP per capita across smaller OECD regions (TL3 regions) within countries increase across most countries. Comparisons of inequalities for large regions mask movements in smaller regions both for the OECD as a whole and within countries. For the OECD as whole, despite convergence across countries, regional inequalities increased among small TL3 regions within countries (Figure 11, Panel A), in line with the evidence of growing geographies of discontent. Moreover, regional inequalities increased in 21 out of 25 OECD countries (Figure 11, Panel B) with available data in the post-global financial crisis period (2008-19) compared to the pre-crisis period (2000-07).

Top-performing small TL3 regions are driving and deepening the inequality gap. Among countries where inequalities grew, in all but Greece and Italy (where the bottom regions saw declines in income per

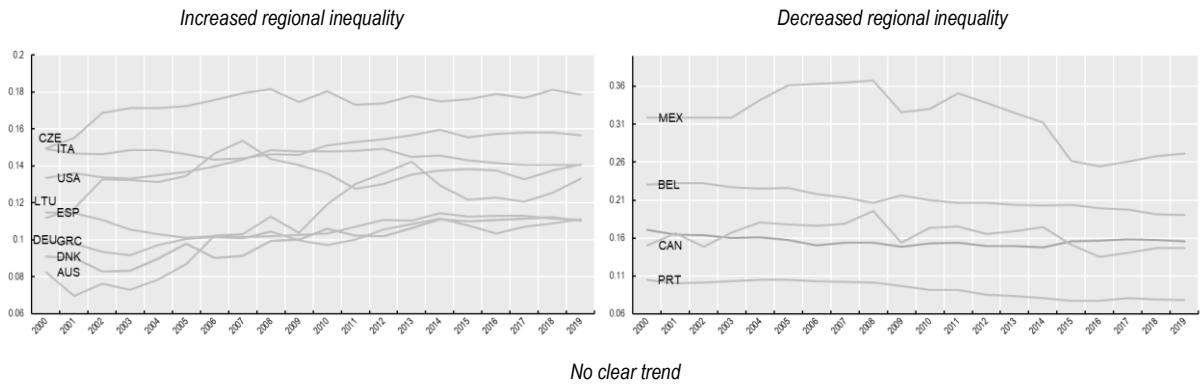
capita between 2000 and 2019) this was driven by the top performing regions (Figure 11, Panel B). In absolute terms, the change in regional inequalities was largest in Czech Republic, Slovakia, Lithuania, and Poland, where the gap in per capita income between top and bottom regions increased by at least USD 7 707 between 2000-07 and 2008-19.

Figure 10. Inequality between and within countries, 2000-2019 in large regions

Panel A. Inequality trends between and within countries using the Theil Decomposition Index in GDP per capita, TL2 level (2000-2019)

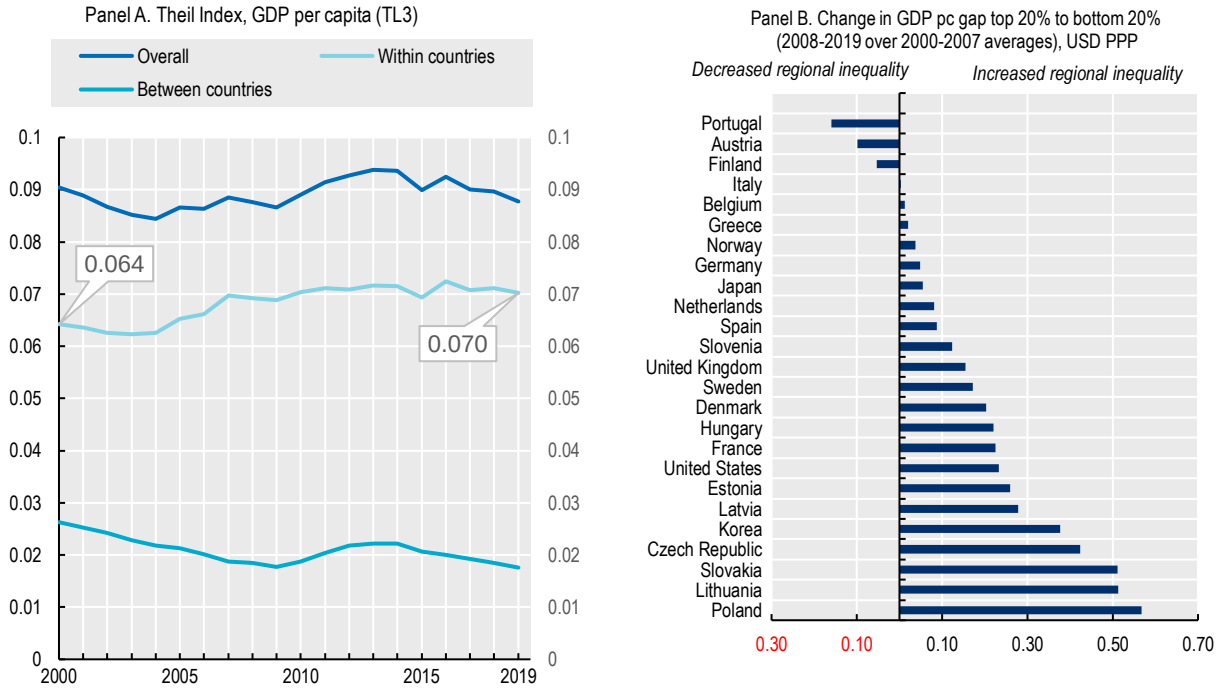


Panel B. Regional inequality between TL2 regions in GDP per capita, 2000-2019



Note: Inequality as measured by the Theil index including AUS, AUT, BEL, CAN, CHE, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HUN, ITA, JPN, KOR, LTU, LVA, MEX, NLD, NOR, NZL, PER, POL, PRT, SVK, SVN, SWE, TUR and USA. Observations are linearly extrapolated for countries missing 2019 data.
Source: OECD (2022) OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

Figure 11. Regional inequalities increased after the 2008 crisis in most OECD countries, 2000-2019

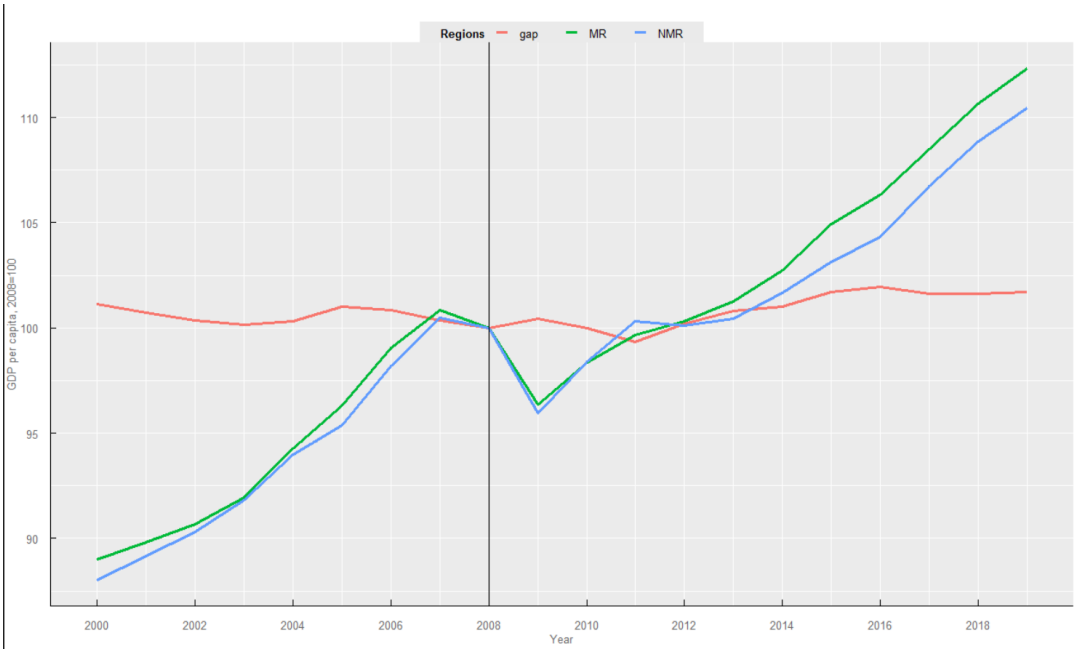


Note: Analysis based on GDP per capita, constant prices, constant PPP, base year 2015. 2019 data contains extrapolated values using recent growth rates. Based on available data for 1 494 TL3 regions. In panel B, values reflect change in GDP per capita gap in top 20% to bottom 20% in the pre-financial crisis and post-financial crisis periods (i.e. 2008-2019 over 200-2007 averages, then centered at 0). An above 0 value indicates increased regional inequality, and vice versa. Unlabelled cases are better off (top or bottom). Top (bottom) refers to top (bottom) 20% regions with the highest (lowest) GDP per capita levels (PPP) with populations adding up to at least 20% of the national population.
Source: OECD (2022) OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

Gaps in GDP per capita between metro and non-metro TL3 regions have grown across the OECD and within many countries (Figure 12**).** Analyses by different types of TL3 regions classified by metro (metropolitan) and non-metro regions reveal a rise in the gap between metro and non-metro across the OECD (by 29% between 2000 and 2019) and in two-thirds of the countries where data are available (16 out of 25).

Non-metro regions were particularly affected by the 2008 global financial crisis. Although the drivers of regional inequality are, in general, mainly related to structural factors rather than macroeconomic shocks (Garcilazo, Moreno-Monroy and Oliveira Martins, 2021[46]), the global financial crisis had a profound impact. Prior to 2008, remote regions and those near a small city (with less than 250 000 inhabitants) saw GDP per capita converging towards metropolitan areas but since then there has been divergence (Figure 13). This is driven by the smaller size and lower economic diversification of non-metro regions that leaves them more exposed to systemic shocks as well as from heightened international competition brought about by the reduction of transportation costs and delocalisation of production to developing countries. Such impacts have meant that in 2019, non-metro region median GDP per capita was only at the levels of metro regions two decades ago (Figure 13).

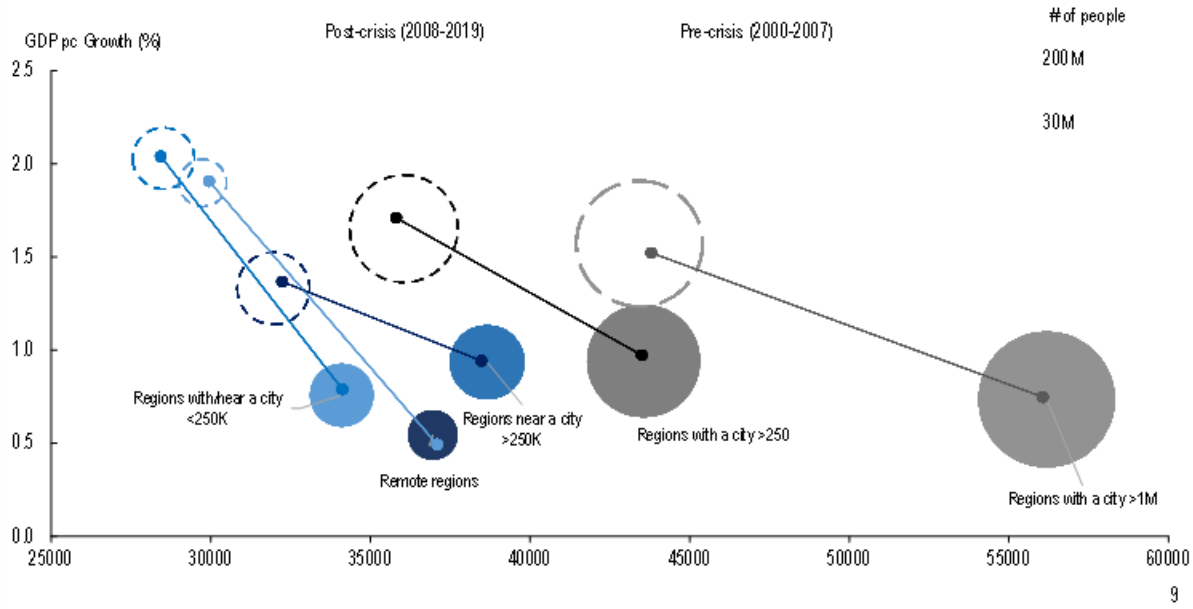
Figure 12. Real GDP per capita gap between metro and non-metro regions has increased over the 2000-2019 period



Note: Based on GDP per capita, constant prices, constant PPP, base year 2015, for 1 494 TL3 regions in 26 OECD countries.
Source: OECD (2022) OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

Figure 13. The global crisis brought convergence in remote and non-metro small regions to a halt

Dotted lines refer to pre-crisis growth performance and non-dotted to post-crisis performance



Note: Size of the bubble proportional to population in initial and final year. Based on available data for 1 530 TL3 regions in 28 countries. The dotted bubbles represent the average growth rate during pre-crisis and the non-dotted lines the average growth in the post-crisis. The slope shows the effects of the crisis.
Source: OECD (2020) OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en.

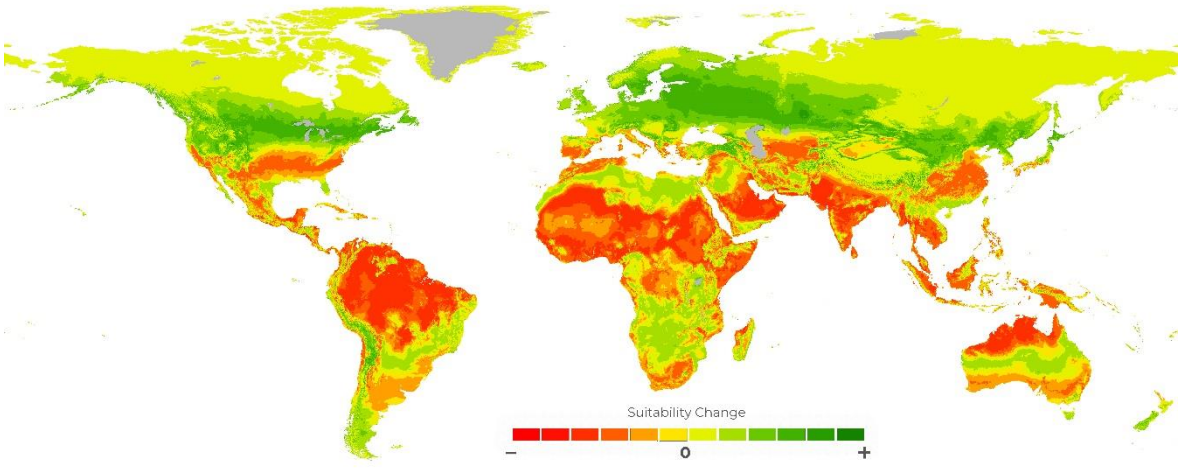
The asymmetric impact of megatrends within countries

Megatrends could further amplify existing regional inequalities. The megatrends of technological change, climate change and demographic change are likely to exacerbate structural factors driving regional inequalities. Some regions will need to undergo major transitions to adapt to challenges, while others are better equipped to seize the opportunities that are created from the transition. Policymakers will increasingly need to take action now to address both short and long-term impact of megatrends, and in particular their spatial impacts.

Developing a regional perspective to climate policy and investment is essential

Reaching the objectives of the Paris Agreement will prevent major global threats to human wellbeing, but actions need to be taken at a local level. Key risks from an increase in global temperatures of 2 degrees and above include worldwide food shortages, high risks of water scarcity in dryland regions and large-scale wildfires. Under a business-as-usual climate scenario, by 2070, some regions in the world may become virtually uninhabitable (Figure 14)[3]. To address the threat posed by climate change, actions are needed at a local level that are in line with the local context for three reasons. Firstly, because the actions needed to get to net zero-emissions vary significantly across regions and a just transition needs to attend to the different regional socio-economic vulnerabilities and opportunities. Secondly, the additional well-being benefits climate policy generates are key to improve the political economy of climate action, as the negative impacts of actions are often felt more strongly locally. Thirdly, subnational governments are key actors to support the net zero transition as they account for 64% of all climate-related public investment (OECD, 2019[3]) and can develop local solutions for the transition, such as supporting the development of circular economies (OECD, 2020[47]).

Figure 14. By 2070 some regions may become virtually inhabitable and some more suitable for life



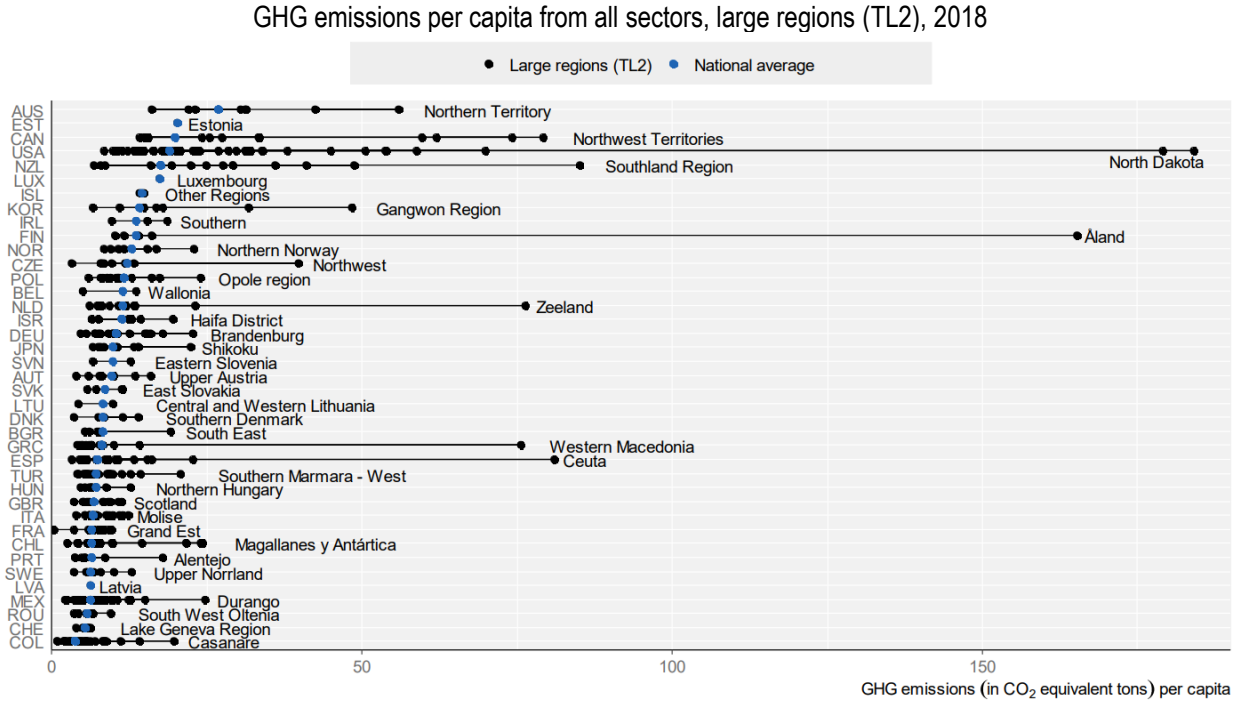
Note: The graph above is based on research indicating that about 30% of the world's population will live in places of 'unliveable heat' within 50 years. Source: (Xu et al., 2020[48])

Climate adaptation challenges and opportunities also differ sharply across regions. Estimated emissions per capita often vary more across regions within countries than between countries (Figure 15)

[3] This analysis is based on a commonly-cited high-emissions climate scenario known as RCP8.5 or *business-as-usual*. Under this scenario it is estimated that roughly 3.5 billion people (~30% of the future human population) would have to migrate in order to remain distributed according to habitable temperatures as it has been for thousands of years.

(OECD, 2021[49]). In some regions, industrial emissions dominate, in others, emissions from transport, agriculture or power-generation dominate. Regions therefore have different climate actions to undertake to support the transition. For example, while metropolitan regions across OECD countries combined contribute the most to total GHG emissions, rural regions' emissions are higher per capita. Regions and cities also differ with respect to their climate action needs, such as in the need to prioritise reducing coal use or improving public transport performance. Understanding regional emissions and socio-economic characteristics can help to support effective local climate actions.

Figure 15. Within-country variations in per capita GHG emissions are larger than differences between countries



Source: OECD, 2021, Regional Outlook.

Industrial transitions to climate neutrality are a central part of regional development. In the transition to a climate-neutral economy by 2050, some manufacturing industries will need to undertake particularly profound transformations. These industries contribute substantially to emissions and are among the hardest to decarbonise. Employment and emission-intensive activity are concentrated some regions. For example, high emissions and employment from chemical industries are concentrated in some Belgian, German and Czech Regions. Average wages in the key manufacturing sectors are often higher than average wages, meaning that job loss or job transformations pose risks for wealth in regions hosting them. These risks are sometimes reinforced by lower GDP per capita, and more widespread poverty risk. Regions also differ in their access to key infrastructure some of these industries will require, notably for hydrogen, carbon capture and storage and zero-emission freight transport, which is key to value chains.

Opportunities to benefit from digital transition are unequal across places

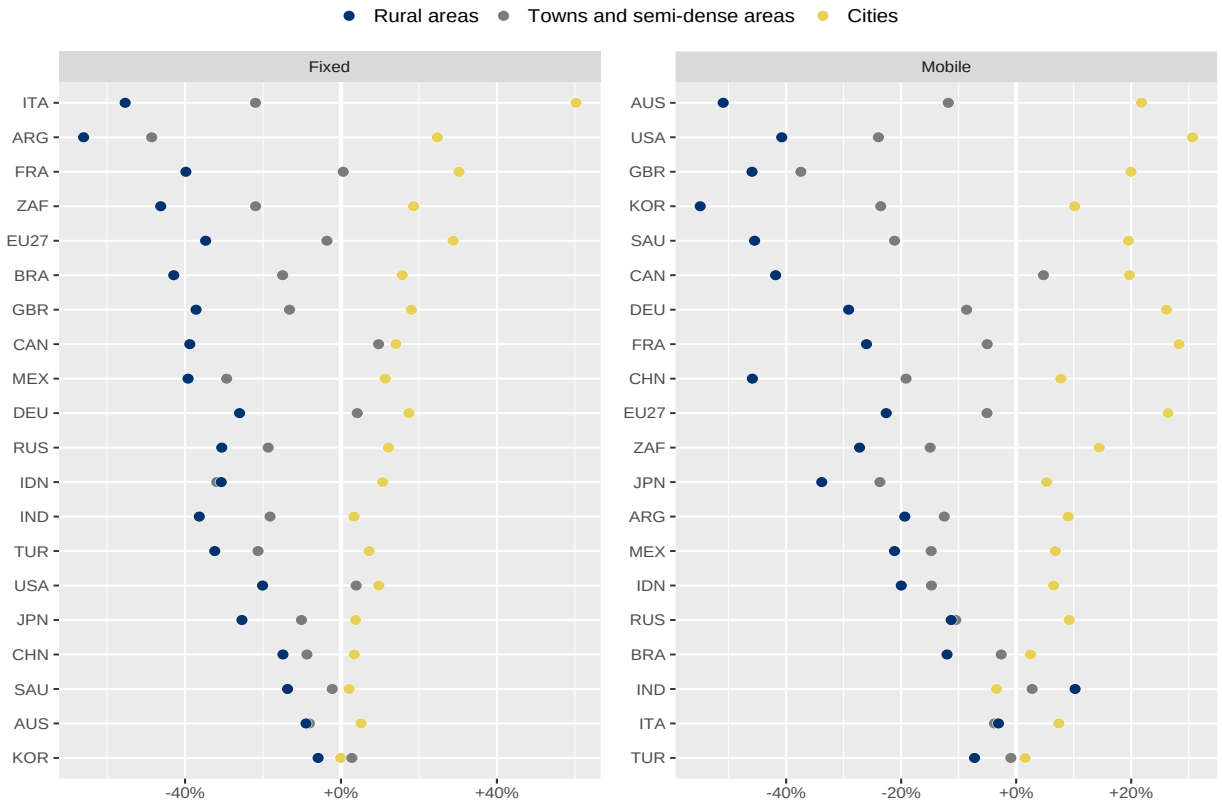
The digital transition is transforming the future of work for many firms and people, but the emerging opportunities are uneven across different places. The rise of remote working, increasing automation and the digitalisation of services are improving productivity and well-being for many people. Remote working, for example, is redefining how and where people choose to work, proving an important opportunity

to improve the work-life balance by reducing commuting times and encouraging more flexible working arrangements. At the same time, it is redefining where higher income higher skilled workers choose to live, which will impact the future development of regions, transportation systems and impact carbon emission patterns. The opportunities being created are not even across places, largely due to differences in connectivity, the share of occupations amenable to remote work, and the digital skills required to succeed in this new economy (OECD, 2021[50]).

Limited high-speed broadband connections can impede benefits from digitalisation and the potential for remote working. Digital access varies significantly across regions, which can limit access to the advantages from the digital transition (Figure 16). Download speeds over fixed networks in rural areas, for example, are on average 31 percentage points below the national average, while download speeds in cities are 21 percentage points above (OECD, 2021[4]). These differences can exacerbate structural factors that limit the ability for some regions to fully benefit from the digital transformation. Regions for example with relatively few workers in knowledge industries are much more less likely to benefit from remote working. On average, the share of workers that could potentially work remotely differs by 15 percentage points across regions within OECD countries (OECD, 2020[51]; OECD, 2021[50]).

Figure 16. Gaps in download speeds experienced by users by degree of urbanisation

Gaps estimated as percentage deviation from national averages in Q4 2020



Note: Speedtest data corresponds to 2020Q4. The data for average fixed and mobile broadband download Speedtests reported by Ookla measures the sustained peak throughput achieved by users of the network. Measurements are based on self-administered tests by users, carried over iOS and mobile devices. Aggregation according to the degree of urbanisation was based on GHS Settlement Model (GHS-SMOD) layer grids. The figure presents average peak speed tests, weighted by the number of tests

Source: OECD, 2021, Implications of Remote Working Adoption on Place Based Policies (OECD, 2021[4]). OECD calculations based on Speedtest® by Ookla® Global Fixed and Mobile Network Performance Maps. Based on analysis by Ookla of Speedtest Intelligence® data for 2020Q4. Provided by Ookla and accessed 2021-01-27. Ookla trademarks used under license and reprinted with permission

The acceleration of automation will also have a strong, spatially-differentiated impact. Automation will both create and destroy jobs, but the new jobs created will not necessarily be in the same places as the jobs that were lost. However, the share of jobs at risk from automation varies greatly depending on local economic specialisation and digital skills. Regions with a higher share of manufacturing activities, especially those in rural and remote regions face a higher risk of automation. The share of jobs at high risk of automation is nearly 40% in some regions (for example, West Slovakia), but can be as low as around 4% in others (around Oslo) (OECD, 2020[52]). Automation is also likely to accelerate job polarisation (Goos, Manning and Salomons, 2014[53]). More jobs are shifting from middle-skill to high- and low-skill jobs, with demand for high-skill workers outpacing demand for middle-skill and with low-skill workers facing greater risks to job loss due to automation across OECD metropolitan areas (OECD, 2020[52]).

Adapting to the digital transition requires that people and firms have the right digital skills. There remain large gaps in the speed of the digital transformation between small, medium (SMEs) and large firms. SMEs trail large firms in the adoption of everything from social media and e-commerce tools to cloud computing and big data. While the pandemic has helped to close the gap, with 70% of businesses surveyed worldwide indicating a recent increase in the adoption of digital technologies, significant gaps and challenges remain (OECD, 2021[54])**.** At the household level, the share of people using the internet in regions with the highest use is 10 percentage points higher than in the region with the lowest use. This can lead to significant differences in the ability of people and firms to position themselves for the new digital environment. Finally, the COVID-19 crisis drew attention to weaknesses among local governments and SMEs around digital security which creates significant vulnerabilities for people and firms during the rapid adoption of teleworking and shifts to e-commerce (OECD, 2020[55])

Demographic change will strongly affect some regions

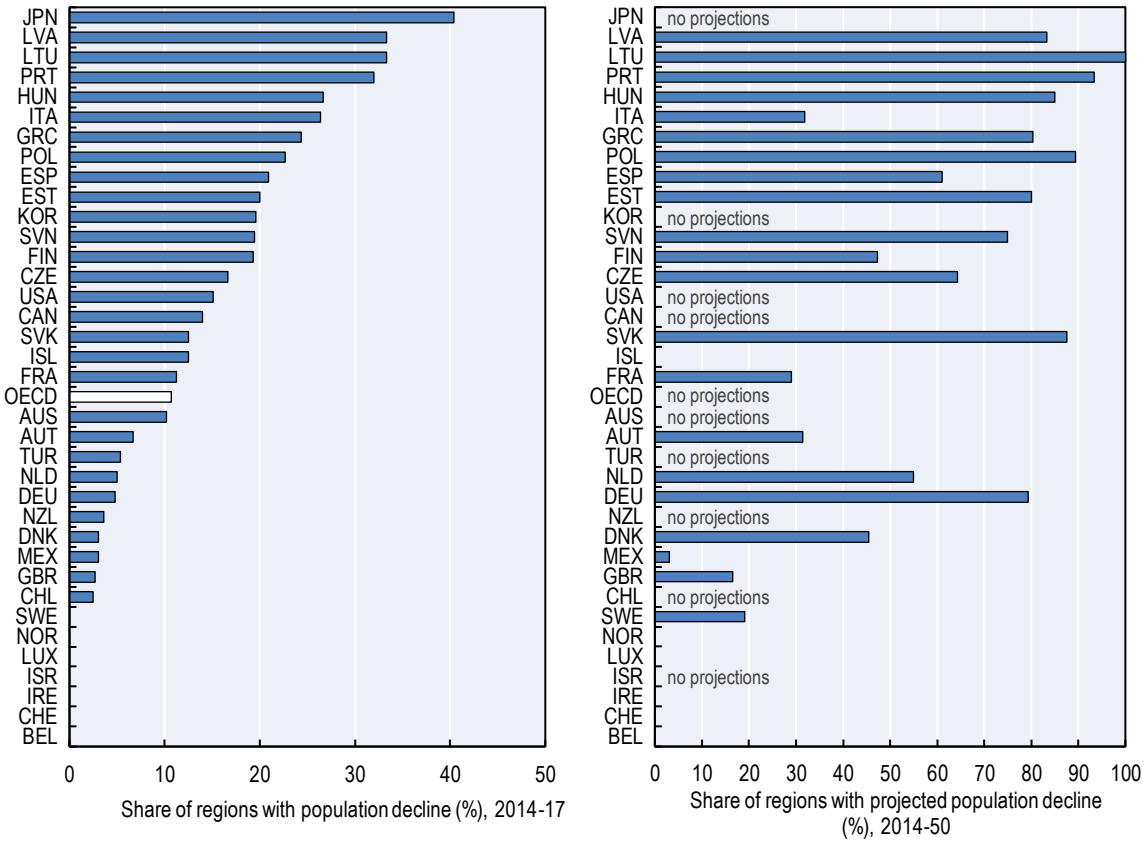
Although the majority of OECD countries are ageing and starting to shrink at a national level, these patterns are much stronger in remote and rural regions. The large decline in fertility rates between the 1960s and 1980s is starting to be felt in many countries as baby boomers and the following generations are reaching retirement age. In many regions, population decline is already a reality: 29 out of 36 OECD member countries had regions with shrinking populations. Within Europe, 35% of people live in a region that saw the population decrease between 2011 and 2019 (OECD/EC-JRC, 2021[56]). By 2050, over 50% of OECD regions are expected to have lost population (OECD, 2019[3]). While many major cities in OECD countries are anticipated to continue to grow, many non-metropolitan areas will shrink (Figure 17).

Ageing presents economic challenges, which are even bigger in rural and remote areas. The share of elderly people (i.e. 65 years old or older) is projected to increase in almost all regions over the coming decades. By 2050, nearly 30% of the population in European regions outside of metropolitan areas is expected to be 65 years old or older. Only regions that are part of metropolitan areas with at least 1.5 million inhabitants will continue to have close to 25% of their population 65 or older (OECD, 2019[3]). An immediate consequence of ageing is an increase in the dependency ratio (the ratio of retired people to those involved in productive activities), thus implying a reduction in the growth rate of GDP per capita. The lower old-age dependency ratio in cities is primarily due to the domestic migration of young people into cities.

Demographic changes will create fiscal challenges for some local and regional governments. Shrinking and aging populations will reduce revenues and increase the cost of service provision per capita for subnational governments**.** For example, education costs per student in rural areas can be 40% higher than in urban areas for primary schools in Estonia, Finland and Latvia and 16% higher for secondary schools in Greece and Spain (OECD/EC-JRC, 2021[56]).

Figure 17. Population decline is affecting many regions and will affect more in the next 30 years

Percentage of small regions (TL3) where population declined between 2014 and 2017, and projections of the percentage of small regions with declining population by 2050



Note: Population projections are for the main scenario developed by Eurostat in its "Europop2013" model for which regional projections were developed to complement the national-level projections.

Sources: OECD, (2018) Regional Outlook, OECD Regional Statistics (database), http://dx.doi.org/10.1787/region-data-en and Eurostat "Europop2013" demographic projections.

Migration is another global demographic trend whose implications are predominantly felt at the regional and local levels. While migration and mobility took a large hit during the pandemic, with the issuance of residence permits plummeting and near-universal restrictions on mobility, (OECD, 2021[57]), migration will remain a key policy lever to fill regional employment gaps left by ageing populations, and may likely accelerate due to conflicts, and displacements due to climate change. The inclusion of subnational governments in the migrant integration process can help ensure the greatest social and economic outcomes from migration given their common responsibility for policy domains crucial to integration such as labour, housing, health and education (OECD, 2022 forthcoming[58]). During the pandemic, migrants were especially vital as they represent 23 percent of medical doctors and 14 percent of nurses in EU regions (OECD, forthcoming 2022).

Benefits from globalisation have not been evenly distributed within countries

Reaping and sharing the benefits from globalisation requires place-based development strategies. Increasingly mobile flows of goods, capital and information have led to an unprecedented integration of economies across the world but some regions and firms, especially SMEs, have been less able to benefit than others, often exacerbating regional inequalities (Autor, Dorn and Hanson, 2013[59]). In the wake of the COVID-19 crisis, and the subsequent disruptions to supply chains, these uneven outcomes have led some companies to consider a reorientation of supply chains, bringing the production of goods (notably, essential ones) closer to home and to improve the resilience of global value chains by shifting to just-in-time production processes to just-in-case. It has also led some countries and regions to consider re-shoring priority industries, with the aim of increasing strategic autonomy. Over the long term, ensuring that the benefits of trade are felt by all requires a better understanding of the factors that drive regional attractiveness and integration (FDI, local clusters, supply chains infrastructure, location, knowledge, R&D, tourism, migration). (OECD, 2021[60]). This includes the critical role of SMEs in international trade and their uneven access to trade financing compared to their large-firm counterparts (OECD, 2021[61]).

During the pandemic, supply chain interruptions have not been equal across regions within countries. A report[4] by the Bank of Spain illustrates how disruptions have a differentiated impact on regions, depending on their integration into interregional and global values chains (GVCs), (Prades-Illanes and Tello-Casas, 2020[62]). Less developed regions like Extremadura and Castilla-La Mancha are less directly internationally integrated in GVCs, and therefore less immediately affected by a global economic shock. However, they are nonetheless exposed to shocks to domestic demand in regions directly affected by international supply shocks as well as from shocks that reflect their upstream integration in domestic value chains serving foreign markets.

Regions are increasingly seeking to use smart specialisation strategies to better position themselves in global value chains. Smart Specialisation Strategy is a place-based EU policy that seeks to enhance regional competitiveness through leveraging and bolstering innovation in the selected priority areas (industries or technologies) in each region. The most recent iteration requires developing cross-border collaborations with regions possessing complex and complementary technological expertise currently missing in a region to upgrade its technological evolution. This acknowledges that new growth opportunities arise from recombining existing technological capabilities while more complex technologies offer strong competitive advantage. The region of Friuli Venezia Giulia, in Italy, for example, is seeking to leverage its endowment of science and research institutions to develop the region (OECD, 2021[63]).

The important linkages between megatrends

Understanding the impact of megatrends on territories requires looking at them as part of one system. The convergent and divergent effects of megatrends in particular places, can compound the challenges faced by regions and create trade-offs when prioritising policy actions. This means that there is a need to understand the inter-linkages, for example in the social-ecological nexus, the linkage between urbanisation and climate change, and the effect of demographic change on globalisation.

The social-ecological nexus is a core example of how these trends – in this case, a deteriorating environment and rising social and economic inequalities – are inextricably linked.[5] In the U.S., research shows that heat-related events have disproportionately impacted neighbourhoods along racial

[4] This study relies on a database 'EUREGIO' which maps input-output linkages within countries (domestic links) and across EU regions (foreign links) at the TL2 level. It includes industry-specific data making region-industry specific output multipliers mappable within Spain and with regions in other countries.

[5] Globally speaking, an estimated 956 million people are exposed to high-risk floods, with 587 million of them living in poverty and 132 million in extreme poverty (Rentschler and Salhab, 2020[131]).

lines with Black, Asian and Hispanic individuals facing 52%, 32% and 21% respectively, more exposure to risks than Whites (Jesdale, Morello-Frosch and Cushing, 2013[64]). The greater the level of income inequality the more challenging the adoption of environmental regulations and taxes (e.g. on carbon) which may appear – or, indeed, be – regressive (Laurent, 2014[65]).

Globalisation and demographic change interact in positive and negative ways across places. While trade shocks and offshoring leave some regions adversely impacted with lower labour force participation and demographic decline, many regions have sought to help reverse these trends by attracting migrants from near and far to bridge skills gaps and maintain public services (OECD, 2019[3]). The ability to attract foreign workers and firms often relies on having available economic land. This can raise challenges around the need to avoid compromising climate and biodiversity objectives. Attractive regional systems of innovation and the appropriate multi-level governance arrangements with enough competences devolved to cities and regions can help to mitigate potential trade-offs.

The asymmetric impact of the COVID-19 crisis on regions

The health, economic and social impacts of the COVID-19 crisis have been different across regions within countries. The COVID-19 crisis also has longer-term implications for development of regions. Understanding the unequal impacts of the crisis, and being more forward-looking, can help to ensure that the negative impacts of the crisis are not felt much more strongly in some places.

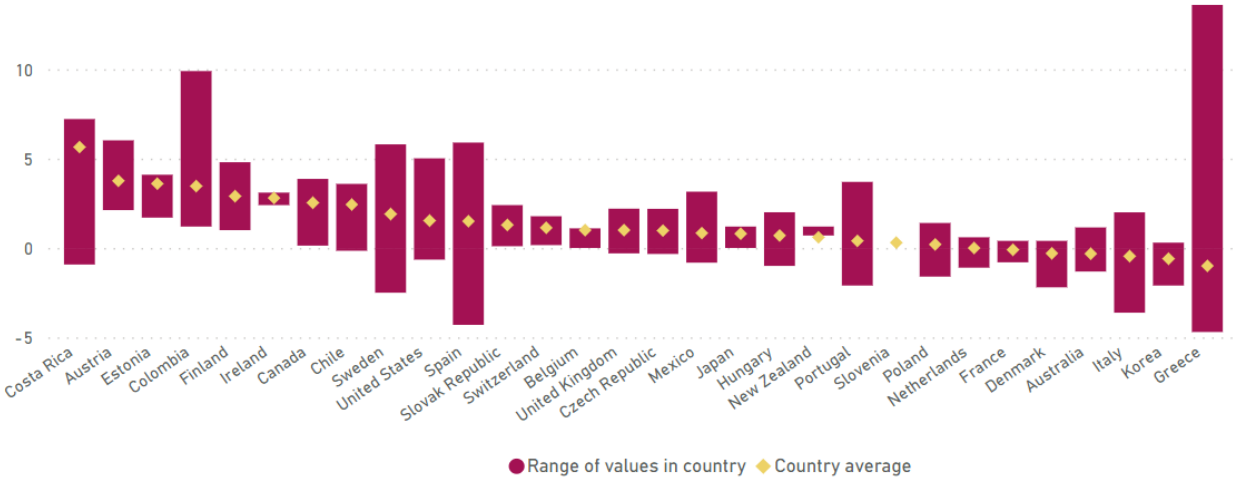
The impact of COVID-19 within countries has been uneven

The tragic impact of the COVID-19 crisis on health has been felt much more strongly in some regions. On average, across OECD countries, the region with the highest excess mortality had a 17-percentage point higher rate of excess deaths than the least affected region within the same country (OECD, 2021[5]). At the same time, although vaccination presents the best way to minimise the health and economic impacts of the crisis, there are large regional variations in vaccination rates in some countries. In September 2021, the difference in vaccination rates between the most-vaccinated and least-vaccinated region within countries was 16 people out of 100 on average (across 15 OECD countries). It was more than 20 people out of a hundred in the Czech Republic, the United States, Germany and Belgium (OECD, 2021[5]). Differences in vaccination rates may be co-related to trust in central public institutions, which highlights the important role of building trust in government to effectively respond to crises. Subnational governments are well-situated to bridge that trust gap by launching initiatives that build civic engagement and promote accountability between citizens, institutions and political processes (OECD, forthcoming 2022[66]).

The negative economic impact of the COVID-19 crisis have been particularly strong in places with the most exposed industries, such as the tourism industry. The economic impact of the COVID-19 crisis differs across regions, depending on a number of factors, both domestic in nature (such as the region's exposure to sectors most impacted by lockdown measures; capacities to adapt to restrictions; the existence and uptake of digital infrastructure; the share of SMEs and their contribution to employment and capacity to weather the recovery) and global (such as the degree of integration into global value chains and dependencies on tourism). Capital regions and other metropolitan regions have a relatively higher risk of job disruption than other regions, particularly in the short term, but at the same time higher capacities to adapt, for example through the adoption of digital tools. Across most regions, the impact on employment has been felt quite strongly. In the second quarter of 2021, unemployment was higher than pre-COVID levels in more than 80% of OECD regions with significant differences observed within countries (comparing the most recent quarterly data with Q4 2019). Spain, Sweden, Colombia and Greece show more than an 8 percentage point difference between the top and bottom performing regions in terms of changes in total unemployment (Figure 18) (OECD, 2021[5]).

Figure 18. Change in total unemployment during the COVID-19 crisis across regions within countries

Range in the change in the unemployment rate (all persons) since Q4 2019 across large regions (percentage points, TL2 or TL3 regions)



Note: Change in unemployment from Q4 2019 to the most recent quarter with data available in each country.
Source: OECD Regional Recovery Platform

The tourism sector has been especially hard hit by the pandemic. Many of the regions that saw the highest increase in unemployment during the COVID-19 crisis were tourist destinations. For example, the South Aegean in Greece experienced a 13 percentage point increase in unemployment, while the Canary Islands and Balearic Islands in Spain, and Ionian Islands in Greece all saw a 5 percentage point increase (OECD, 2021[5]). Recovery to pre-COVID levels is not expected in some regions for 5 years. However, the pandemic has also created a significant opportunity to build back a stronger, more resilient and more sustainable tourism industry, with new opportunities for some regions emerging, such as digital nomad visas, which have seen a surge in some regions that are well-equipped (digitally connected) to benefit (OECD, 2021[67]).

The COVID-19 crisis has significantly affected subnational government finances, although the impact so far has been lower than was anticipated earlier in the crisis due to national government support. Subnational government expenditure increased in 20 out of 24 OECD countries with data available (average 2.5% increase), while subnational government revenue from taxes decreased in 17 countries (average 5.5% decrease) and from user charges and fees decreased in 21 countries (average decrease of 6.5% decrease)[6]. In 21 OECD countries, the decrease in revenue was partially or fully offset by an increase in grants and subsidies from national governments to subnational governments. Although the impact on subnational governments was less severe than anticipated in 2020, the future prospects for subnational governments remain uncertain.

[6] Based on preliminary data for 2021 from the OECD National Accounts, harmonised according to the System of National Accounts (SNA) 2008. Calculated based on the average unweighted change in revenue by transaction type for subnational governments between 2019 and 2020 across 24 countries with data available. See the OECD Regional Recovery Platform for details (OECD, 2021[5]).

Longer-term impacts from the COVID-19 crisis on cities and regions

The pandemic is accelerating and reshaping megatrends, deepening their impact and their territorial dimension. Regional economies, cities, and populations are undergoing transformations that have been reoriented by the COVID-19 crisis. For example, supply chain interruptions have highlighted that some regions are more exposed by their integration into the global economy. For example, while richer states in Brazil (Sao Paulo and Rio de Janeiro) were more immediately affected, poorer regions on the periphery suffered compounded consequences when demand for interregional trade from core states declined (Sanguinet et al., 2021[68]). The impact on urbanisation has also varied. In the U.S., the largest metropoles (with 1 million+ residents) who benefitted from the highest per-capita gains in population in recent decades, suffered the greatest population losses during the pandemic (Brookings, 2021[69]).

Increased remote working is likely to be a lasting legacy of the crisis, with implications for the future of cities and regions. Although the transition towards virtual working was a forced experiment for many, it has produced a number of positive results including the temporary reduction of greenhouse gas emissions, greater potential for improved work-life balance and cost savings. Greater adoption of virtual working methods and social interactions offer incentives for some workers to relocate outside large cities (either partially or full time). The possibility to work virtually—coupled with a greater availability of suitable housing, lower costs of living and greater environmental amenities outside large cities—can attract workers. For firms, the pandemic has also raised the possibility to consider a change in their real estate strategy, either by downscaling or relocating part of the office space. Ultimately, people's and business' decisions to relocate, full time or partially, will involve a cost-benefit analysis in which national and subnational government actions can play a decisive role by creating conditions for workers and firms to adopt hybrid/remote working, while improving local conditions of quality of life.

Greater adoption of remote working could also foster in-depth renewal in cities by accelerating the digital, climate and societal transitions that were already underway before the pandemic but sprung forward with COVID-19 recovery strategies. Sustained uptake of remote working could help shift more public services and activities online, free up some urban public space previously invaded by individual cars and give it back to pedestrians and users of clean urban mobility, and convert unused office space into much needed residential housing, for example.

New settlement patterns may emerge as we exit from the COVID-19 crisis due to the increase in remote working. Although the future effects that remote working might bear on settlement patterns remains speculative and uncertain, various settlement scenarios could emerge in the post-COVID-19 normality due to the increased adoption of remote working including (Table 3):

- Business as usual, with greater use of hybrid working model
- A doughnut effect, with expansion of commuting zones around cities
- Intermediate cities becoming increasingly attractive
- Structural change of cities related to the permanent movement of high skilled workers outside city centres
- Renewable of cities, experiencing transformations to tackle congestion pollution and inequalities

Table 3. Scenarios of settlement patterns distribution on the post-COVID-19 world.

	Description	Degree of workers' relocalisation and workplace environments	Effect on mobility and regional development
Business as usual with greater use of hybrid working model	Dense cities continue to agglomerate workers and firms. Remote working is increasingly adopted within the city, with little impact on the worker's relocation.	Low: Most workers remain in large cities by favouring proximity to workplaces. -Some firms with teleworkable activities still limit possibilities of remote working.	-Reduce pressure on public transport at peak times in large cities and increased use at off-peak times. -Increased one-off commuting to telework outside cities, either in secondary houses or rented spaces. -Rural regions with touristic attraction experience greater inflows throughout the year.
Doughnut effect	The city centre becomes more hollow or empty, as businesses and people move into the outskirt of the city to find affordable and larger housing.	Medium-Low: High-skilled workers move from large cities to their outskirts or areas with bigger and cheaper spaces. - Workplaces in CBD became friendly/attractive spaces that promote social interactions.	-Increase distance of commuting, but per person commuting time reduces. -Outskirts and rural regions face new demand for services and land -Improve housing affordability within large cities. -Greater demand for expansion of public transport services in some large cities
Rise of intermediate cities	Cities offering agglomerations and medium services benefit from the drain of densely populated cities. Workers and firms search for advantages of a city balanced quality of life.	Medium-High: Workers on highly teleworkable activities move to intermediate cities. -Firms reduce headquarters and open satellite offices. -Increase co-working spaces in intermediate cities	- Greater demand for services and land in intermediate cities. - House and office prices stagnate or reduce in large cities, relative to other cities. - Increase use of car in intermediate cities with poorly developed public transport.
Structural change of cities	Highly skilled workers move outside central business districts. It reduces income for workers (mostly low-skilled) in local consumer service industries in cities, which might trigger movement of thee workers outside the city.	High: An important share of high skilled and low skilled workers leave large cities and spread-out across the territory. -Increase of nomad workers (mainly young) with a greater use of hotels and touristic areas as Workplaces. -Increase of co-working spaces across the territory	-Long but less frequent commutes by nomad workers. (Car, train and plane). - Decrease general commuting time, but increase short commutes by car. -Rise of co-working centers in rural regions/ outskirts. -Small cities and rural regions face greater demand for services and land. -CBD fade and reconvert into housing districts or green areas.
Renewal of cities	Cities tackle their longstanding challenges, notably in terms of congestion, pollution and inequalities, to offer a more sustainable and inclusive living environment.	Low: Most workers and firms remain in large cities. - Some workers and firms that had moved out in search of higher quality of life and more affordable prices may be attracted back to cities	- Commuting flows are less frequent, spread out across time to avoid peaks and use more sustainable modes. - Cities remain or become even more attractive

Note: These four scenarios are built based on relevant articles. The Doughnut effect scenario is inspired by (Ramani and Bloom, 2021[23]). The rise of intermediate cities scenario is inspired by a work in progress by Philipp McCann; the Structural Change of Cities is based on (Althoff et al., 2020[36]), while the Renewal of Cities with more remote working world was built from internal discussions at the OECD. CBD refers to Central Business Districts

Source: OECD, 2021, Implications of Remote Working Adoption on Place Based Policies, https://www.oecd.org/cfe/implications-of-remote-working-adoption-on-place-based-policies-b12f6b85-en.htm

The costs of inaction on megatrends and regional inequality

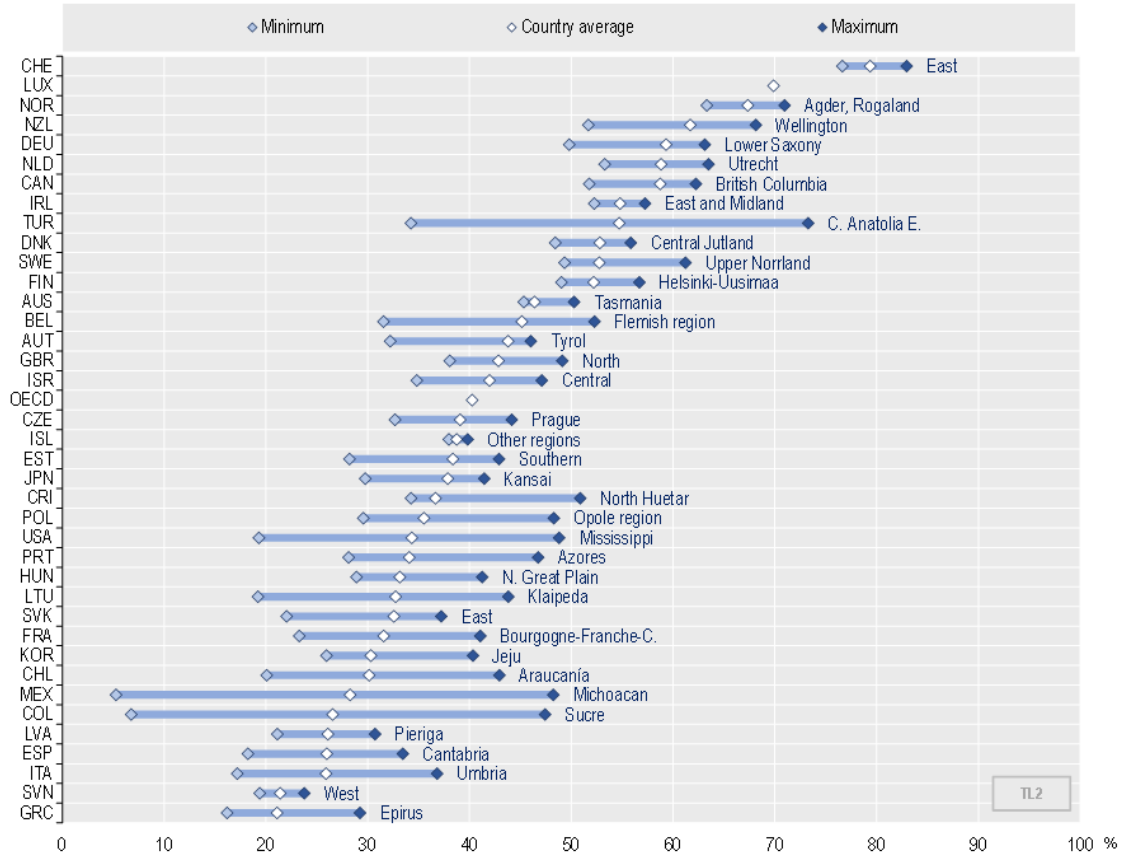
Understanding and addressing asymmetries is essential to prevent longer-term risks to our society, economy and environment. Asymmetries across places within countries – in economic inequality, in the effects of megatrends and in the impact of COVID-19 – creates risks for social cohesion and well-being. For example, delaying action on climate change may cost as much as USD 5 trillion/year (7% of global GDP), with higher costs incurred by regions under pressure to adopt new technologies to adapt and mitigate. Similarly, leaving inequality across regions within countries – and between metro and non-metro regions – may threaten social cohesion and political stability. Acting now to address these risks can prevent much more significant consequences and higher costs over the long term.

Territorial inequalities pose long-term risks for social cohesion

Regional disparities in social cohesion could be deepened as megatrends and economic shocks continue to pose greater risks to some regions over others. The crisis brought to the fore how deeper divisions within societies can lead to drastic outcomes; higher COVID-19-related death rates were observed where social cohesion was weaker, as was the case in past health crises (Helliwell et al., 2021[70]). A US-wide study using survey data from 1978-2010 illustrates that low-trust regions consistently reported higher all-cause mortality than high-trust regions (Girodano, Miewes and Miething, 2019[71]). Looking further, a study of 84 countries finds that places where income inequality is wider and certain dimensions of social capital weaker (notably, civic engagement and confidence in institutions) reported consistently higher rates of mortality due to COVID-19 (Elgar, Stefaniak and Wohl, 2020[72]). Within countries, social capital has a strong territorial dimension, with confidence in the national government varying by double-digits (percentage) between highest and lowest performers across many OECD countries (Figure 19) (OECD, forthcoming 2022[66]). Regional trust levels in health authorities show a strong relationship with vaccine acceptance, illustrating the importance of monitoring and improving trust in institutions in anticipation of future health crisis. Furthermore, increasing preventative measures, through critical investments in health and education, can help ease pressures on future public finances by reducing the potential need for high remedial costs down the road.

Increasing or sustained inequalities could bring instability to democratic systems, which may create larger challenges in the future. Rising regional inequalities in income show strong effects on national and supranational (EU) trust levels and can lead to extreme levels of skepticism and support for populist parties in the least well-off regions (Lipps and Schraff, 2020[73]). This suggests that the effect of increasing income disparities has knock-on effects for social cohesion and political stability. Addressing income inequalities can help to mitigate against political unrest and promote a greater sense of cohesion within and across countries. As observed above, regional inequalities are more salient than those between countries, while the situation is even more profound between metro and non-metro regions. The territorial angle is therefore an imperative lens to consider when addressing rising inequalities and to avoid the creation of ‘haves’ and ‘have-nots’ within countries.

Figure 19. Confidence in the national government, average 2014-2018



Note: Confidence in the government refers to the share of population aged 18+ who declare that they have confidence in the national government; TL2 regions
Source: OECD Regions and Cities at a Glance 2020, OECD estimates based on Gallup World Poll

COVID-19 has exacerbated some already-worrying trends in mental health, with OECD-wide increases in levels of anxiety and loneliness over the past two years. Moreover, the impact was felt most by youth, the under-employed, the less educated and the financially vulnerable (OECD, 2021[74]). Climate change is increasingly found to be a driver of poor mental health as extreme weather events like heat waves, wildfires and floods lead to increased anxiety, post-traumatic stress disorder and depression (Cianconi, Betrò and Janiri, 2020[75]).These events are contingent on geographies, suggesting a (mental)health-climate nexus that is territory-dependent (Cruz et al., 2020[76]). Indeed, average future and current life satisfaction varies by territory with the highest levels concentrated in cities followed by towns and semi-dense areas and finally rural areas. Overall, the impact of COVID-19 on well-being takes many forms – it has stalled education attainment, reduced social interactions, increased depression and anxiety among already-vulnerable groups and led to long-term unemployment and isolation for many (OECD, 2021[74]). In the U.S., researchers have developed an interactive tool to monitor geographies of 'hope and desperation' showing vast differences across and within States and along racial lines in people's sense of optimism and worry – these findings point to higher health and employment outcomes for the optimistic than their less hopeful counterparts (Graham and Pinto, n.d.[77]).[7] Identifying and treating geographies of discontent has long-term implications for public health and the public purse, but also for the sustainability

[7] Geography of Hope and Desperation (brookings.edu)

of democracy, in combatting populism and disinformation and maintaining social cohesion across people and places.

Direct costs to firms and households are set to increase as public action on the digital transition and climate change is delayed. In parts of the United States that are particularly vulnerable to droughts, floods and wildfires, the costs of insurance premiums on mortgages have, in some cases, risen faster than inflation causing people to consider moving to regions less prone to extreme weather events (Khanna, 2021[78]). In the U.K., costs to food, energy and water (11%, 5% and 2% of household expenditures, respectively) are all expected to rise as a result of climate change, with a significant impact on low-income households (Watkiss et al., 2016[79]). Subnational governments have significant regulatory jurisdiction over climate issues such as water governance and energy grid management, allowing them to address the costs and the sustainable use of these resources in a way that best serves people and planet. On the firm side, local governments and SMEs remain the victims of weak digital security which will render them vulnerable to cyber threats which are increasingly common and sophisticated (OECD, 2020[55]). Moreover, firms with existing digital sales infrastructure weathered the crisis much better than their offline peers. In Canada, of the 26% of small businesses with an online presence, 30% saw sales increase during the pandemic. SMEs are cornerstones of local and regional economies making their digital and supply chain preparedness a lifeline in the event of future crises.

Firms may also stand to benefit from sustainable financing and green investments ushered in by financial institutions and responsible investors looking for social returns on investment. However, there are demand-side (lack of awareness, reporting requirements) and supply-side (information asymmetries between banks and firms, limited offerings) barriers that stall SMEs in accessing this financing (OECD, 2021[80]). Carbon pricing mechanisms may place additional cost pressures on SMEs but there will be new opportunities for small firms in the clean technology sector that should far outweigh these marginal cost increases (Smart Prosperity Institute, 2017[81]; IEA, 2021[82]). In this respect, regions that forego investments in SMEs to fully engage in the net-zero transition are foregoing significant economic – not to mention, environmental – benefits.

Managing risk in uncertain times

Future-proofing public investment for the new global environment requires adopting a regionalised approach informed by strategic foresights on emerging and anticipated regional risks. Future scenarios for global and interregional migration – largely driven by climate change - will vary greatly across regions, leading to increased demand for public services, putting potential pressure on social and health systems in OECD countries if not pre-empted (International Organization on Migration, 2009[83]). Infrastructure investments will need to be made that anticipate extreme weather events and sea level rise, all while avoiding the 'green gentrification' of cities and regions which can make life less affordable for vulnerable populations in the name of sustainable development (UNEP, 2021[84]). In this respect, the European Parliament has proposed an innovative method for stress testing policies at each stage in the policy cycle in order to capture the potential impact of exogenous shocks (ex. on food supply, public health capacity, financial markets, and different scenarios under a changing climate) (European Parliament, 2021[85]). The capacity advantage of subnational governments – vis-à-vis spending, regulatory and policy competences, as well as trust from- and proximity to citizens – positions them well to pave the way forward in future-proofing their regions against the risks outlined in this chapter and beyond.

3 Making the most of public investment across levels of government

Quality public investment to achieve long-term priorities

Quality public investment is critical to address pressing economic, environmental and societal challenges at a global, national and regional scale. Public investment[8] in hard and soft infrastructure helps to build the foundations for future wellbeing and prosperity. It can help to respond to significant macro forces and related regional challenges – ranging from economic shocks to climate change, the digital transition and demographic change. Investment can also help to unlock new economic opportunities arising from these challenges and prevent higher future costs. It can be in new infrastructure, or in the upgrade and modernisation of existing hard and soft infrastructure.

Quality public investment requires working across levels of government to align investment plans with long-term priorities and effectively deliver planned investment. This means ensuring that investments are sustainable and responsive to current economic conditions - for example, by prioritising maintenance and upgrades during the current economic recovery (IMF, 2020[86]) as well as megatrends (demography, climate change, digitalisation, etc.). As public investment is a shared responsibility between central, regional and local, it also means working collaboratively across levels of government to ensure that investment priorities are efficiently identified and delivered in line with local needs.

This section of the report highlights the importance of public investment, and stresses the essential role of subnational governments to help achieve long-term policy priorities. It then outlines the key success factors to effectively deliver public investment across levels of government.

[8] **Definition of public investment:** The way public investment is defined and measured across countries varies. In general, it refers to investment in hard infrastructure (physical infrastructure such as transportation, energy, public buildings, basic utilities, etc.) and soft infrastructure (e.g. innovation support, human capital, institutional and regulatory frameworks, etc.) with a productive use that extends beyond a year. Capital expenditure consists of direct investments (i.e. gross capital formation and acquisitions, less disposals of non-financial non-produced assets) and capital transfers (i.e. investment grants and subsidies in cash or in kind made by subnational governments to other institutional units). Public investment consists of direct investment, whose gross fixed capital formation (GFCF or fixed investments) is the main component. Maintenance can count as public investment, even though from an accounting perspective it may sometimes be included in current expenditure and not gross fixed capital formation.

Key messages

Public investment for a more equitable and sustainable future

- Public investment is crucial to address pressing economic, environmental and social challenges, but levels of investment have declined since the 1970s in many countries.
- The extraordinary stimulus packages being implemented by many countries as part of the COVID-19 recovery have put public investment at the centre of the recovery, which provides an important opportunity to invest in long-term priorities to build a more equitable and sustainable future.

Quality public investment across levels of government

- Public investment is a shared competency across levels of government, with subnational governments responsible for 55% of public investment in OECD countries in 2020 and having key responsibilities for social and economic development, and for adapting to the impact of megatrends.
- As public investment is a shared competency, supporting high-quality public investment requires effective multi-level governance, including strong vertical and horizontal coordination.
- Public investment as part of economic recovery packages can involve a trade-off between a need for timely economic stimulus, which requires efficient investment processes, and a need to ensure effective implementation, through good governance and consultation frameworks. One approach to minimise this trade-off is to invest in the maintenance of existing assets, where governance mechanisms and infrastructure maintenance plans are already in place.
- Regional and local governments are key actors in the recovery through national and subnational COVID-19 recovery plans. Collaboration with subnational governments in the design and planning of stimulus can help to ensure successful implementation as subnational governments understand local priorities and will have a core role in implementation.

Key success factors for quality public investment across levels of government

- Establishing strong and fruitful partnerships among levels of government - National and subnational governments need to coordinate priorities and actions to support efficient public investment, address local needs and achieve long-term policy objectives.
- Collaboration between cities and regions to support investment at the right scale - Horizontal coordination between jurisdictions can help to ensure that investments are undertaken at the right scale.
- Ensuring that governments at all levels have adequate capacities - Differences in subnational government capabilities risk exacerbating spatial inequalities, but national and subnational governments can implement a number of initiatives to build capabilities.
- Making use of innovative mechanisms to fund and finance public investment - Harnessing diverse funding and financing mechanisms can support investment during both the current period of increased fiscal stimulus, and beyond.
- Strengthening public-private collaboration and engaging stakeholders - Various models exist to build public-private co-operation and leverage private investment. In addition, participatory investment approaches to involve the community are emerging that may help to strengthen trust in government.

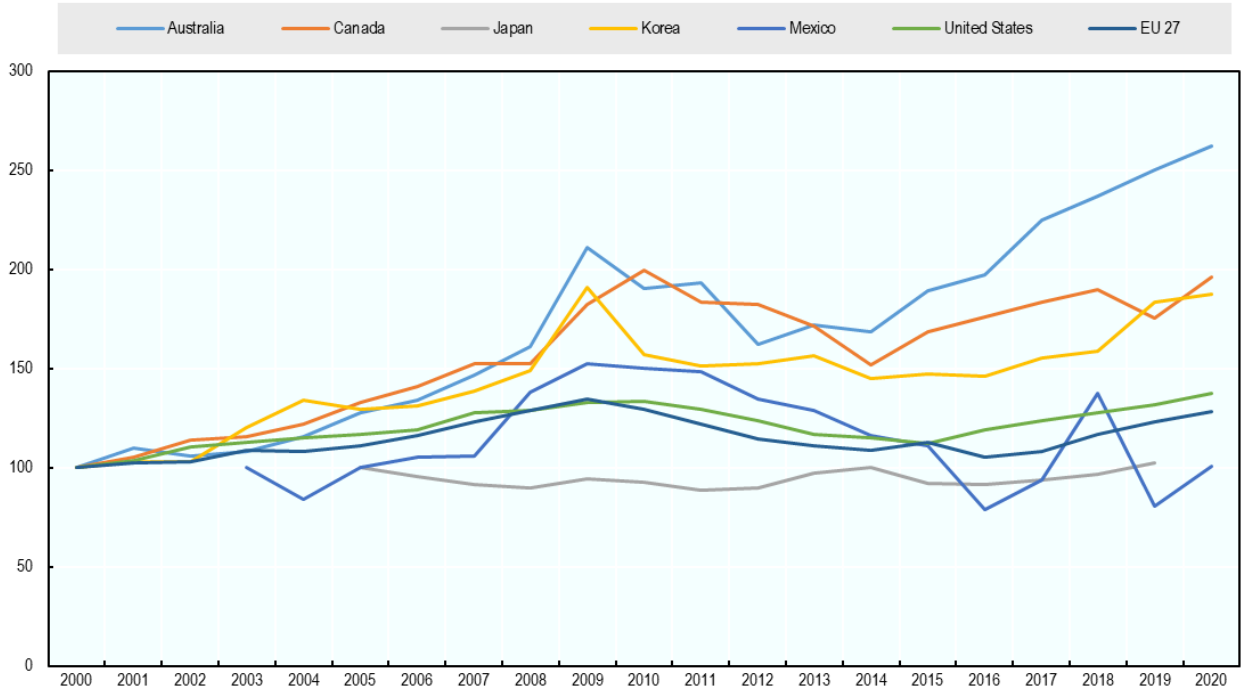
Public investment priorities for a more sustainable and equitable future

Addressing investment gaps

Before the COVID-19 pandemic, public investment was just starting to recover after an extended period of decline in many countries. Since the 1970s, public investment in advanced countries has steadily declined from 5% of gross domestic product (GDP) in the 1970s, to approximately 3% of GDP, on average, in the OECD in 2020, with important differences amongst countries (see chapter 1). The 2008 global crisis, in particular, put strong downward pressure on investment. After a strong increase of public investment in 2009 and 2010 resulting from stimulus plans, public investment dropped substantially in many countries as the result of fiscal consolidation strategies and austerity packages. Public investment started to recover only in 2015-2016 in OECD countries, however at varying rates by country (see Figure 20). Since 2015, for example, public investment has increased by 2.6% per year in real terms in EU countries and by more than 4% per year in the United States (4.1%), Korea (4.9%) and Australia (6.7%). Over the last 20 years, public investment increased by 4.9% per year in real terms in Australia, while it increased by only 1.2% in the European Union. OECD countries are projected to increase their public investment-to-potential-GDP ratio by 0.4 percentage points on average in 2021-23, which is lower than the average annual amount that would be required to boost potential GDP per capita by 2% in 2030 (OECD, 2021[1]).

Figure 20. Changes in public investment between 2000 and 2020 in the EU and selected OECD countries

In volume, base year 2000 = 100



Note: Mexico base year 2003= 100 and Japan: base year 2005 = 100; Public investment is defined as gross capital formation and acquisitions, less disposals of non-financial non-produced assets.
EU27: in order to maintain consistency over time, the "European Union" aggregate presented on the graph excludes the UK for the entire time series.
Source: OECD elaboration based on OECD national accounts

Global investment needs are significant. Investment need estimates are most readily available for infrastructure investments. Before the COVID-19 crisis, the OECD estimated that between 2016 and 2030, approximately USD 95 trillion in public and private investments would be needed in energy, transport, water and telecommunications infrastructure at global level to sustain growth (OECD, 2017[87]). This equals approximately USD 6.3 trillion per annum, without taking into account the additional climate or social infrastructure needs associated with commitments to achieve the Sustainable Development Goals (SDGs) and the Paris Agreement (OECD, 2021[88]). In 2017, the Global Infrastructure Hub estimated an infrastructure gap (i.e. the difference between the estimated investment need and investment expected under the current trends) (of USD 94 trillion over the period 2016-2040 -a further USD 3.5 trillion would be required to achieve the SDGs (Oxford Economics/Global Infrastructure Hub, 2017[89]) This investment gap is largest in the Americas (47%), followed by Africa (39%), Europe (16%), Oceania (10%) and Asia (10%) (Oxford Economics/Global Infrastructure Hub, 2017[89]). If these deficiencies are not addressed, they can hamper productivity and socio-economic opportunities as well as countries' resilience in the face of demographic, climate and digital changes.

For infrastructure investment, balancing the maintenance and upgrade of existing assets with new infrastructure is critical to address investment gaps. Infrastructure maintenance is a large challenge for many countries, in particular in the OECD. Prior to the COVID crisis, infrastructure spending was already insufficient to address both the need for building new infrastructure and maintaining existing infrastructure (OECD, 2021[90]). The future costs for repairing, renewing or even replacing infrastructure that has suffered from a lack of maintenance are often higher, not to mention the safety risks involved. In a 2016 survey among local governments in the U.S., 42% of respondents reported that the current state of the existing local infrastructure adversely affects the quality of life in a community (Chen and Bartle, 2017[91]) (OECD, 2021[90]). It has been documented, for example, that good and timely infrastructure maintenance boosts prosperity, enabling growth and well-being of people, firms and economic systems (The World Bank, 2021[92]). Investing in maintenance is much needed, and the recovery from COVID is the right time to do so as maintenance projects are relatively small, generally quick, and often less complex, so these investments can be rapidly implemented (IMF, 2020[93]).

The extraordinary stimulus packages implemented by countries around the world have put public investment at the centre of the recovery. According to the OECD Green Recovery Database, approximately USD 3.2 trillion has been committed in recovery spending over the coming years, much of which is for public investment. This investment represents an unprecedented opportunity to shape sustainable and equitable development. In the EU, for example, the EUR 750 billion[9] "NextGenerationEU" recovery package, in particular the Recovery and Resilience Facility, has made available loans and grants to support reforms and investments undertaken by EU countries, putting sustainability and resilience at the core of the recovery. In the US, the American Rescue Plan Act (ARP) committed USD 1.9 trillion for investments, including essential upgrades to water, sewer and broadband infrastructure. In parallel, the Infrastructure Investment and Jobs Act (IIJA), approved in November 2021, has provided USD 1.2trillion, including USD 550 billion of new spending on hard infrastructure recovery from the current crisis and rebuild US competitiveness. The experience with large investment programmes has shown that, to make the most of it, adequate funding is necessary but not enough; it requires working in a complex space that involves ensuring absorptive capacity and the removal of barriers to investment (European Investment Bank, 2021[94]).

Coordinating investments from the timing perspective is important, for instance because COVID-19 containment restrictions can dampen the effects of fiscal stimuli. Public investment can have an important fiscal multiplier effect, resulting in broader economic benefits beyond direct investments. But the unique features of the COVID-19 crisis can make it difficult to anticipate the size of the fiscal multiplier. During the crisis, it has been anticipated that in advanced economies and several emerging market

[9] This figure is in 2018 prices. It amounts to €806.9 billion in current prices.

economies, the multiplier will be larger than in normal times and well above 1.0, if projects chosen are of good quality, because resources are idle, interest rates are stuck at the effective lower bound and fiscal packages can increase confidence in the recovery (IMF, 2020[86]). As the crisis progresses, households have accumulated savings, which means that private consumption may increase when the economy fully reopens, potentially contributing to inflation. Given this, it is important to ensure that fiscal measures, including public investments, are well timed and managed so that they result in effective stimulus and efficient use of public finances.

Quality public investment as a driver of growth and wellbeing

Public investment can have a positive impact on growth, particularly when strong governance mechanisms are in place. A growing body of work points to the positive effect of public investment on growth, showing that countries with higher levels of public investment increase their productivity faster than countries with lower levels of public investment (Fournier, 2016[95]; IMF, 2020[96]). Taking a closer look at infrastructure investment, recent evidence shows that in countries with stronger infrastructure governance – defined as the institutions and frameworks for planning, allocating, and implementing infrastructure investment spending – public investment can support growth without raising public debt (IMF, 2020[96]). There is a growing consensus that the recovery will be successful if public investment – and the right framework conditions for that investment to be successful – is at the core of recovery and transition strategies. Recent estimates by the IMF, for example, show that globally in the recovery context, increasing public investment by 1% of GDP could boost GDP by 2.7%, increase private investment by 10%, and increase employment by 1.2% (IMF, 2020[93]). As stressed by the *OECD Recommendation on Effective public investment across levels of government* (OECD, 2014[6]) and the *OECD Recommendation on the Governance of Infrastructure* (OECD, 2020[97]) when public-investment is well managed it can effectively support growth.

Long-term forward-looking strategic planning can facilitate the post-COVID-19 economic recovery and address megatrends. Making sure that policy design is made on a long-term basis is the most effective way of seizing the opportunities and addressing the challenges brought by the megatrends of demographic change, digitalisation, climate change and the changing global environment. Good planning practices are positively related to higher efficiency and quality of infrastructure (Demmou and Franco, 2020[98]). To make long-term visions concrete, and to incentivise supporting actions, it is important to translate these visions and missions into cross-sectoral and coherent and co-ordinated sectoral policy strategies, programmes and instruments. Australia and the United Kingdom, for example, undertake regular, independent strategic planning for future investments. In the United Kingdom, the National Infrastructure Commission is responsible for long-term strategic infrastructure planning through the 30-year National Infrastructure Assessment. In Australia, Infrastructure Australia undertakes a regular forward-looking Australian Infrastructure Audit, and then prepares an Australian Infrastructure Plan to outline policy responses to address infrastructure needs.

Recovery efforts represent a unique opportunity to boost public investment in a way that is consistent with the transition to a climate-neutral economy. While large economic stimulus packages during the COVID-19 recovery have included an important focus on green and digital priorities, there is further space to make recovery consistent with transition. However, as shown in the OECD Green Recovery Database, which tracks the COVID-19 recovery measures across 43 countries, green measures represent only 17% of currently planned recovery spending (OECD, 2021[2]). In the EU, countries have agreed a 37% minimum target for spending on climate objectives under the Recovery and Resilience Facility, the largest component of the Next Generation EU recovery package. Making sure that economic stimulus invests in public infrastructure and encourages private investments in a way that is consistent with the transition to a climate-neutral economy could turn the COVID-19 crisis into an opportunity to prevent a major climate crisis (OECD, 2021[49]).

Future proofing public investment strategies can help countries to manage uncertainty. The COVID-19 pandemic has made evident the need to be more prepared for unexpected shocks. Strategic long-term planning needs to use collaborative and forward-looking approaches, such as strategic foresight, to identify emerging and anticipated risks, and to guide the transition and future-proof investment strategies. Such instruments can also help in developing shared narratives– not only among the levels of government, but also with citizens, private actors, experts and others – as well as conveying urgency and commitment. By future-proofing, governments at all levels can be prepared with the appropriate tools to anticipate and prepare for early actions when a crisis emerge to mitigate risks to human well-being and take cost-minimising action (OECD, 2021[49]).

Resilience needs to be at the core of long-term and future proof planning. This means ensuring that countries are able to absorb, recover from or adapt to the impact of economic, financial, environmental, political and social shocks or chronic pressure (OECD, 2021[49]). Infrastructure investments will need to be made that anticipate extreme weather events (ex. floods and fires) and sea level rises, among other climate-related threats, all while avoiding the 'green gentrification' of cities and regions which can make life less affordable for vulnerable populations in the name of sustainable development (UNEP, 2021[84]). Optimising existing infrastructure assets and making them more resilient also needs to be part of long-term infrastructure investment strategies. Upgrading existing infrastructure assets provides a solution for existing asset stock making it more effective, longer-lasting and better value for money (OECD, 2021[99]). Over the lifetime of infrastructure assets, the benefits of resilient investments are generally considered higher than the cost of inaction (OECD, 2021[99]).

The investment mix needs to be balanced and differentiated across places to properly address megatrends and reduce regional inequalities. The investment mix inevitably varies strongly from urban to rural regions, reflecting the specificities and assets of different territories – and if they lead or lag in terms of growth (OECD, 2014[6]). In addition, digitalisation, demographic changes, and climate change will impact regions differently, shaping their investment needs. Challenges linked to megatrends, such as localised flooding or urban heating, are also profoundly local and place-specific. This means not only a need to target the investment mix to each place, but also a need to balance investment in hard infrastructure with investment in human capital to maximize the potential for long-term growth and sustain a continuing improvement in living standards, environmental quality and well-being. The complex socio-economic and geographic systems of cities, and the regions within which they are integrated, for example, requires a specific approach to urban planning and energy-using activities, including for transport (OECD, 2021[49]). In contrast, rural communities are often less digitally connected than urban areas, reflecting a need to strengthen digital infrastructure, quality education and digital skills training. Place-based investment strategies for the recovery and transition – that take into account these different assets, development challenges and investments needs- need to align short-term objectives with long-term priorities, including responding to inequalities through infrastructure but also human capital investment.

Quality public investment across levels of government

The effectiveness of public investment is strongly linked to the quality of governance across levels of government

The benefits that arise from public investment depends on how different levels of governments manage this shared competency. Improving the management of public investment across levels of government can lead to substantial savings and enhanced productivity (OECD, 2013[100]) (Abiad (ADB), Furceri (IMF and University of Palermo) and Topalova (IMF), 2016[101]) (IMF, 2015[102]). There is growing evidence and consensus on the fact that, together with macroeconomic conditions, infrastructure governance shapes the level and quality of infrastructure investment. The IMF, for example, through the Public Investment Index assessment, shows that, on average, countries lose about 30 percent of the

potential returns to their infrastructure investments due to inefficiencies, and could close about two-thirds of this gap by strengthening institutions for infrastructure governance (IMF, 2015[103]; OECD/IMF, 2019[104]). Demmou and Franco recently show that sound governance correlates with high quality of infrastructure and higher average productivity in network industries (2020[98]). Preliminary estimates by these authors indicate that this positive correlation seems to be greater in some governance dimensions. Good planning practices, for example, appear to be positively related to the quality and, to a lower extent, to the efficiency of infrastructure sector. Coordination across levels of government seems to be another key factor as it appears to be strongly correlated with the efficiency of infrastructure services (Demmou and Franco, 2020[98]).

Evidence also shows that good subnational governance is important to make out the most of subnational public investment. Evidence from the EU, for example, shows that the quality of governance is a determinant for both, economic growth and the efficiency of Structural and Cohesion Funds expenditure. While examining the impact of the quality of local and regional governments on the returns of investment, Rodríguez-Pose and Garcilazo (2015) show that that both EU investments targeting regions and the quality of government make a difference for regional economic growth, but that above a significant threshold level of expenditure, the quality of government is the key factor determining the returns of public investment (Rodríguez-Pose and Garcilazo, 2015[105]). In this sense, the most efficient way to achieve greater economic and social cohesion is by improving the quality of government; otherwise, improvements in economic growth would require massive amounts of additional investment (Rodríguez-Pose and Garcilazo, 2015[105]). In the same line, recent IMF estimates show a positive correlation between the World Bank government effectiveness index and the speed of national implementation of projects financed by European Structural and Investment Funds (IMF, 2020[93]).

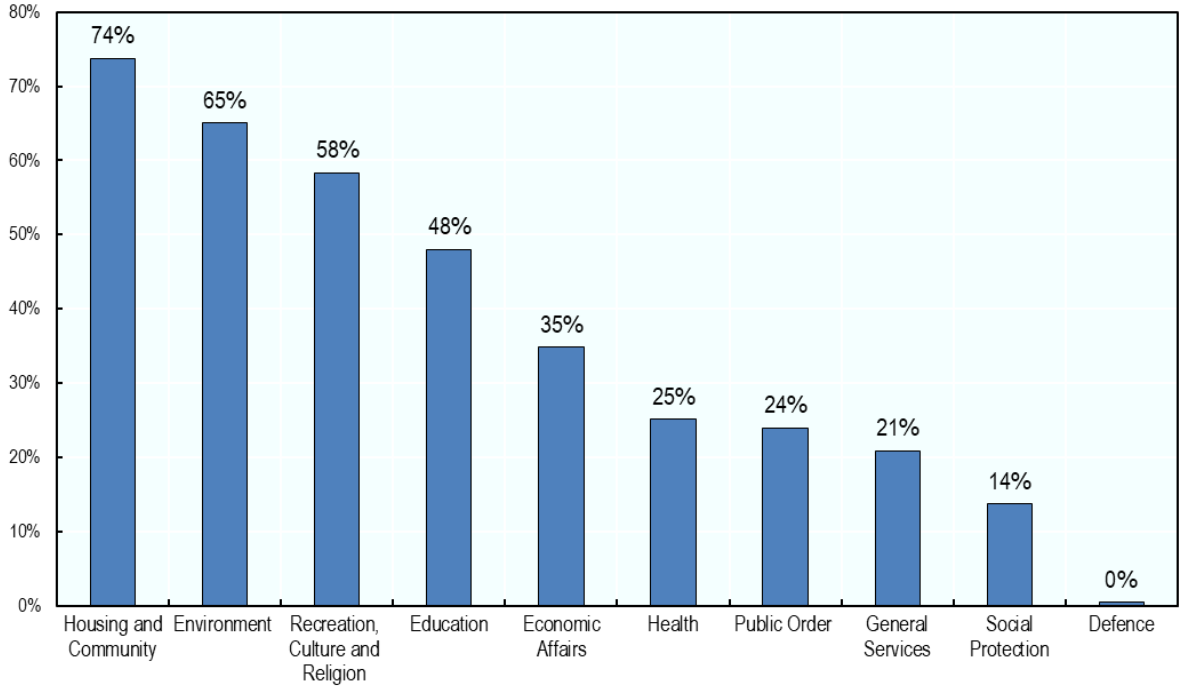
Better governance may help to crowd-in private investment. Evidence suggests that institutional quality and governance processes affect the expected returns on public investment and the capacity for public investment to leverage private investment, including foreign direct investment, rather than crowd-out such investment (OECD, 2018[106]). This requires addressing the binding constraints which may limit investment, and improving public investment frameworks across levels of government to achieve high return on investment. If well-managed, public investment can also act as a catalyst to attract private investment.

The key role of subnational governments in the recovery and transition

In recent decades, subnational governments have received additional spending responsibilities through decentralisation processes (OECD, 2019[107]), meaning that they are increasingly essential public investors. In 2020, subnational governments were responsible for 37% of public expenditure in the OECD, and 35%% in the EU27. Subnational government expenditure amounted to 17.1% of GDP in the OECD, and 18.3% in the EU27 (OECD, Forthcoming[108]). Many expenditure responsibilities are shared between national and subnational governments (Figure 21).

Figure 21. Most responsibilities are shared between the national and subnational governments

Share of subnational government in public expenditure by sector in OECD countries (%, 2019)

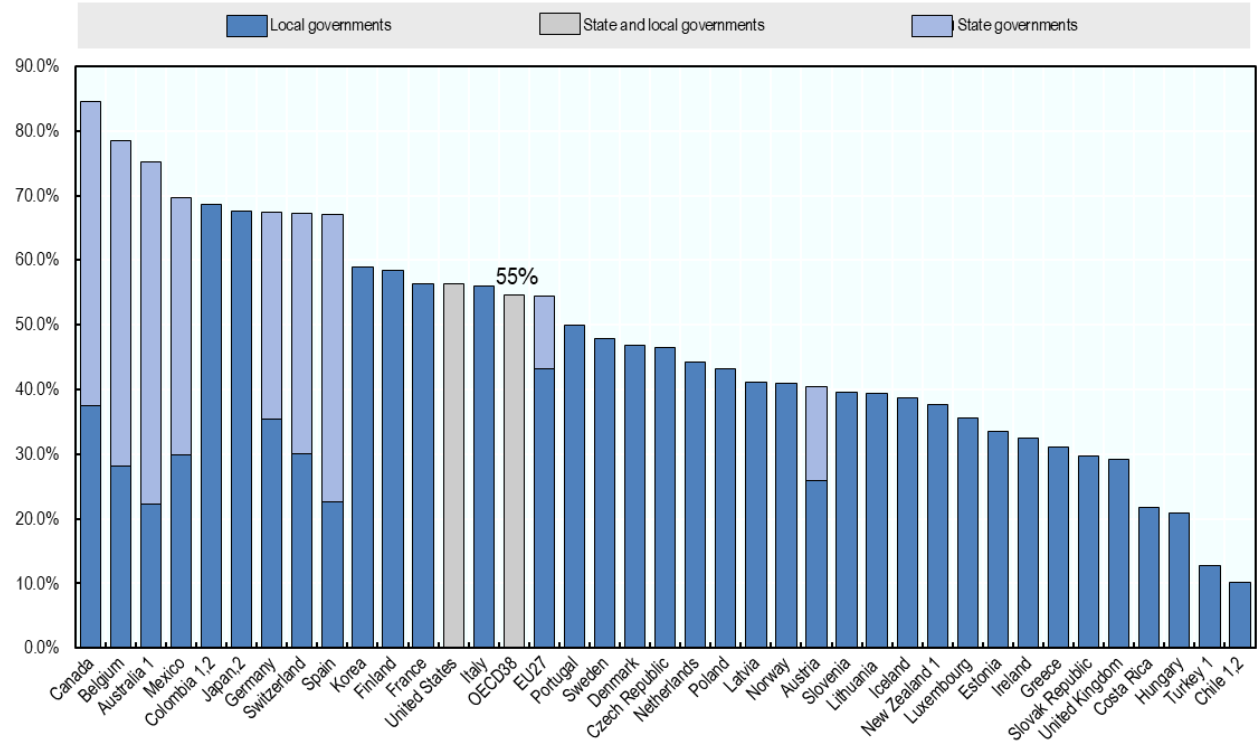


Note: The OECD average (unweighted) is calculated for 33 countries (no data for Canada, Colombia, Costa Rica, Chile, and Mexico) with data from 2019. The functional areas correspond the Classification of the Functions of Government (COFOG), which distinguishes 10 areas. The total of general government spending is non-consolidated.
Source: OECD calculations based on OECD national accounts and Subnational Finance database

Subnational governments are responsible for a large part of public investment, in particular, investment required to adapt and mitigate the potentially adverse effects of megatrends. On average in OECD countries, subnational governments are responsible for 55 of total public investment in 2020, although there are substantial variations across countries (see Figure 22). Decentralisation trends have resulted in regions and cities playing an increasing role in key public investment areas, such as transport, energy, broadband, education, health, housing, water and sanitation. In 2020, 39% of subnational investment focused on economic affairs (transport, communications, economic development, energy, construction, etc.) and 20% on education in the OECD. Investment related to public administration (e.g. construction and improvement of public buildings) represented nearly 11% of subnational investment, while the fourth priority area was housing and community amenities (potable water supply, street lighting, etc.), followed by environmental infrastructure and healthcare.

Figure 22. Subnational governments are key public investors

State and local government investment as a % of total public investment in OECD countries (%, 2020)



1. Estimates from IMF Government Finance Statistics.
2. 2019 data. Israel is excluded from the graph as significant part of direct investment by the central government is carried out by public companies and not recorded in General Government Expenditure, thus leading to an overestimation of the ratio of subnational government in public investment.
Public investment is defined as gross capital formation and acquisitions, less disposals of non-financial non-produced assets.
OECD and EU27 average are weighted.
Source: OECD calculations based on (OECD, Forthcoming[108])

Public investment typically involves different levels of government at some stage of the investment process – be it through decision-making, shared policy competencies or joint funding arrangements. The extent to which these responsibilities are shared varies across different sectors. Responsibilities tend to be shared more often in public transport than in childcare or elderly care, for example. Infrastructure investment tends to be among the most commonly shared responsibility – subnational governments generally responsible for local roads and local transport infrastructure, while the central level tends to manage infrastructure investments with high externalities (OECD, 2019[107]). In many countries, due to the complexity of interactions in shared rule, there are ambiguities or a lack of clarity in the assignment of responsibilities that can risk reducing the efficiency of policy delivery and public investment (OECD, 2019[107]).To overcome these barriers, and efficiently manage these shared responsibilities, proper co-ordination mechanisms are necessary.

Subnational governments are key to deliver a green and sustainable transition. OECD estimates show that subnational governments were responsible for 62% of public spending and 69% of public

investment in 2019[10] in sectors having a direct impact on climate change and other environmental issues (OECD, Forthcoming[109]). Furthermore, it is estimated that 50-60% of adaptation and mitigation actions need to be implemented locally (Regions4SD, 2016[110]). Indeed, many decisions taken by local authorities, such as local regulation on transport, building construction standards, spatial planning and economic policies, determine GHG emissions directly or indirectly (OECD, 2019[3]). Cities are instrumental to mainstream climate resilience into their spatial planning, infrastructure, local policies and investments, through locally tailored climate strategies in line with national objectives (OECD, 2019[3]). For example, subnational governments can prioritise energy efficiency in infrastructure, replace buildings' fossil fuel-based heating and hot water systems with renewable or high efficiency electric systems, or invest in low-emission form of transport to help meeting climate goals. In the United States, for instance, an analysis of city climate action in 2015 revealed that 52 of the 132 cities that reported their climate commitments to public platforms had reduction targets that were equal to or more ambitious than the national government ones (OECD, 2019[3]).

Subnational governments are also responsible for policies that are key to "rebuilding together". Local actors are responsible for many policies to help workers and firms transition to the new normal, and for shoring up social safety nets (OECD, 2020[52]). In addition to general competences for local development, local or regional governments are fully or partially responsible for the management of active labour market policies in almost half of OECD countries (OECD, 2021[111]). They also have an important role to play in adult skills policies in many countries. For example, regions or state governments are responsible for the delivery of active labour market policies in Belgium, Canada, Mexico, Spain, Switzerland, and the United States. In countries such as Chile or Denmark, this is part of the municipal government responsibilities. In general subnational governments also have an important role to play in adult skills policies in many countries (OECD, 2020[52]).

Subnational government investment during the recovery

Public investment as part of economic recovery packages can face a trade-off between the need for timely economic stimulus and a need to ensure effective and efficient delivery. Establishing effective multi-level governance partnerships, and undertaking the planning for new quality public investment, can many months or years. Yet, the current COVID-19 crisis has created an urgency around public investment to provide fiscal stimulus for a strong recovery. This can risk creating a trade-off between investment speed and quality. One approach to overcoming this risk is to using existing institutions and multi-level governance systems to invest in pre-existing investment needs. For example, maintenance programs has been identified as one of the most effective ways to invest during a crisis as spending can be deployed quickly and the economic benefits can be significant (IMF, 2020[93]). In the current context of constrained finance, ageing facilities and rising demand, optimising existing infrastructure assets allows to upgrade the existing asset stock making it more effective, cheaper and longer-lasting (OECD, 2021[99]).

The involvement of subnational governments in recovery planning is essential to ensure successful implementation of stimulus packages. As several responsibilities on public investment and key policy areas for the recovery, are shared among the national and subnational levels, it is important to involve subnational governments in the design and delivery of recovery packages. In the EU, for example, municipal investment will play an important role in the recovery (European Investment Bank, 2021[94]). In Canada, the COVID-19 Resilience stream of the Investing in Canada Infrastructure Programme[11], has

[10] Weighted averages for 33 OECD and EU countries

[11] The Investing in Canada Infrastructure Program is part of the Investing in Canada Plan, which was launched in 2016, and through which the Government of Canada committed over $180 billion over 12 years for infrastructure. The Investing in Canada Infrastructure Program has planned to use about $33-billion in funding through bilateral agreements between Infrastructure Canada and each of the provinces and territories.

made available over $3 billion CAD to support projects such as repairs and upgrades for municipal, territorial, provincial and indigenous buildings, disaster mitigation and adaptation projects, including natural infrastructure, among others (Government of Canada, n.d.[6]). In the US, the American Rescue Plan Act (ARP) included 1.9 trillion USD, with a significant portion being directed towards states, cities, tribal governments and U.S. territories to invest in water, sewer, and broadband infrastructure. In Australia, initial COVID-19 support to regional governments included AUD 100 million over two years to fund 10 Regional Recovery Partnerships (see Box 1).

Box 1. The role of subnational governments in recovery packages

Canada

Although the **Canada Community-Building Fund** existed pre-COVID, the federal government increased payments to the provinces from the fund in 2020/2021, providing more money specifically for municipalities. For instance, the province of Alberta received an additional CAD 244 million for municipal investment for 2021/2022 through this fund.

The new COVID-19 Resilience stream of **Investing in Canada Infrastructure Program** with over CAD 3 billion available supports the following types of projects:

- Repairs and upgrades for municipal, territorial, provincial and Indigenous buildings, health infrastructure and schools;
- COVID-19 response infrastructure, including measures to support physical distancing;
- Active transportation infrastructure, including parks, trails, foot bridges, bike lanes and multi-use paths; and
- Disaster mitigation and adaptation projects, including natural infrastructure, flood and fire mitigation, and tree planting and related infrastructure.

United States

In March 2020, the USD 2.2 trillion **CARES Act,** and its associated emergency supplemental appropriations, was passed by U.S. lawmakers. The CARES Act was a massive rescue package — the biggest in U.S. history. It sought to mitigate the impact of the economic downturn set in motion by the global pandemic. State and local governments received USD 150 billion, USD 3 billion was reserved for federally administered territories and USD 8 billion went to tribal governments

The **Infrastructure Investment and Jobs Act (IIJA)**, approved in November 2021, addresses federal aid for highways and transit; highway and motor carrier safety; hazardous materials; and rail programs of the Department of Transportation (DOT). The amount of Act totals USD 1.2 trillion, including USD 550 billion of new spending on hard infrastructure. While the package supports recovery from the current crisis, it was primarily meant a longer term approach to rebuild U.S. competitiveness through infrastructure. Federal agencies are responsible for implementing the law but the State and local governments, who own and operate most infrastructure, will have key role in implementation and in securing additional financing. During the first 60 days of implementation of IIJA, a number of projects and measures have been implemented in the four main policy areas: i) roads, bridges, and transportation infrastructure; ii) water infrastructure; iii) high-speed internet; iv) clean energy and environmental remediation.

Australia

in March 2020, the Government established a A$1 billion **COVID-19 Relief and Recovery Fund** to support regions, communities and industry sectors that have been disproportionately affected by the Coronavirus crisis. The initiatives announced under the Fund are supporting industries including

aviation, agriculture, fisheries, tourism and the arts. Funding has been channelled through existing mechanisms where possible to ensure support is provided quickly. New funding mechanisms were established where critical need was identified. The Fund is administered by the Department of Infrastructure, Transport, Regional Development and Communications, with each initiative under the Fund administered by the relevant department or agency with portfolio responsibility. Support has been tailored to meet the needs of communities and industries that needed assistance during the crisis and into recovery. While most of the funding is allocated directly to businesses, the support to regional governments include $100 million over two years to fund Regional Recovery Partnerships. The Partnerships will coordinate investments with other levels of government to support recovery and growth in 10 regions. The partnerships seek to support existing regional plans by developing a package of targeted initiatives with contributions from all levels of government to deliver jobs, economic recovery and economic diversification. The first year of funding is drawn from the COVID-19 Relief and Recovery Fund.

Japan

In November 2021, the Government of Japan adopted a new economic policy package, amounting to JPY 78.9 trillion for fiscal years 2021-22, with emphasis on both growth and redistribution. The growth strategy includes expanding investment, and research and development, especially for establishing the University Endowment Fund worth JPY 10 trillion during the fiscal year 2021. The growth package also includes investments to help achieve the government's net zero carbon emission goal with clean energy technologies, including JPY 166 billion to support implementation of digital technology in local governments (optical fibre and 5G).

Source: Ministry of Finance of Japan (2022): Highlights of the FY2022 Draft Budget; Government of Australia (2022): COVID-19 Relief and Recovery Fund; The White House (2021): Fact Sheet: The Bipartisan Infrastructure Deal; Government of Canada (2022): Canada Community-Building Fund.

Key success factors for quality public investment across levels of government

Delivering effective public investment is not easy. It requires understanding investment needs and aligning investment delivery across levels of government. Building on the *OECD Recommendation on Effective public investment across levels of government* (OECD, 2014[6]), a number of key success factors for effective long-term public investment emerge:

- Establishing strong and fruitful partnerships among levels of government;
- Effective collaboration between cities and regions to support investment at the right scale;
- Ensuring that governments at all levels have adequate capacities;
- Making use of innovative mechanisms to fund and finance public investment; and
- Strengthening public-private collaboration and engaging stakeholders in the investment cycle.

Establishing strong and fruitful partnerships among levels of government

National and subnational governments need to coordinate priorities and actions to support efficient public investment, address local needs and achieve long-term policy objectives. National and subnational governments share responsibilities for public investment, meaning that coordination is essential to align investment objectives and activities towards long-term objectives. Different levels of government have different fields of competence and knowledge. Subnational authorities tend to have a relevant advantage in determining local needs, identifying which and where actions work best, and their

higher accountability may contribute to an efficient management of the investment process (Demmou and Franco, 2020[98]). National governments arguably have a more comprehensive view, taking into account economy-wide spillovers and returns to scale, as well as the technical capabilities for an accurate cost-benefit analysis, which are often missing at the local level. National and subnational levels need thus to partner when setting priorities and implementing public investment. There is some evidence that coordination across levels of government is strongly correlated with the efficiency of infrastructure services in network industries (Demmou and Franco, 2020[98]) .

A range of complementary tools can be implemented to build partnerships across levels of government. Governments have at hand several tools to align priorities and strengthen the coherence of national, regional and local public investment while ensuring that national priorities take into account the local impact of public investment (OECD, 2019[39]). These include co-funding arrangements, conditionalities on grants from national governments, contracts between levels of government, formal consultation processes, national agencies or representatives working with subnational areas, or other forms of regular inter-governmental dialogue. In the United Kingdom, the Netherlands and France, for example, city deals and other contracts between levels of governments have been implemented to support development and sustainability objectives:

- In **the United Kingdom (UK),** city deals are agreements between government and a city that give the city control to take charge and responsibility of decisions that affect their area; do what they think is best to help businesses grow; create economic growth; and decide how public money should be spent. The UK City Deals are focused on aligning investments by different institutions and the re-centring local governments as key agents of urban planning. More recently, the UK Government has announced a Levelling Up program, with the aim to spread economic opportunities more evenly across the UK (Department for Levelling Up, 2022[112]).
- In **the Netherlands**, city deals are agreements signed between central and subnational authorities and stakeholders as part of the "Dutch Urban Agenda (Agenda Stat)" on priority areas for development. The first city deal was signed for the development of a roadmap for the 'next economy', the second for climate adaptation and others will follow relating to sustainable energy, healthy cities and clean technology.
- In **France**, during the recovery from the COVID-19 crisis, the government has launched Contrats *de relance et de Transition écologique*. These contracts are created between local authorities and the national government in order to accelerate the recovery and support ecological, demographic, digital and economic transitions in regions. The six-year contracts can support local authorities to integrate ecological transition into their priorities, in line with the national low-carbon strategy and the national plan for adaption to climate change.

Collaboration between cities and regions to support investment at the right scale

Horizontal coordination between jurisdictions can help to ensure that investments are undertaken at the right scale. Inter-municipal cooperation allows local governments to reduce fragmentation, prevents investment duplication, helps to take advantage of benefit spillovers and allows for the pooling of resources for investment projects (OECD, 2019[113]). This is typically the case for physical infrastructure investment, where the most efficient scale often exceeds the administrative boundaries of individual regions or localities. Co-ordination of investments is particularly relevant at the metropolitan scale, where less fragmented governance structures have been indicated to favour growth and productivity (Ahrend et al., 2014[114]). Enhancing the co-operation and co-ordination for investments in public infrastructure or services at the metropolitan scale can also improve the quality of life and international competitiveness of large cities (OECD, 2015[115]).

Providing concrete incentives for horizontal co-operation might help to overcome cooperation challenges. Co-ordinating investments is difficult, even when actors recognise the need for it. It can be

hampered by transaction costs, competitive pressures, resource constraints, differing priorities and fears that the distribution of costs or benefits from co-operation will be one-sided (OECD, 2019[113]). Localities are sometimes called to compete along several dimensions for residents, firms, and investment. In the EU, less than 40% of municipalities coordinate with peers for the planning of infrastructure projects (EIB, 2021[116]). Countries generally use incentives – either financial or non-financial – to enhance inter-municipal co-operation and networking, information sharing, and sometimes to help in the creation of joint authority entities. Incentives for cooperation can be stronger where subnational governments finance spending with own-source revenues (and with balanced budget requirements or other fiscal rules), but extra financial incentives are needed in countries where subnational governments are financed largely with central government transfers. Financial incentives include special grants for inter-municipal co-operation, special tax regimes, additional funds for joint public investment proposals (Estonia, Norway), bonus grants for municipalities that generate savings through co-operation (Spain). In other cases, governments have opted to provide consulting and technical assistance, promoting information sharing or providing specific guidelines on how to manage collaboration, such as Canada, Norway and the United States (OECD, 2019[113]).

Facilitating cross-border investment projects would be beneficial for the recovery and transition. Although regions with international borders represent 40% of the EU territory and 30% of the EU population (MOT, 2017[117])**,** co-ordination among them is difficult due to the co-existence of different political, legal, technical and fiscal systems, and the **complexity, length and costs of cross-border interactions.** Some evidence shows that these regions have tended to underperform economically than other types of EU Member State regions (European Commission, 2017[118]). A 2017 study, for example, suggests that EU border regions could on average potentially see an 8% increase in GDP if current legal and administrative obstacles were eased (European Commission, 2017[119]). Facilitating and supporting cross-border investment projects in the area of transport, but also in healthcare, digital and green transitions could boost the recovery and build stronger and more resilient regions in the EU, and beyond.. Along this line, Canada and the United States announced in February 2021 a roadmap for a Renewed U.S.-Canada Partnership, in a whole-of-government effort. They agreed on taking a coordinated approach to accelerating progress towards sustainable, resilient, and clean energy infrastructure, including encouraging the development of cross-border clean electricity transmission and energy infrastructure (The White House, 2021[120]).

Ensuring that governments at all levels have adequate capacities

Differences in subnational government capabilities risk exacerbating spatial inequalities. Strong capabilities and know-how are required to support the planning, prioritisation and delivery of investment programmes. The complexity of the challenges ahead put stronger pressure on the know-how of subnational government staff. This means that staff need to be prepared, for example, to integrate climate change priorities into investment projects design and delivery. However, the lack of sufficient human resources and appropriate expertise is one of the main capacity challenges for investment among many subnational governments, especially for small municipalities (European Investment Bank, 2021[94]) (OECD-CoR, 2015[121]). The capacity challenges are particularly acute in small administrations that have difficulties attracting required expertise, particularly when there is competition for expertise with the private sector or when it comes to attract professionals to more isolated areas.

National and subnational governments can implement a number of initiatives to build capabilities. Subnational governments can systematically build internal capabilities through training programmes and guidelines, by being empowered to hire and manage staff according to their needs and by providing support from the national government to build capabilities in subnational governments. In Korea, for example, the Local Government Officials Development Institute contributes to the development of local administration bodies through various education and training programmes (OECD, 2020[122]). They can also undertake a number of practical initiatives, such as standardising project documentation and strengthening peer-to-peer learning.

Improving data, monitoring and evaluation capacities at all levels is necessary for public investment strategies to be more agile in their response to megatrends. Good data – at the right scale – supports the identification of emerging risks, better targeting of policy responses and improved evaluation of policy measures for their effectiveness. An evidence-informed public investment strategy allows governments to focus on the performance of investments through the entire cycle. This, ideally, requires a well-coordinated system for actively monitoring projects, differentiated according to project size, complexity, and stage. Such active monitoring may enable governments, for example, to take on board potential needs related to shocks or crisis (IMF, 2020[93]). While the actual use of monitoring and evaluation results in the decision-making process remains limited, multiple countries have developed interesting initiatives impacting the efficiency of public investment. Colombia, for example, has established an online platform, *MapaRegalías*, that displays geo-referenced information and data on royalties from the extractives sector. A key purpose of this platform is to reduce the cost incurred by public officials and citizens when monitoring the use of royalties. A recent study shows that after the release of *MapaRegalías*, public investment projects financed with royalties had an average increase in efficiency of execution of almost 8 percentage points (IDB, 2019[123]).

Making use of innovative mechanisms to fund and finance public investment

Harnessing diverse funding and financing mechanisms can support investment during both the current period of increased fiscal stimulus, and beyond, where the fiscal environment may become more constrained. In the current period of fiscal stimulus, significant funding is being committed to support public investment, which is helping to support the strong recovery. Combining this funding with other funding or financing sources can help to maximise the scale and benefits from this investment. Moving beyond current economic stimulus into an increasingly constrained fiscal environment, may mean that lower levels of funding are committed to public investment and that alternative means of supporting investment are required. In a constrained fiscal environment, supporting further investment will involve identifying additional or alternative funding and financing mechanisms.

A wide range of innovative funding and financing mechanisms can be harnessed by different levels of government to support investment (OECD, 2021[88]). Many traditional and innovative mechanisms to support investment are underutilised, especially at a subnational government level. For subnational governments, typical funding mechanisms include grants, user charges and fees, taxes and property income, and typical financing mechanisms include the use of bonds and loans. More innovative mechanisms include land value capture mechanisms, green and social bonds, and new types of financial institutions. Governments can also innovate in the type of investment approach that they use – ranging from increased uses of public private partnerships to the use of state owned enterprises to deliver investment. Numerous examples of innovation in these mechanisms exist at all levels of government (OECD, 2021[88]). For example, a number of governments have adopted environmental taxes or emissions trading schemes where a portion of revenue are used for sustainable investments. Examples include landfill and incineration taxes in Catalonia (Spain), a green tax in Yokohama City (Japan), a cap and trade system in California (United States), and a carbon tax in British Colombia (Canada). Many places are also harnessing green and social bonds to financing investment programs, including social and green bonds in Ile-de-France (France), Madrid (Spain), Moscow (Russia) and Washington DC (United States), among many other examples.

Effective governance can help to harness funding and financing mechanisms for investment. Unlocking public investment at a local level requires understanding the particular barriers that subnational governments face. Four main barriers to investment include (i) the fiscal frameworks and financial capacity of subnational governments, (ii) the capacity of subnational governments, including for required financial expertise, (iii) coordination and cooperation mechanisms across levels of government, and (iv) legal and regulatory frameworks (OECD, 2021[88]).

Strengthening public-private collaboration and engaging stakeholders

Private investment can support and compliment to public investment programs. Leveraging private investment, alongside public investment, can help to foster additional productive investment in the economy and in wellbeing. Private investment represents approximately 85% of total investment, meaning that it is important to consider how this investment supports the achievement of some of the major investment challenges and priorities.

Various models exist to build public-private co-operation and leverage private investment, and new forms of collaboration are emerging. The PPP market has seen some decline in recent years, with confidence being reduced on the public or private side. Private participation in PPPs have fallen globally in the past decade, gradually declining from USD 55 billion in 2010 to USD 30 billion in 2019; as a share of private infrastructure investment, private participation in PPPs has fallen from 36 percent to 28 percent (GIH, 2020[124]). The decline in PPPs calls for a review of other innovative partnership models involving national and local authorities in which there is a long-term vision and risks and rewards are shared over time, with a view to ensuring mutual confidence and trust (OECD, 2021[125]). One form of emerging model of public-private collaboration is the regulatory asset-based model, which already exists for supporting private investment in some industries (energy, water, etc.) but is increasingly being explored for use in new sectors (OECD, 2021[88]).

Developing a participatory and open approach to public investment may help in strengthening trust in government. Involving stakeholders goes beyond public-private collaboration. In implementing recovery plans and addressing megatrends, governments have the opportunity to make governance processes more human-centred and inclusive. This can include involving stakeholders in public decision-making, in particular for the design of investment strategy, and, at later stages, in feedback and evaluation. Stakeholder involvement may improve legitimacy, strengthen trust in government, and cultivate support and adherence for specific investment projects (OECD, 2014[6]) (OECD, 2017[126]). Well-managed consultation may also help limit corruption, capture, and mismanagement, in particular for big and complex infrastructure projects (OECD, 2017[126]). Involving stakeholders can also help in improving the quality of the projects by better assessing investment needs and the environmental and social sustainability of the project.

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