CHAPTER 3

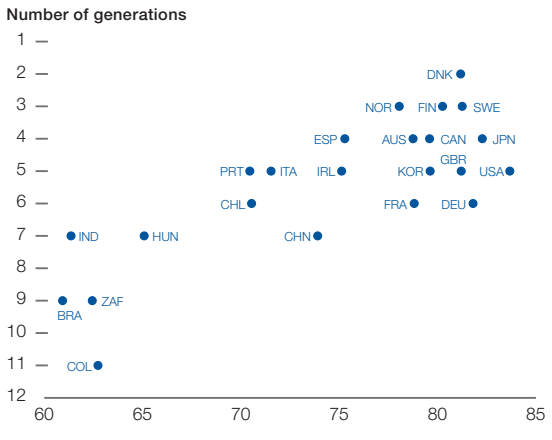
Competitiveness, Equality and Sustainability—The Way Forward

Decades of focus on economic growth without equal focus on making growth inclusive and environmentally sustainable is having dire consequences for the planet and humankind. Accelerating climate change is already affecting hundreds of millions around the world, and it is likely that people under aged 60 could witness its radical destabilizing effects on Earth. In parallel, rising inequality, precarity and lack of social mobility—made worse by the 2008–2009 Great Recession—are undermining social cohesion with a growing sense of unfairness, perceived loss of identity and dignity, weakening social fabric, eroding trust in institutions, disenchantment with political processes, and an erosion of the social contract.

In addition, the recent track record of the global economy is underwhelming. Although many factors contribute to the fragility of the global economy, persisting weaknesses in the drivers of productivity, highlighted by the Global Competitiveness Index 4.0, are among the principal culprits (see Chapter 1).

Over the past decade, it has become clear that environmental, social and economic agendas can no longer be pursued separately and in parallel: they must be merged into a single inclusive and sustainable growth agenda. In this context, the two sections in this chapter examine the relationship between competitiveness and the two other dimensions of sustainable development—shared prosperity and environmental sustainability. Both sections show that there are no inherent tradeoffs between competitiveness and sustainability, and between competitiveness and social cohesion. They explore the "win-win" policy space, revealing that a

Figure 1: Competitiveness and intergenerational mobility, selected countries



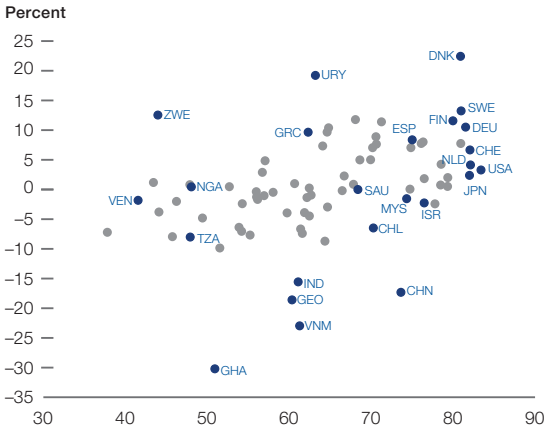
Source: World Economic Forum and OECD, *A Broken Social Elevator? How to Promote Social Mobility*, 2018.

Notes: Number of generations refers to the number of generations needed for those born in low-income families (bottom 10% of the income distribution) to reach mean income in their society.

AUS = Australia; BRA = Brazil; CAN = Canada; CHL = Chile; CHN = China; COL = Colombia; DEU = Germany; DNK = Denmark; ESP = Spain; FIN = Finland; FRA = France; GBR = United Kingdom; HUN = Hungary; IND = India; IRL = Ireland; ITA = Italy; JPN = Japan; KOR = Korea; NOR = Norway; PRT = Portugal; SWE = Sweden; USA=United States; ZAF = South Africa.

Figure 2: Competitiveness and renewable energy trends

Renewable energy, % total consumption, change 2000–2015



Sources: World Economic Forum; World Bank, *Sustainable Energy For All (SE4ALL)* database (accessed 10 September 2019).

Notes: Data available for 79 economies. CHE = Switzerland; CHL = Chile; CHN = China; DEU = Germany; DNK = Denmark; ESP = Spain; FIN = Finland; GEO = Georgia; GHA = Ghana; GRC = Greece; IND = India; ISR = Israel; JPN = Japan; MYS = Malaysia; NGA = Nigeria; NLD = Netherlands; SAU = Saudi Arabia; SWE = Sweden; TZA = Tanzania; URY = Uruguay; USA = United States; VEN = Venezuela; VNM = Viet Nam; ZWE = Zimbabwe.

productive, low-carbon, inclusive economy is possible—and the only viable option going forward. They also make it clear, however, that win-win policies do not depend strictly on competitiveness. Countries with the same level of competitiveness can achieve very different environmental and societal outcomes, because of different priorities and policy choices made over the course of many years.

For example, when it comes to social mobility in the United Kingdom, it takes, on average, five generations for a low-income family to reach the mean income (Figure 1). By contrast, it takes only two generations in Denmark, which has the same GCI score as the United Kingdom (81.2). Similarly, when it comes to environmental sustainability, Denmark and Uruguay have increased their shares of renewable sources of energy significantly more than other countries at their respective levels of competitiveness (Figure 2).

In Depth: Sustainability, Growth and Competitiveness—The Way Forward

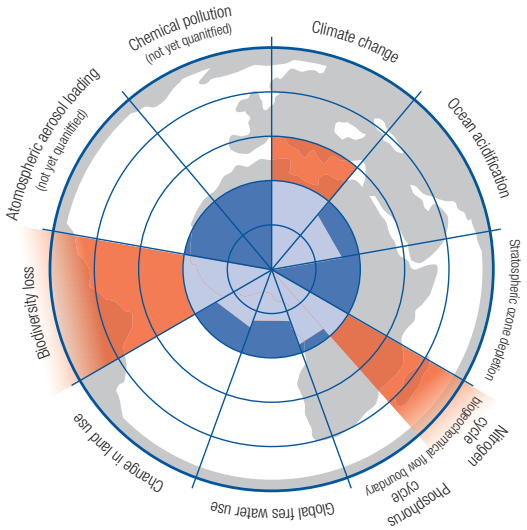
Are there environmental limits to growth?

Since the beginning of recorded history, humans have improved their conditions by—among other factors—modifying their surrounding environment and making the most of scarce resources. Technical progress occurred first with the agricultural revolution, and with the industrial revolution later, eased food and energy constraints and allowed humans to prosper. However, continuous industrial expansion and population growth have put tremendous pressure on the environment and an excessive environmental footprint. If not addressed, environmental degradation may hinder further economic progress, compromise the prosperity built over centuries, and threaten life across the planet.

According to a seminal 2009 *Nature* article ten ecological factors can potentially destabilize the planet's ecosystem—and three of these have already exceeded their "limit" (Figure 3): climate change, nitrogen cycle (pollution from agriculture) and biodiversity loss (extinction of species).[1]

Exceeding these environmental boundaries will have dire and far-reaching consequences, including rising sea levels, more frequent floods, hurricanes, heatwaves and droughts, accelerating biodiversity loss, and acidification of seawater, which in turn will reduce prosperity in vast swathes of the world.[2]

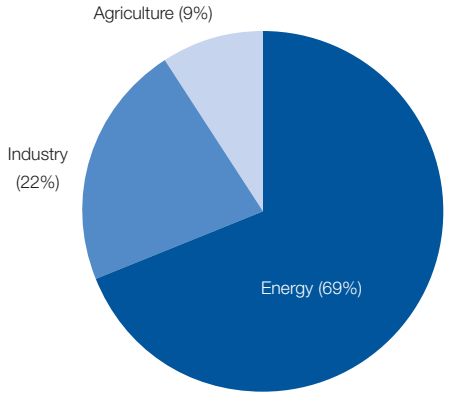
Figure 3: Environmental priorities



Source: Rockström, et al., 2009, p. 472.

Note: The inner blue shading represents the proposed safe operating space for ten planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle) have already been exceeded.

Figure 4: Share of GHG emissions by source, United States, 2017



Source: United States Environmental Protection Agency.

Notes: Energy includes emissions from transportation, electricity production and heating. Industry includes emissions from burning fossil fuels for energy and certain chemical reactions in production processes. Agriculture emissions are those from livestock, agricultural soils and rice production.

Although the linkages between biological ecosystems and human actions are complex, it is possible to distil the causes of these three environmental emergencies into two predominant human activities: energy use and food production.

The first environmental emergency—**climate change**—is caused primarily by emissions of greenhouse gases (GHG), which are largely attributed to energy use. The United States' Environmental Protection Agency estimates that more than three-fifths of both US and global GHG emissions are a by-product of one of the following types of energy use: electricity generation, heating, fuel transformation and transportation.[3] The other two sources of emissions are industrial processes (including chemical, metallurgical, waste management and mineral transformation processes, as well as a small portion of fossil fuels burned for energy), which account for one-fifth of the country's emissions, and agriculture and deforestation, which together account for the remaining one-fifth share of total emissions (Figure 4).

The second environmental emergency—the **nitrogen cycle**—is caused, for the most part, by industrial agriculture, which overloads the soil with nitrogen and phosphorus from animal manure and chemical fertilizers.

The causes of the third emergency—**biodiversity loss**—are more difficult to identify because they intertwine with many of the ecological factors referenced in Figure 3. Among them are practices related to food production (i.e. over-fishing and deforestation for agriculture land use), by-products of energy production (i.e. chemical pollution, indirect effects of climate change), rapid urbanization and pollution from industrial production or waste management.

In addition, population growth—the world's population is expected to reach 9 billion by 2050—may counterbalance efforts to reduce per-capita resource consumption and can lead to even more pressure on those factors that are currently still within the planet's limits (i.e. land use, fresh water use).[4] Based on Global Footprint Network estimates,[5] a population of 9 billion people with the standard of living of today's average European would have an ecological footprint that would require about 3.4 planets, thus clearly exceeding environmental boundaries.[6]

How and when the combination of these factors will impact human life or even just economic activity is uncertain.[7] However, difficulties in forecasting accurately the effects and severity of environmental tipping points must not be an excuse for inaction. As the potential effects of environmental risks extend well beyond economic stability and prosperity, their mitigation should be regarded as an unconditional policy objective. As such, the success of environmental policy crucially depends on both forward-looking leadership vision and private sector awareness and choices.

Multiple signals indicate that environmental damage and losses are already occurring, becoming larger and reinforcing one another.[8] These trends should prompt a swift global response towards a lower footprint, while bearing in mind the fundamental and complex trade-offs involved across the ten environmental boundaries. For instance, reducing nitrogen to within environmental limits may reduce crops by more than 30% globally, which would have an unacceptable impact on food security.[9]

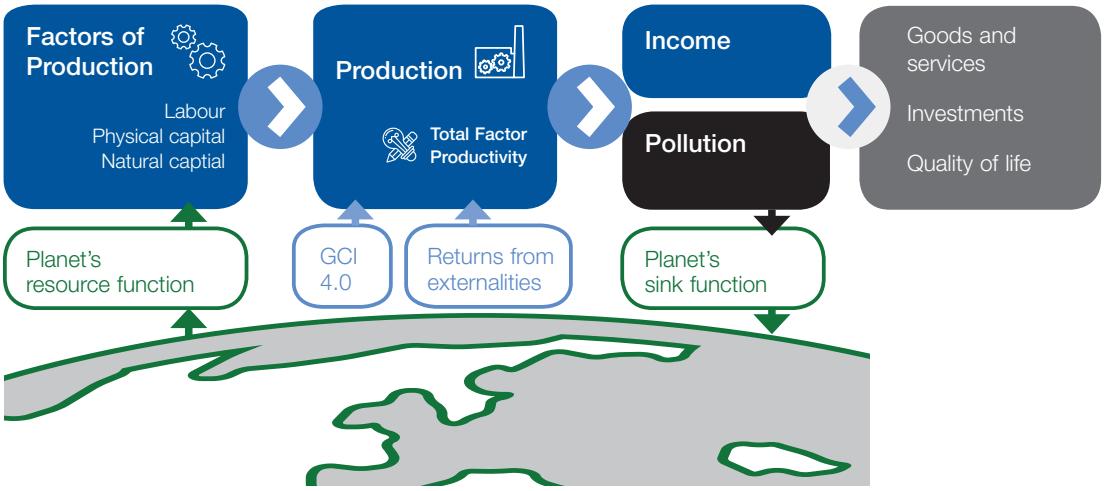
How to address these potential trade-offs and distribute these costs across geographies, social strata and generations is is among the key challenges for policy-makers and global governance over the next decade. Since environmental constraints are global, effectively reducing environmental threats requires very close cooperation among countriesin addition to national efforts.

Competitiveness and the limits to growth

It is possible to decompose economic growth into three elements: (1) growth in labour force, (2) growth in physical and natural capital inputs, and (3) total factor productivity growth (TFP) growth, the "unexplained part" of GDP growth, which encompasses all non-physical inputs, such as technological progress, human capital, and institutional and cultural factors (Figure 5).

TFP growth is considered to be the best predictor of cross-country variations in living standards. That is why TFP growth is at the core of the Global Competitiveness Index 4.0 (GCI), which benchmarks its drivers (see Box 1 in Chapter 1).

Figure 5: Economic growth and the environment framework



Source: World Economic Forum, based on the original concept from OECD, *Towards green growth—a summary for policy makers*, 2011.

As discussed above, there are constraints to achieving growth through the accumulation of factors of production. In contrast, the environmental impact of TFP growth is significantly less taxing.

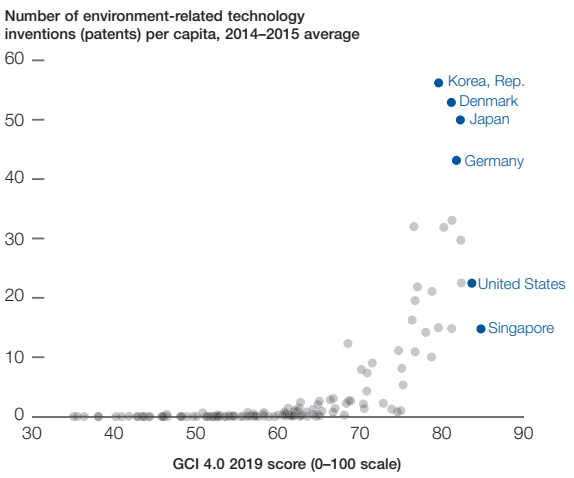
To some extent, sustainability and TFP growth go hand in hand: there is some evidence that failing to address the environmental tipping points will affect productivity. Environmental-driven TFP losses may even outweigh the costs associated with transitioning to a low-carbon economy through different channels.

- *Climate change.* Rising temperatures and modified rain patterns, caused by climate change, will reduce crop yields and intensify crop volatility, resulting in lower agriculture productivity. Other potential channels through which climate change could reduce productivity include capital depreciation due to infrastructure damage from extreme weather events and a fall in both labour supply and workers' output due to higher temperatures.[10] In addition, these effects will likely exacerbate poverty by the fact that the effects of climate change will disproportionally penalize farmers in developing countries that depend on producing staples for their livelihoods. A 2018 FAO report finds that "[i]n low-latitude regions, where most developing and least developed countries are located, agriculture is already being adversely affected by climate change, specifically, by a higher frequency of droughts and floods". According to this study, in West Africa and India crop yields could fall 2.6–2.9% by 2050. Combined with significant population growth in these areas, this reduction is likely to reduce in massive food shortfalls.
- *Pollution.* The negative effects of pollution on productivity are mainly manifested through health. A large body of research shows that exposure to chemicals and air pollution increases the incidence of non-communicable diseases and mortality rates. Among them, a recent study attempts to quantify the link between air pollution and economic production and estimates that an increase in exposure to PM2.5 by 10 micrograms per cubic metre reduces daily output by 1%.[11]

Further, constraints to specific renewable and non-renewable inputs such as energy and water may have important productivity spillover effects:

- *Energy.* Despite increasingly efficient electric vehicles, growing installed capacity of solar and wind farms and energy-saving appliances, non-renewable resources still account for over 80% of global energy consumption.[12] In the short run, the lack of alternatives to meet the global demand for energy, a push towards non-fuel energy may lead to an increase in production costs in most sectors and therefore hurt productivity. For example, modern agriculture requires significant fuel consumption for tillage and harvest operations.[13] Similarly, an increase in transport costs due to a surge in fuel costs would make current manufacturing value chains less feasible.
- *Water:* Episodes of water shortage have proven to have an extremely negative effect on productivity in agriculture, as well as for smelting, chemical and mining activities.[14]

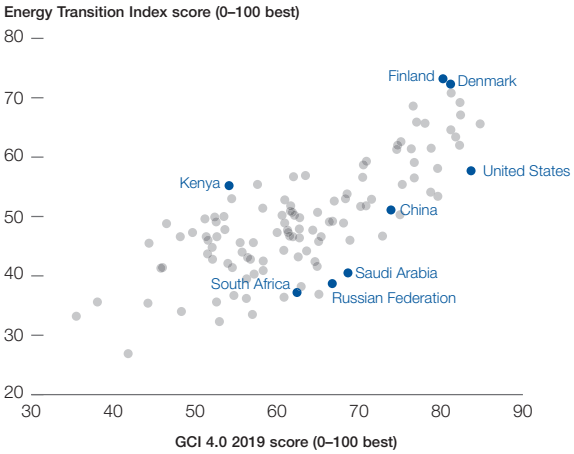
Figure 6: Competitiveness and green inventions



Sources: OECD and World Economic Forum.

Notes: The number of environment-related inventions ("green patents") is expressed per million residents (higher-value inventions/million persons). Indicators of technology development are constructed by measuring inventive activity using patent data across a wide range of environment-related technological domains (ENVTECH), including environmental management, water-related adaptation, and climate change mitigation technologies. The total count includes only higher-value inventions (with patent family size ≥ 2). Detailed information on the methodology used to compute the patent counts is in the OECD Environment Database metadata.

Figure 7: Energy Transition Index and Global Competitiveness Index



Source: World Economic Forum.

Highly competitive economies are better positioned to make the difficult transition to a low-footprint economy happen more smoothly. For instance, transitioning to a low- or zero-carbon energy mix will necessarily require faster technological progress. Highly competitive countries, by providing a more conducive innovation ecosystem, are better placed to foster the emergence of new technologies in all sectors, including potential breakthrough technologies in green inventions (Figure 6).

In addition, countries that possess better human capital, better infrastructure and greater innovation capability are, on average, more likely to adopt a greener energy mix.

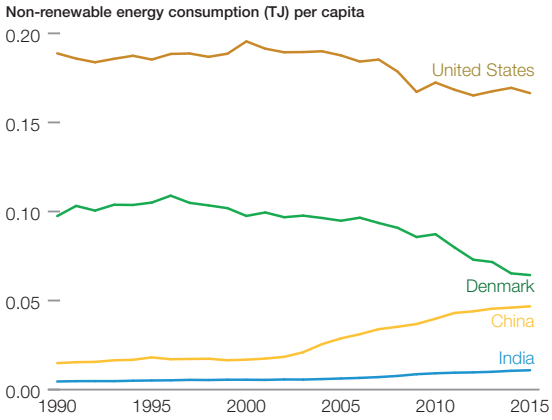
Success will depend on policy choices, as demonstrated by the fact that economies with similar level of competitiveness attain different sustainability performances.[15] For instance, Denmark and Finland—both ranking high on the GCI 4.0—are among the best-placed nations to transition towards a cleaner energy mix (Figure 7). Similarly, while some highly competitive countries and emerging economies are not yet re-structuring their energy sectors towards sustainability, others are reducing their consumption shares of energy from non-renewable sources (Figure 8).

There is also potential for least-developed countries to do more to realize the still largely untapped potential of green energy leapfrogging. African economies such as Kenya, South Africa and Nigeria have introduced some low-carbon energy technology applications, but these have not led to a substantial investment in renewable energy.[16] The policy priority in these countries is to provide widespread energy access; consequently, they are investing mainly in energy generation from fossil fuels, which to date are still cheaper and more scalable than renewables. Of all public financing for energy in Africa between 2014 and 2016, 60% went to infrastructure development for energy from fossil fuels while renewable energy projects received just 18%.[17]

There are, however, some encouraging developments. For instance, although India and China have increased their use of fossil fuels significantly, they are now multiplying their efforts to invest in renewables to cope with increasing demand for energy in their dynamic economies. China plans to become a world leader in climate protection,[18] and has invested $132 billion in clean energy technologies so far.[19] While Chinese coal-based electricity production will continue to grow until 2027, it is estimated that the country's solar and wind penetration in its energy mix will reach 40% by 2040.[20]

If realized, it will be an important step forward; yet, to date, no country has emerged as a comprehensive sustainability champion. A combination of much bolder environmental policies, more research and greater international coordination are needed to fast-forward the achievement of sustainable prosperity.

Figure 8: Trend in non-renewable energy consumption per capita, selected economies



Source: Authors' calculations based on World Bank, *Sustainable Energy For All (SE4ALL)* database.

Note: Renewable energy consumption (TJ) includes the following sources: hydro, solid biofuels, wind, solar, liquid biofuels, biogas, geothermal, marine and waste.

Policy options

Without the ambition of providing an exhaustive and definitive set of environmental policies, we highlight four non-mutually exclusive, widely discussed measures that could stimulate faster transition towards a more sustainable economic development.

Openness and international collaboration

While a country's commitment to an environmental agenda is crucial, sustainability issues are—by definition—a global problem. No country can manage environmental challenges with national policies only. It is essential that, even in a context of trade tensions and diminished commitment to international governance systems, countries discuss shared solutions to climate change and the transition to a low-footprint global economy.

Greater international coordination could also lead to an evolution in the treatment of environmental goods in international trade agreements,[21] as well as in jurisprudence related to the interpretation of exceptions to the General Agreement on Trade and Tariffs (GATT) rules towards environmental policies aimed at reducing risks to human health and to animal and plant life.[22]

Carbon taxes and subsidies

Getting the right price is essential for market mechanisms to work. Yet, currently, the prices of carbon-intensive products do not fully reflect their true cost because of unaccounted externalities and distortions from energy subsidies. According to the International Energy Agency and the OECD,[23] subsidies to fossil fuels from members and partner countries amounted to $140 billion in 2017,[24] most of which were "pre-tax" contributions used to support consumers. Although these subsidies have been decreasing since 2013, they are still significant, and the decline is partially the result of the lower oil prices of recent years rather than a policy change. Similarly, several countries—to reduce externalities—have started to put a price on carbon either in the form of a tax (a fixed amount to be paid for each ton of CO2 emitted) or as a result of the Emissions Trading System (ETS), which fixes the amount of "pollution permits" and lets the market decide their price. In 2019, all carbon pricing policy combined raised a total of $95 billion—a step in the right direction but still insufficient to incorporate externalities in fossil fuels prices.[25] According to the OECD, in 2019, 76% of emissions are still not subject to carbon pricing.[26]

There is consensus in the scientific and policy community that market forces alone will not deliver an environmentally optimal outcome, hence the need for a combination of taxes and subsidies to correct energy prices to incorporate their externalities should be an important pillar in any viable energy transition strategy. [27]

Phasing out subsidies to fossil fuels and implementing bolder carbon pricing schemes, however, should be paired with measures that minimize the potential social costs of these reforms. For instance, as green regulations impose non-progressive costs of living on households,[28] they could be accompanied by progressive reductions in household taxes or other compensating mechanisms to avoid exacerbating inequality while transitioning to a more sustainable energy mix (see the following In Depth section on shared prosperity, growth and competitiveness).

Externality-adjusted prices could potentially further accelerate the re-allocation of investment towards green projects that are already taking place. Fund assets invested in sustainable investments have already increased by 34% in two years[29] to reach a total stock of assets of about $30 trillion in 2018.[30] At the same time, the Task Force on Climate-related Financial Disclosures (TCFD) is developing a voluntary, climate-related financial risk disclosures for companies which could lead to increase "sustainable investments".[31] Similarly, the share of stocks' value of fossil fuels companies in the Standard & Poor's 500 index has decreased from 29% to 5.5% over the past 40 years.[32] These trends signal a higher sensitivity of fund managers to climate policy, as well as a change in the mindset and incentives of investors. However, they may not lead to sufficiently fast progress to achieve global environmental sustainability and need to be accompanied and incentivized further by policy interventions.

Incentives for green R&D

Renewable energy technologies still need to overcome technical limitations that prevent them from becoming the main and possibly the sole source of energy in the future. First, in terms of power generation, with current technology renewable electricity infrastructure requires significantly more land and materials than fossil fuel power plants to produce the same output. For instance, to produce 1 megawatt hour of power, fossil fuels plants require only 0.4 square metres of land; wind farms require one square metre (almost three times more land) and photovoltaic panels, 10 square metres (25 times more).[33]

Second, the intermittent nature of output from renewable sources limits their use as the primary source of electricity. Large backup systems are required to guarantee supply at any given time. These backup facilities may still need to rely on fossil fuels to some extent, increasing the cost of power production and distribution.[34] Technical limitations and the continuous increase in demand explain why fossil fuels still account for about 80% of total energy consumption (as noted above), despite the significant decrease in the cost of electricity production from renewable resources.[35] More investments in research are needed to overcome these technical limitations and possibly develop other new technologies. According to the International Renewable Energy Agency, global investment in renewable energy in 2017 was about $280 billion;[36] up 77% up since 2007 and mostly provided by the private sector. Tax incentives and/or direct public investments could help to complement these efforts to accelerate the process towards more sustainable energy systems.

Green public procurement

The public sector represents an important economic actor. For instance, OECD countries spend about 15–20% of their GDP on public procurement, and industrial policy has leveraged government purchases in the past to generate knock-on effects on other buyers' markets.[37] As such, public procurement can sustain markets for innovative products as well as for sustainable products or services.[38] Some countries have already started to introduce environmental standards in technical specifications, procurement selection and award criteria, and have inserted environmental performance clauses into contracts. Despite potential implementation challenges—such as difficulties in justifying higher prices, updating practices and ensuring staff expertise[39] —green public procurement can signal a major policy shift and break from the lock-in effects of status-quo technologies and production models.

In Depth: Shared Prosperity, Growth and Competitiveness—The Way Forward

The drivers of inequality: global market forces versus policies

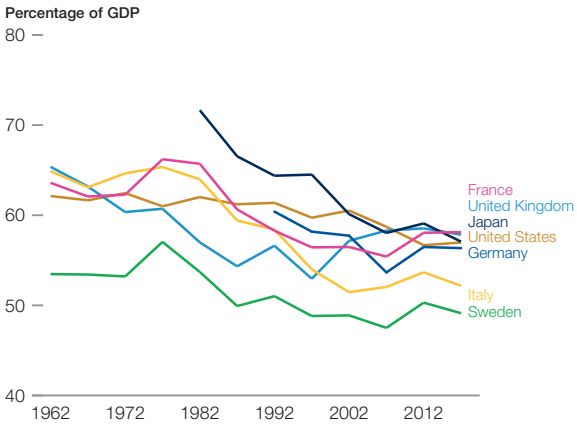
Over the past few decades, income inequality has increased in both advanced and emerging economies (Figures 9 and 10). It has generated a sense of disillusionment in the capacity of the liberal international economic model to deliver shared prosperity.

The exceptional period of socioeconomic expansion experienced most directly by baby boomers in advanced countries after World War II has been hailed as a remarkable developmental achievement of economic liberalism. This in turn created the expectation that, going forward, economic growth would continue to deliver similar results and lift all boats in advanced and developing economies alike.

However, growth and shared prosperity started to decouple in most of the advanced economies by the 1970s, and they have further diverged since the early 2000s. In the United States, for instance, the percentage of children earning more than their parents fell from 92% in the 1940s to only 50% in the 1980s.[40] Similarly, in developing and emerging economies, growth has been accompanied by a significant increase in inequality—despite pulling millions out of poverty and reducing the gap with advanced economies.

To find solutions to the inequality challenge it is important to understand its causes. The most-cited causes in academic studies and political debates are globalization and technology. Globalization has increased inequality within countries by transferring low-skilled jobs in high-productivity sectors from advanced economies to developing and emerging countries, mainly in Asia,[41] and, consequently, penalizing workers in specific locations and jobs. Technology has impacted

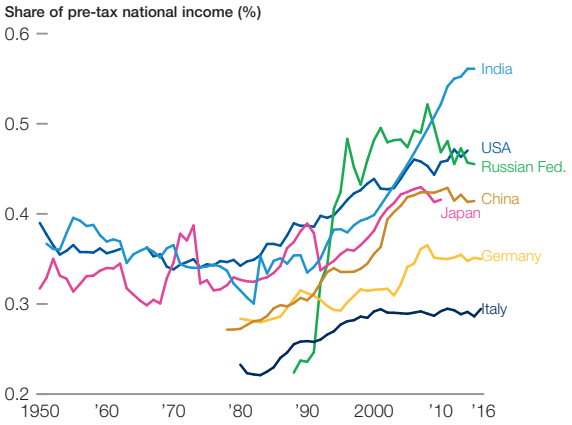
Figure 9: Trend in labour shares



Source: European Commission, *AMECO* database.

Note: Labour shares are defined as compensation per employee as percentage of GDP at market prices per person employed in the total economy.

Figure 10: Income share of the top 10%



Source: World Inequality Lab, *World Inequality* database.

Notes: Share of pre-tax national income of the 90-100 percentile of adult individuals. Pre-tax national income is the sum of all pre-tax personal income flows accruing to the owners of the production factors.

inequality by reducing demand for low-skilled jobs and rewarding high-skilled jobs disproportionately. However, recent studies point at further possible drivers including the consequence of business cycle effects,[42] and depreciation effects (owing to a shift towards intangibles).[43] Additionally, despite some progress, entrenched inequality of opportunities (i.e. socio-economic background, ethnicity, location) are still limiting social mobility and perpetuating inequalities.

With these factors viewed as being determined by global forces on which individuals have no control, they are perceived as largely unfair, in contrast to cases where inequality is the result of merit or effort, and consequently more acceptable.[44] Such perceptions matter: empirical behavioural economic studies reveal that when people believe that income distribution is unfair, they change their attitude and do not contribute to society in the same way as they would otherwise.[45] This in turn contributes to the erosion of trust among stakeholders, the polarization of society, the rise of extremism and the weakening of social fabric, and can potentially lead to social unrest and political instability. Furthermore, the idea that inequality stems from global forces fuels the belief that it is the inevitable by-product of capitalism, leading to the conviction that economic liberalism has failed to deliver on the promise of widespread prosperity.

The emergence of inequality instead should be considered as the result of policy choices: over the past 40 years, countries have deregulated labour markets[46] and finance,[47] changed tax codes[48] and reduced public investments—all with insufficient attention to the consequences on income distribution and to some potentially negative social externalities. Insufficient policy attention was also granted to preparing workers and entrepreneurs to embrace the Fourth Industrial Revolution and to mitigate the effects of globalization for those parts of society that have not fully benefited from it.

The observed increase in inequality therefore is not the inevitable by-product of a knowledge-intensive and internationally open economic model. Instead, proactive national policies and international coordination can mitigate the potentially adverse effects of globalization and technology on income distribution and can create more equal opportunities for all.

Inequality and competitiveness: is there a link?

The relationship between economic growth and inequality is complex—owing to multiple factors—and a causal link between the two cannot be established empirically. Productivity, however, is one factor that drives both economic growth and higher labour shares. For instance, a recent study shows that productivity growth in manufacturing in the United States has reduced inequality at the municipal level, and wherever productivity has grown, earnings of local *less-skilled* workers grew as rapidly as those of local *skilled* workers.[49] On average, American workers have benefited substantially from productivity growth, even after controlling for differences in workers' education levels.

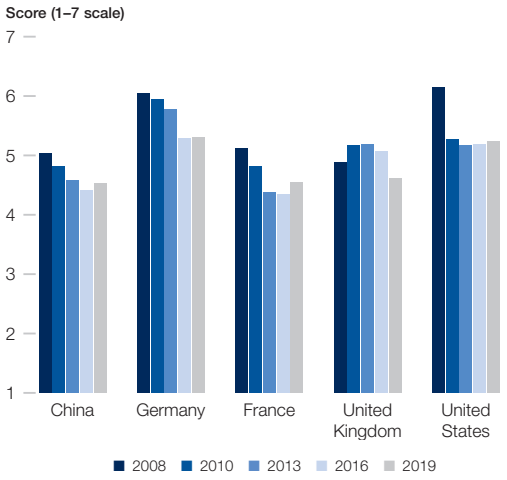
However, the relationship between earnings and productivity is not as clear as previously observed. While the typical worker's compensation and productivity moved in tandem for two decades after World War II, they started to diverge in the 1970s,[50] precisely when inequality started rising. This apparent contradiction can be reconciled: although productivity growth has continued to benefit workers' pay, some factors (discussed in the previous section) have had only marginal effects (either positive or negative) on productivity but pushed wages down;[51] and a second set of factors have at the same time contributed to increasing inequality and diminishing productivity.[52] Among the latter group of factors, three stand out.

First, market concentration has been growing in advanced and emerging economies alike (Figure 11). Less competition has reduced business dynamism, increased capital shares and broadened differences in wages across companies. Increased concentration—while caused partially by the parallel emergence of technologies that empower network externalities—has been to a large extent the result of policies that have failed to remove barriers to entry and often lax anti-trust monitoring and enforcement.

Second, both public and private productivity-enhancing investments have declined over the past decades. For instance, public spending on basic research and infrastructure has reduced significantly since the 1970s (Figure 12). China is a notable exception:

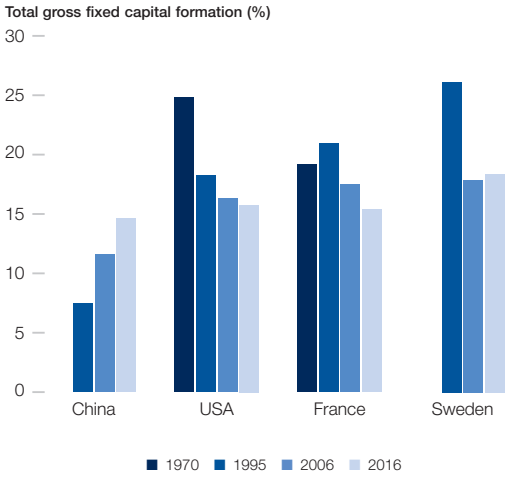
Figure 11: Executives' perception of business competition

"In your country, how do you characterize corporate activity?" [1=dominated by a few business groups; 7=spread among many firms]



Source: World Economic Forum, Executive Opinion Survey.

Figure 12: Government investment, selected countries



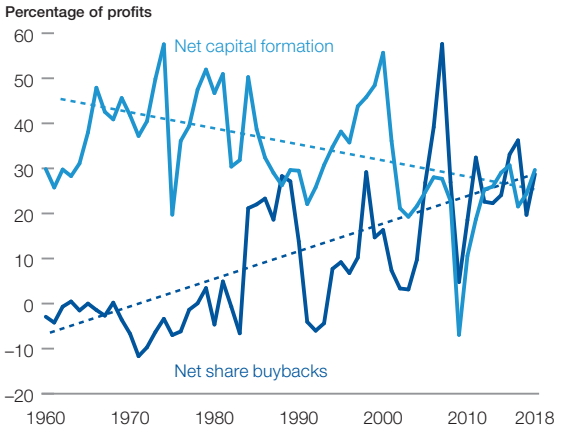
Source: OECD, *Investment by sector (indicator)*, 2011.

Notes: Investment by sector includes household, corporate and general government. For government this typically means investment in R&D, military weapons systems, transport infrastructure and public buildings such as schools and hospitals. Under the 1993 System of National Accounts (SNA), military expenditures on fixed assets were treated as gross fixed capital formation (GFCF) only if they could be used for civilian purposes of production (e.g. airfields, docks, roads etc.). The 2008 SNA treats all military expenditures on fixed assets as GFCF regardless of the purpose.

public investments have doubled there since 1970, but are still far from the levels achieved by advanced economies during the "golden age". In parallel, corporate investments as a share of GDP have diminished, a process that originated before the Great Recession (Figure 13). Furthermore, investments have to some extent been misallocated. Increasing trends in share buybacks signals a possible diversion of resources (hindering productivity growth) in favour of financial assets, whose returns benefit mostly those that already own significant capital.

Third, inequality of opportunities has prevented talent from being allocated to its best use. Although participation in higher education has increased on average, the distribution of educational attainment has remained uneven. The presence of barriers (e.g. credit constraints, geographical inequalities, political connections, corruption, discrimination) has led to a lack of high-quality education and training and gainful employment.[53] This underinvestment in human capital (at times due a population's own low expectation of returns[54]) has occurred in parallel with the development of skills that do not match the economy's needs, even for those who have been able to acquire education and experience, further exacerbated by the impact of technological change on business models. In the Fourth Industrial Revolution, human capital is the driving force

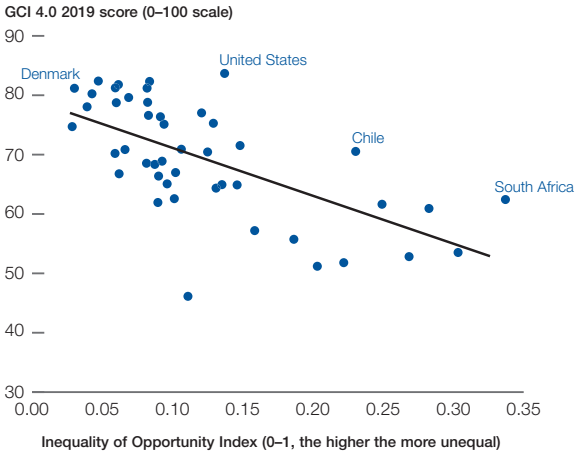
Figure 13: Trend in net share buybacks and net capital formation, non-financial corporations



Source: Deloitte Insights analysis based on Bureau of Economic Analysis and Board of Governors of the Federal Reserve System data.

Note: Dotted lines show linear trend.

Figure 14: Absolute inequality of opportunity and productivity drivers in OECD countries

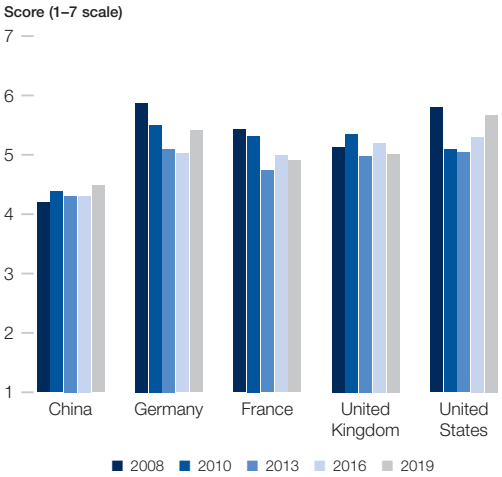


Sources: World Economic Forum and Equal chances—The World Database on Equality of Opportunity and Social Mobility

Note: The (absolute) inequality of opportunity index is computed by extracting from total inequality (Gini coefficient) the variability systematically correlated with three fundamental sources of unfair inequality: parental education, parental occupation and origin (i.e. race, ethnic origin, area of birth).

Figure 15: Executives' perception of antitrust effectiveness

"In your country, how effective are anti-monopoly policies at ensuring fair competition?" [1 = not effective at all; 7 = extremely effective]



Source: World Economic Forum, Executive Opinion Survey.

of economic growth, and frictions that prevent the best allocation of talent and impede the accumulation of human capital also limit growth. Inequalities of opportunity underpin such frictions, which not only perpetuate income inequality, but also hinder the drivers of productivity (Figure 14).

Policy options

As discussed above, multiple forces that impact both productivity and inequality are at play. Policy interventions should focus on addressing these factors that can lead to improve productivity while reducing inequalities at the same time. Four of them are presented here.

Enhance access to opportunities

Inequality of opportunity, inequality of income and economic growth form a circular nexus. If an economy does not develop, it will offer fewer quality jobs and fewer entrepreneurship opportunities. Lack of opportunities leads to under-investment in human capital and inefficient allocation of talent, which would at the same time reduce growth potential and further exclude under-privileged households from the benefits of economic growth. A solution to break this link could be enhancing the "conversion factors" that bridge the differences in circumstances and incentives between disadvantaged households and privileged ones. Among these factors, family policies (parental leave and access to quality childcare), equitable access to quality education systems, equal access to quality healthcare, meritocratic processes to access fair and dignified employment, and social safety nets to shelter households from temporary hardship together form the basis for a fairer and potentially more prosperous society.[55] Notably, policies should aim to reduce network barriers and asymmetric information and modify risk profiles rather than relying on passive welfare that fosters a culture of dependency. The concept of inequality of opportunity is deeply linked to the idea of unfair inequality, according to which public intervention should remove barriers that prevent individuals from reaping the benefits of their talent and effort—and create an even playing field to contribute to socioeconomic progress.

Foster fair competition

Fair competition and level playing fields allow for better outcomes in terms of innovation, prices and product quality. If many firms compete in the markets, prices are lower—benefitting consumers—and stronger competitive pressure translates into greater innovation, investments, jobs and products improvement. Market power has increased across advanced economies.[56] Indeed, the GCI results suggests that the effectiveness of anti-trust authorities as perceived by businesses has declined or remained weak since 2008 (Figure 15).

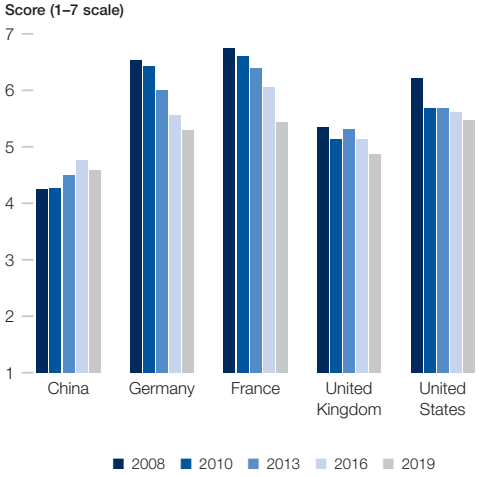
Data shows that most sectors in advanced economies have gained some degree of market power,[57] yet the emerging and most dynamic sectors (i.e. data

platforms, information technology, etc) are those where concentration has increased more significantly.[58] These new segments are structurally different: they achieve higher efficiency through network effects that also create powerful barriers to entry.

Consequently, although traditional measures to foster competition (i.e. stronger enforcement of antitrust policies and a reduction of barriers to entry) remain important, they may also risk slowing down innovation in these new segments of the economy where the benefits of large scale play a critical role. As such, approaches that address the effect of concentration without stifling innovation should be adopted instead. These could include (1) using technology to reduce barriers to entry (i.e. increase accountability, transparency, access to data assets, update data ownership and rights), and (2) shifting the focus of anti-trust action from price levelling to addressing broader socioeconomic effects of winner-take-all business models. [59] As business strategies in new segments apply low prices in the short run to gain substantial market share in the longer run,[60] antitrust authorities should take a more holistic approach to assess whether a company is assuming a dominant position in the market.

Figure 16: Executives' perception of quality of roads

"In your country, how is the quality (extensiveness and condition) of road infrastructure?" [1 = extremely poor-among the worst in the world; 7 = extremely good-among the best in the world]



Source: World Economic Forum, Executive Opinion Survey.

Update tax systems and their composition as well as the architectures of social protection

Data shows that statutory tax rates on firms and top incomes have decreased over the past few decades. In the United Kingdom and the United States, for instance, the top statutory tax rates of income tax (applying to the highest incomes) were above 70% until 1980; today they are around 40%.[61] At the same time, the corporate effective marginal rate has also declined while the fiscal burden on median incomes has increased since the 1980s.[62]

These facts suggest different options for interventions. When it comes to personal income, restoring greater tax progressivity with higher top tax rates should allow for more equitable income distribution without significant losses to economic activity or productivity.[63] The economic rationale behind this approach is that, beyond a certain level of income, further earnings accruing to richer individuals increases inequality but does not benefit productivity.[64]

When it comes to corporate taxation, solutions need to consider the complexity of international tax architecture, the increasing importance of intangible assets and the digital economy that allow for greater profit shifting-opportunities by multinationals. In this context, it has proven harder to enforce high tax rates on corporate income as demonstrated by decreasingly effective tax rates and a higher share of corporate profits generated in tax havens.[65] Against this backdrop, greater international coordination is essential, while countries—at the same time—are experimenting with revenue-based taxes and online advertainment taxes.[66]

Foster competitiveness-enhancing investments and incentives

Insufficient investments in productive factors represent an important reason behind subdued productivity growth. As an example, lacking investments in transport infrastructure has led to a deterioration of road quality (at least in relative terms; see Figure 16). Public investments in particular have been declining in most advanced and emerging countries (see Figure 12 on page page 33). As a result, general purpose research has diminished, and public capital has decreased.

By re-igniting public and private investment in infrastructure, education and innovation, countries would not only enhance productivity growth but also further support employment and broaden aggregate demand. The global economy has entered a long-term economic slump since the 2008 financial crisis, and many economists foresee a near-term recession. While the debate on public investments raises questions about resources and the sustainability of potential fiscal deficits, investments cost relatively less in a low-interest-rate environment, and consensus on greater fiscal stimulus to foster investments is growing. Economists are also making the case for specific public investment in science as important and unique to channel resources in a sector that produces high returns to countries'

economies and their citizens.[67] As the limits of monetary policy to spur economic growth have become apparent (see Chapter 1), targeted fiscal policy towards productivity-enhancing investments and incentives could represent an important instrument to revive productivity growth while rebalancing income distribution over the next few years.

Conclusion

The need for a new economic agenda that combines environmental, social and economic growth objectives has been recognized by all stakeholders in advanced, emerging and developing countries alike. We have shown how achieving productivity growth is not just compatible with greater equality and environmental sustainability, but may in fact spur a new era of quality economic growth.

The challenge is the implementation of such an ambitious agenda. Transitioning to such a new development path will require significant efforts, bold policies and resolving some potential trade-offs.

Against this backdrop, all stakeholders need to come together and agree on a shared common solution—failing to do so may jeopardize present and future generations. In a multi-stakeholder fashion, policy-makers, business leaders and civil societies around the world should act together and take full responsibility for adopting policies, practices and behaviours that are aligned with the common goal of achieving widespread prosperity and sustainable development.

Notes

1 Rockström, et al., 2009.

2 For details, see *National Geographic* portal, https://www.nationalgeographic.com/environment/global-warming/global-warming-effects/.

3 For data on US emissions, see the United States EPA website at https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions; for data on global emissions, see the US EPA website at https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data.

4 Rockström, et al., 2009.

5 The Global Footprint Network is an international non-profit organization that benchmarks countries' ecological limits (https://www.footprintnetwork.org/).

6 This estimate is a back-of-the-envelope calculation based on Global Footprint Network data, assuming a static scenario. According to the Global Footprint Network, in 2016 the environmental footprint of an average European was about 4.56 global hectares per person, and the planet's regenerative biocapacity was approximately 12 billion global hectares in total. If these proportions hold true, extending the 2016 average European footprint to a population of 9 billion people results in an estimated 3.42 planets, http://data.footprintnetwork.org/#/countryTrends?cn=5001&type=BCtot,EFCtot.

7 Since the emergence of environmentalist movements in the 1960s, several studies have attempted to predict tipping points of environmental factors and their potential impact on economic development. For instance, the 1972 *Limits to Growth* report by Meadows et al.—using a computer simulation—showed that environmental limits on Earth would become evident by 2072 as a result of "sudden and uncontrollable decline in both population and industrial capacity". More recently, the seminal work of Nordhaus, 1992, using dynamic integrate climate economy models, attempted to introduced climate change effects into neoclassic models. Using these frameworks, researchers have produced potential impacts in terms of the percentage of output lost at different levels of predicted temperature increase. A recent study (Amundi, 2019) has combined different estimates based on DICE models; the study's findings show that the outcome varies considerably based on the underlying assumptions.

8 For example, higher average temperatures are increasing the frequency and severity of wildfires in the Artic (European Commission, 2017). The resulting loss of forest further exacerbates carbon emission, contributing to climate change. According to NASA, the Alaskan wildfire season is 40% longer and twice as common as it was 75 years, while Siberia has been experiencing frequent very fires destroying millions of hectares of forests since 2003 (Kahn, 2017).

9 Stewart, et al., 2005.

10 ILO, 2019.

11 He, Liu and Salvo, 2019.

12 Authors' calculations, based on World Bank, *Sustainable Energy for All*, https://datacatalog.worldbank.org/dataset/sustainable-energy-all/.

13 Frye, 1984.

14 World Bank Group, 2016.

15 Note that "competitiveness" and "productivity" are used interchangeably in this context.

16 For a review of low-carbon energy applications in Africa, see Doig and Adow, 2011.

17 Lee and Doukas, 2018.

18 World Economic Forum, 2017.

19 Bloomberg New Energy Finance, 2018, https://www.bloomberg.com/professional/blog/clean-energy-india-sector-no-investor-can-afford-miss/.

20 https://about.bnef.com/new-energy-outlook/ .

21 Mathew and de Córdoba, 2009.

22 For WTO rules and environmental policies: GATT exceptions, see https://www.wto.org/english/tratop_e/envir_e/envt_rules_exceptions_e.htm.

23 OECD and IEA, 2019.

24 These countries are the 36 OECD member states plus Argentina, Brazil, China, Colombia, India, Indonesia, Russia and South Africa.

25 Data from the World Bank's Carbon Pricing Dashboard, available at https://carbonpricingdashboard.worldbank.org/.

26 OECD, 2018.

27 Dechezleprêtre, Martin and Bassi, 2016.

28 Jha, Matthews and Muller, 2019. Similarly, California's greenhouse-gas regulatory programme has contributed to a housing shortage and reduced purchasing power of households.

29 The Global Sustainable Investment Alliance (GSIA) qualifies "sustainable investment" as an "investment approach that considers environmental, social and governance (ESG) factors in portfolio selection and management." Sustainable investment encompasses the following activities and strategies: Negative/exclusionary screening; Positive/best-in-class screening; Norms-based screening; ESG integration; Sustainability themed investing; Impact/community investing; and Corporate engagement and shareholder action.

30 GSIA, 2019, http://www.gsi-alliance.org/wp-content/uploads/2019/06/GSIR_Review2018F.pdf.

31 TCFD is an initiative by the Climate Disclosure Standards Board (CDSB), an international consortium of business and environmental NGOs.

32 Sanzillo, 2019, http://ieefa.org/ieefa-update-new-york-state-pension-fund-should-divest-from-fossil-fuels/.

33 Fritsche, et al., 2017.

34 Oxford Institute for Energy Studies, 2019.

35 Hernandez, Hoffacker and Field, 2013, https://www.researchgate.net/publication/259386034_Land-Use_Efficiency_of_Big_Solar.

36 See the International Renewable Energy Agency (IRENA) Finance Dashboard, available at http://resourceirena.irena.org/gateway/dashboard/?topic=6&subTopic=11. To put this in context, this level of spending (including both public and private investment) is roughly about 0.3% of global GDP and pales compared to the average OECD 20% public spending in social security measures (see OECD's Social Expenditure Database, or SOCX, at https://www.oecd.org/social/expenditure.htm) or the 2.1% public military spending (see the Stockholm International Peace Research Institute, or SIPRI, at https://www.sipri.org/media/press-release/2018/global-military-spending-remains-high-17-trillion).

37 OFT, 2004.

38 Aschhoff and Sofka, 2009, and KOINNO, 2017.

39 UNEP, 2017.

40 Chetty, et al., 2016.

41 On inequality driven by trade, see Harrison, 2005.

42 McKinsey, 2019a, shows that boom-bust cycles and rising capital depreciation have played a significant role in increasing inequality in the United States in general and across sectors. Booms tend to shift prices in favour to asset holders and episodes of commodity super-cycles tend to increase profits (and investment) and reduce labour's share of income.

43 Intellectual property products' capital—software, databases and research and development—depreciates faster than physical capital investments. When an economy uses more intangible capital in production the gross capital ratio increases because a larger share of gross capital (the sum of all types of capital before depreciation) needs to be replaced—hence, the gross capital shares increase.

44 The concept of "fairness of inequality" has been pioneered by Rawls, 1971, and Sen, 1979. Based on this literature, Roemer, 1998, broke down the determinants of income in two categories: "circumstance" and "effort": "circumstances" being defined as factors which are outside an individual's control (such as race, gender or socio-economic background), and "effort" being used to define factors which individuals' control. Therefore, inequality deriving from an individual's "effort" is deemed fair, whereas inequality due to "circumstances" is considered unfair.

45 Fehr and Fischbacher, 2003.

46 See, for instance, Blanchard and Giavazzi, 2003.

47 Sherman, 2009.

48 Piketty, 2014, notably, mentions that the decrease of marginal taxes on high income has been a potential powerful incentive to pursue higher compensations from top executives and greater efforts to generate new capital profits.

49 Hornbeck and Moretti, 2019.

50 Bivens and Mishel, 2015.

51 Stansbury and Summers, 2017.

52 Furman and Orszag, 2018.

53 Based on the definition of "inequality of opportunity" provided by McKinsey, 2019b.

54 Galor, 2012.

55 For a deeper analysis of these concepts and policies, see Ferreira, 2011, and Brunori, et al., 2018.

56 IMF, 2019.

57 Kwoka, 2017.

58 Ibid.

59 Based on World Economic Forum, 2019a.

60 Khan, 2017.

61 Piketty, 2014.

62 Egger, et al., 2019.

63 Based on World Economic Forum, 2019b.

64 Piketty, 2014. Using data on top executives finds that, as long as the top tax rates were high, managers had little incentive to bargain for higher compensation because a high share of any additional dollar accrued to the government. When the rates become lower, since any additional dollar increased a manager's personal wealth, there was an incentive to persuade firms' stakeholders to grant substantial raises. This increase in managers' income, however, is hardly related to their productivity since the decrease in top marginal tax rates has not led to substantial productivity growth in developed countries since 1980.

65 Zucman, 2014.

66 For further discussion, refer to World Economic Forum, 2019b.

67 See, among others, Gruber and Johnson, 2019; Summers and Furman, 2019.

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