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Policy Pathways for the New Economy

Shaping Economic Policy in the Fourth Industrial Revolution

Platform for Shaping the Future of the New Economy and Society

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This white paper is the outcome of a set of international, multi-stakeholder dialogues organized by the World Economic Forum's Platform for Shaping the Future of the New Economy and Society under the umbrella of the Second Dialogue Series on New Economic Frontiers. The First Dialogue Series was convened between September 2018 and January 2019 (https://www.weforum.org/whitepapers/dialogue-series-on-new-economic-and-social-frontiers-shaping-the-new-economy-in-the-fourth-industrial-revolution).

This second series engages the Platform's Global Future Councils on the New Economic Agenda and the New Social Contract, representing views from business, government, civil society and the research community. It identifies some of the most urgent challenges at the intersection of globalization, technology, economics and society, and explores a range of potential interventions to address them. As opposed to the First Dialogue Series, which considered a broad range of public- and private-sector led solutions, this Series focuses entirely on interventions in the public policy space, in the areas of labour, innovation and tax policy.

As a key output of the learning created, this white paper draws upon discussion contributions by leaders and experts who engaged in the Dialogue through a series of virtual calls between May and August 2019. It also includes the latest thinking from international organizations, academic researchers, think tanks, businesses and other stakeholders. It aims to develop consensus towards a common narrative on the new economic and social context and objectively identify emerging response options for policy makers. The white paper is intended to be a resource for governments, business and other stakeholders interested in furthering economic and social progress in the Fourth Industrial Revolution.

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Introduction

Systems Change to Build Inclusive Economies in the Fourth Industrial Revolution

Globalization and technological progress have profoundly transformed economies and radically redistributed opportunities to participate and thrive. As a result, there is a need for new deliberate action across stakeholders—business, government and workers—to create greater shared prosperity. Economic inequality and social polarization are growing in many countries. Their sources are many and the guises varied: technological change has been hollowing out the middle class[1]; productivity gains have not translated into higher wages for the vast majority of workers and the labour share of total income continues dropping[2]; career paths have become more volatile and working conditions more precarious for many workers[3]; and algorithm bias has the potential to become a source of perpetuating discrimination.[4] At the same time, competition in many industries has been weakening and wealth concentration growing.[5] All of this has come on top of the effects of globalization, which left many low-skilled workers in a precarious position by the time the Fourth Industrial Revolution began to unfold.

While the challenge is tremendous, there is a unique window of opportunity today to mobilize human collaboration and technology to move toward more equitable outcomes. Achieving the kind of multi-systems change that will be needed to fully realize the new potential and fairly distribute the gains from openness and technological progress will require breaking with established paradigms that have proven insufficient. It will require leaders committed to institutional change and policy reform as well as shifts in societal norms, business practices and attitudes by individuals. It will also need to involve fresh thinking on the best way to redraw the boundaries on roles and responsibilities in managing the transition to the new economy. In the best case this would lead to the formulation of a new social contract between governments, businesses and individuals.

While collaboration between the public sector, business and populations will be a critical component of such a contract, policy-makers have a central role in deploying several of the levers available for catalysing the move towards a more productive and inclusive new economy. This paper summarizes three emerging economic policy challenges and identifies a range of new public-sector led response options. In doing so, it covers approaches at different levels of maturity from idea stage to policy experiments to newly implemented policy measures. The aim of the paper is to support leaders in integrating new economic frameworks and policies towards delivering a new social contract fit for the Fourth Industrial Revolution.

Three Interrelated Emerging Challenges for Economic Policy-Makers

The paper builds on the First Dialogue Series on New Economic and Social Frontiers, which laid out four key challenges to leveraging emerging technologies to advance economic prosperity while keeping in check the host of polarizing forces unleashed by the recent technological transformations: (1) rethinking the traditional concept of economic value and its measurement, (2) addressing market concentration, (3) enhancing job creation, and (4) reimagining social protection.
The current dialogue series incorporates learnings from the first series and develops implications for governments on future paths for policy-making in three important and interrelated areas:

1. **The future of innovation policy:** How does innovation policy need to evolve to ensure more productive and inclusive economies?

2. **The future of labour policy:** How must labour policy be updated for the new world of work?

3. The future of fiscal policy: How will approaches to taxation and government spending have to adapt to the transformation of labour and product markets?

The future of innovation policy is included for policy-makers to reconfigure, with a view to accelerating innovation diffusion and to setting a clearer direction for innovation outcomes. It is complementary to the discussion around competition policy in the first dialogue series, as both are crucial in safeguarding a level playing field.

The labour policy dialogue builds on insights from both the job creation and social protection discussions in the first Dialogue Series. Moving beyond strategies to increase the number of jobs, it considers how the quality of all forms of work can be improved and the workforce be supported in capitalizing on newly created job opportunities.

The dialogue on the future of fiscal policy considers the new demands on government spending surfaced in the debates around labour policy, innovation and social protection, and examines emerging ideas for rebalancing the tax burden and shifting spending to create greater equality of opportunity.

Taken together, innovative thinking in these three policy areas holds the potential for achieving greater resilience and realizing the gains from the ongoing transformation. Importantly, the areas are closely interrelated and success in one of the three areas is reliant on progress in reshaping the other two. For example, a successful strategy for innovation diffusion will require a workforce which possesses the right skills to work with advanced technologies. If access to reskilling and upskilling is indeed evenly distributed across the population, this will in turn reduce one source of inequality, creating less need for redistributive policies.

At the same time, there are trade-offs: a tax on technology will have the first order effect of shifting tax burden from labour onto capital, yet at the same time might discourage technology development and diffusion to smaller players. An 'all of government approach' will therefore be essential as policy-makers consider their role in managing new economy challenges and unleashing new economy opportunities for their populations.

Additionally, the set of challenges considered here are by no means comprehensive. Beyond identifying the relevant areas where boundaries will need to be redrawn, other fundamental questions will also need to be addressed around geography and generational responsibility, particularly difficult in a climate of declining trust and growing populism. Finally, while globalization and technological change are considered here as the two key drivers of economic and social outcomes, another important challenge includes fairly distributing responsibilities and costs in the transition to a more carbon-neutral economy.

The work of the Platform for Shaping the Future of the New Economy and Society will continue to surface, raise awareness of and offer solution paths to emerging challenges for building prosperous, inclusive and equitable economies.

The Dialogue Series draws upon the views of preeminent thought leaders in the 2018-2019 Global Future Council on the New Economic Agenda and the Global Future Council on the New Social Contract. Each of the two Councils provides a unique lens on the selected topics as well as a highly essential interdisciplinary approach to proposed solutions.

Each of the next three chapters is organized to provide a brief overview of the emerging challenges and opportunities around each area as well as the spectrum of response options generating traction in each area. Response options for each area are displayed without an order of preference, and while some are mutually exclusive, others may be considered in tandem. As consensus emerges around a specific set of solutions or as there is further experimentation with a range of approaches, future work should aim to examine case studies globally to build a framework of core principles and a 'bank' of potential solutions to inform decision-making. We invite readers to share examples of response options for the featured challenges and proposals for future topics.

Notes

1 Bernstein and Raman, 2015, Autor and Salomons, 2018, and Darvas and Wolff, 2017.

2 Bernstein and Raman, 2015, and Karabarbounis and Neiman, 2013.

3 Prassl, 2018.

4 O'Neill, 2016, and Eubanks, 2018.

5 Calligaris, et al, 2018.

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The Future of Innovation Policy

Summary

Innovation is a key lever of economic growth and job creation. However, globalization and, notably, accelerated technological change associated with the rise of digitalization, have deeply disrupted innovation pathways with increased complexity, faster pace of change, the rise of network effects and enhanced uncertainty about their net impacts on society. In addition, there is growing demand for innovation to be unleashed to address both long-standing and emerging societal and environmental challenges, such as climate change, health, education or social inclusiveness. Against this changing backdrop, the rationale and role of governments in supporting and managing innovation are being redefined. Governments need to strike the right balance between enabling innovation-led entrepreneurial activity and preventing and mitigating any potential negative effects that may accrue from them, such as potentially rising inequality. As a result, 'tried and tested' traditional innovation policies, while still relevant, need to be complemented with new approaches and new policy experiments that can support stronger innovation diffusion and enable innovation towards achieving societal outcomes. This will require stronger involvement of citizens in the design and implementation of innovation policies.

This chapter aggregates the latest thinking on pathways to positive change in innovation policy that may enable stronger innovation diffusion and accelerate the directionality of innovation towards societal needs. In addition, it identifies a set of policy approaches and instruments that have been adopted, are being tested or have been proposed to adapt the future of innovation policy within these pathways.

What is the Current State of Play?

Long-term economic growth depends on the ability of an economy to raise its productivity, and thus its innovation. Forecasts predict that for both developed and emerging economies approximately 80% to 90% of economic growth in the next four decades will rely on productivity growth.[1] Productivity growth, by extension, is driven by the ability of an economy to introduce new and higher value-added products and services and more efficient production processes—i.e. innovation. Innovation in production, distribution and business models can generate efficiency gains, new or better products that create higher value-added, boosting productivity growth and economic prosperity. This is particularly true in a context where, collectively, we must maintain production within our planetary boundaries.

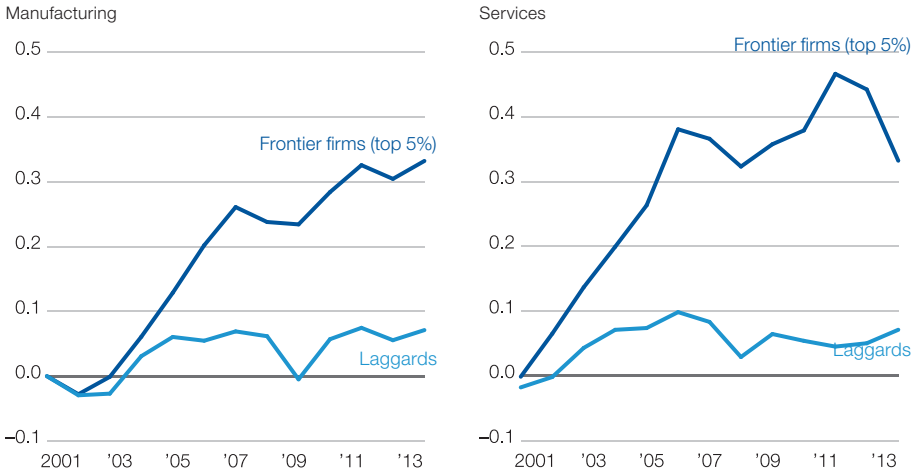
However, new dynamics have resulted in slow innovation diffusion across and within sectors, with large productivity differences between a handful of 'superstar companies' in some key sectors that have exhibited robust productivity growth and a vast majority of companies that have seen their productivity growth stagnate (see Figure 1 on following page). This has resulted in low productivity growth rates at the aggregate level that for many countries have remained close to zero for a prolonged period of time.[2] Moreover, these dynamics also have an impact on the rise in inequality and lack of territorial convergence, as superstar companies are able to pay better salaries than those with stagnant productivity growth rates and tend to concentrate geographically in regions with high access to talent and knowledge.

There is also growing demand for innovation to respond better to broader societal challenges, such as climate change, health, education and social inclusiveness. Innovation cannot only focus on boosting growth and jobs; it also needs to contribute to transforming societies by ensuring a beneficial direction of this growth. In other words, innovation must contribute to the creation of productive, inclusive and sustainable economies, with a human-centric approach at its core.

Furthermore, the increasing unpredictability of some innovations has raised ethical concerns about potential undesired outcomes. This has been most prominent for—but not limited to—the development of Artificial Intelligence and the ability of machines to discriminate between individuals according to certain traits, such as gender or ethnicity, or to make value judgements in conflictual situations.

Figure 1: Labour productivity gap: global frontier firms vs. selected other firms, 2001–2013

Annual productivity growth (log value)



Source: OECD, 2015.

Note: The "global frontier" is measured by the average of log labour productivity for the top 5% of companies with the highest productivity levels within each two-digit industry. "Laggards" capture the average log productivity of all the other firms. Unweighted averages across two-digit industries are shown for manufacturing and services, normalized to 0 in the starting year. The vertical axes represent log differences from the starting year. For instance, the frontier in manufacturing has a value of about 0.3 in the final year, which corresponds to approximately 30% higher in productivity in 2013 compared to 2001.

Against this changing backdrop, the rationale and role of governments in innovation are being redefined. Traditional innovation policies aimed at building an enabling environment for innovation by (1) investing in fundamental science and skills, investments that traditionally suffer from private underinvestment (to address 'market failure'), and (2) fostering knowledge flows through the strengthening of regional and national innovation systems (to address 'system failure') continue to be very relevant. These policies aimed at boosting the "quantity of innovation" are however insufficient on their own. In the new context, innovation policy also needs to (3) ensure the orientation or 'quality of innovation', so that it is contributing more directly towards broad societal goals such as inclusiveness or sustainability ('orientation failure'). In this new paradigm, governments are not only mere enablers of innovation, but fundamental *shapers* of innovation that, together with citizens, set the direction of innovation and create the necessary demand for desired innovation outcomes.

In this new vision for innovation, governments must adopt an array of different policies that can help shape the appropriate new frameworks and attitudes towards innovation. They also have to balance the need between fostering innovation-led entrepreneurial activity and preventing and mitigating any negative social or environmental effects, orientating innovation towards achieving socially desirable objectives.

Policy Pathways Towards Inclusive Change

'Business-as-usual' policies and traditional innovation playbooks are no longer sufficient. 'Tried-and-tested', traditional innovation policies to support higher investment and knowledge flows, while still relevant, will require adaptation or complementary approaches to support stronger innovation diffusion in the age of globalization and digitalization. In addition, new policies that ensure the orientation of innovation outcomes towards social goals with a stronger involvement of citizens and users in their design and implementation will also need to be adopted. This chapter presents a set of novel policy approaches and instruments that have been adopted, are being tested or have been proposed, organized around these pathways. They can serve as food for thought for future policy development.

Fostering faster and broader diffusion of innovation

Boosting innovation diffusion has always been a priority for innovation policy, particularly as small and medium-sized enterprises (SMEs) or young companies, may lack the information, skills, resources, access or expertise that are fundamental for innovation development and uptake. To a large extent, stronger innovation diffusion will depend on the broader framework conditions that govern economic activity and entrepreneurship, such as the level of competition[3], taxation[4], regulation or skills development.[5] Much analysis has been carried out in recent years on how competition levels are currently stifled and the related effects on innovation creation and diffusion, as well as on the shortages of new skills that are fundamental for innovation. Arguably, first and foremost, fostering stronger diffusion will depend on adapting those measures that can restore better framework conditions for innovation.

At the same time, new approaches to innovation policies can also contribute to addressing some of the persistent bottlenecks that hinder innovation

diffusion in the digital age. In fact, many innovation tools aimed at innovation diffusion—such as the creation of innovation vouchers allowing companies to contract research from research institutes, or research and innovation tax credits, grants and loans—have been part of the innovation policy portfolio for decades. Policies to support stronger knowledge flows between research institutions, universities and businesses through cluster policies or intermediary research institutions such as technology centres have also been heavily promoted.

However, the evident slowdown in innovation diffusion in the digital age has led to renewed efforts of this nature. New or revisited approaches to some of these tools have recently been adopted or are being piloted. Recent examples of such policy initiatives focus on (1) supporting the scale-up of breakthrough innovation; (2) boosting the ability of SMEs to understand and assess the potential of digitalization for their businesses; (3) developing new intermediary knowledge broker institutions; (4) stimulating new digital clusters; (5) opening up scientific research by making its outcomes more publicly available; and (6) developing appropriate regulation that allows balancing predictability and flexibility without hampering innovation and risk taking.

Below are examples of policy instruments that have been recently adopted or piloted in these six areas.

1. Scaling up breakthrough innovation: The Fourth Industrial Revolution is opening up a wide range of new opportunities for breakthrough innovations, but oftentimes promising new prototypes and products fail to be scaled up and adopted across sectors due to a lack of information, contacts or patient capital. This hinders stronger innovation diffusion throughout the economy, as well as its economic transformation. Some governments have started to develop and adopt innovative instruments to identify and accelerate the scale-up of these initiatives by providing advice and funding. Three initiatives are currently piloted: the European Innovation Council, for scaling up breakthrough innovations with the potential to create entire new markets, the Tech City UK Upscale Programme and the Dubai Smart Cities Accelerator.

The European Innovation Council (EIC), European Union[6]

The European Innovation Council (EIC) will be tasked with turning Europe's scientific discoveries into fast-scaling businesses. The EIC has been created with two types of innovators in mind: (1) technologists and researchers, who can apply to its Pathfinder programme that aims at supporting radically new technologies emerging from collaborative research with funding, support for proof-of-concept to demonstration and commercialization activities, as well as coaching and mentoring programmes; and (2) start-ups, entrepreneurs and SMEs, under the Accelerator programme that will support the development and scale-up of high-risk innovations by start-ups and SMEs through grants and blended financial models.

Currently in its pilot phase, the EIC will become a reality beginning in 2021 under the next EU research and innovation programme, Horizon Europe. The Commission has proposed to dedicate €10 billion to the EIC under Horizon Europe.

Tech Nation Upscale Programme, United Kingdom[7]

Tech Nation's Upscale Programme supports the next generation of scaling digital businesses in the United Kingdom. Upscale provides mid-stage businesses with expertise from world-class scale coaches who have influenced the growth of some of the world's most successful digital companies. To participate in Upscale, businesses must have their headquarters in the United Kingdom, be VC backed having raised Series A round or generating £1.5-5 mio in revenues and be growing at a rate of approximately 20% month-on-month (be it in revenue, headcount, users or another key growth metric).

Dubai Smart Cities Accelerator, United Arab Emirates[8]

The Dubai Smart City Accelerator supports innovative companies in the areas of Internet of things and connectivity, urban automation and mobility, artificial intelligence, blockchain, open city data, sustainable cities and living, smart government, and smart retail. It is a platform for start-ups to scale up their business and demonstrate their product to leading corporates and government partners. The Accelerator offers a three-month programme to 10 selected Smart City companies with hands-on mentorship from over 100 industry experts, office space, seed funding and access to a global network of investors and corporate partners. The Dubai Smart Cities Programme is a joint venture by the Dubai Silicon Oasis, Dubai Chamber, Smart Dubai, Visa, Orange Business Services, and Rochester Institute of Technology.

2. Boosting SMEs' ability to take up digital activities: Small and medium-sized enterprises (SMEs), with the exception of some members of the start-up community, have been particularly slow in taking up digital technologies and adapting their business models to the digital imperative. Lack of information, expertise and, many times, access to finance hinder their ability to do so. In order to bridge these gaps, several countries—such as Germany with Industrie 4.0, Austria with the Pilotfrabrik für Industrie 4.0, Italy with the Fabbrica Intelligente, and South Korea with the Small and Mid-Size Business Smart Manufacturing Strategy—have developed specific programmes with the objective of supporting the digital transformation of SMEs. While each initiative has its own specific parameters, all focus on the provision of information, advice and resources as core components of their offer to SMEs in the manufacturing sector. Less focus seems to have been placed on supporting SMEs in the service sector.

Industrie 4.0, Germany[9,10]

Industrie 4.0 is the name given to the German strategic initiative to establish Germany as a lead market and provider of advanced manufacturing solutions in the Fourth Industrial Revolution, and it's one of 10 "Future Projects" identified by the German government as part of its High-Tech Strategy 2020. "Industrie 4.0" is a national strategic initiative from the German government through the Ministry of Education and Research (BMBF) and the Ministry for Economic Affairs and Energy (BMWI). It aims to drive digital manufacturing forward by increasing digitalization and the interconnection of products, value chains and business models. It also aims to support research, the networking of industry partners and standardization, with a special focus on SMEs.

Pilotfabrik für Industrie 4.0 in Austria[11]

The Pilotfabrik (pilot factory) in Seestadt Aspern, Austria, is an experimental factory featuring the latest networked production technologies. Partner firms can learn about emerging technologies and adapt or develop them further to modernize their production processes. The factory also provides an environment for developing prototypes of new products and includes a training centre for students and employees of partner companies. The Pilotfabrik programme is a public-private initiative between the Austrian Ministry of Innovation and Technology, the Technische Universität Wien and several firms that are co-financing the project.

Frabbrica Intelligente in Italy[12]

In 2012, Italy launched its Fabbrica Intelligente initiative with the objective of developing and implementing an R&D-based strategy to contribute to transforming and upgrading Italy's manufacturing sector in view of the opportunities and challenges opened up by digitalization. The Fabbrica Intelligente cluster initiative provides opportunities for networking and sharing research infrastructures and carrying out technological foresight with a special focus on SMEs.

Small and Mid-Size Business Smart Manufacturing Strategy in South Korea[13]

In June 2014, the Manufacturing Industry Innovation 3.0 strategy was launched with the objective of implementing the concept of a smart factory in the country; adopting automation, data exchange and enhanced manufacturing technologies throughout the manufacturing process; and incorporating both short- and long-term technological plans. South Korea is a global manufacturing powerhouse and ensuring a successful digital transformation of its industry is crucial to ensure its competitiveness. To do so, the government, in promoting the roll-out of digital technologies to ensure the creation and conversion of its small and medium-sized businesses into smart factories. In 2017, the private and public sectors agreed to expand the number of smart factories in the country, with a target of transitioning at least 30,000 factories thanks to the adoption of the latest digital and analytical technologies by 2022. Under this strategy, the government will provide support to train 40,000 skilled workers to operate fully-automated manufacturing sites through various educational programmes.

3. Setting up digital clusters: Clusters have been widely used—and equally loved and hated—by policy-makers as a means to foster stronger knowledge flows across innovation stakeholders thanks to physical proximity. While the ad-hoc creation of clusters has received much criticism due to their ineffectiveness to create linkages out of thin air when previous knowledge and production capacity were absent, new clusters aimed at building strong linkages in the digital economy have been created to rally and support the development and spread of digitally enabled innovation of emerging start-ups, such as the Cap Digital in Paris.

Cap Digital in Paris, France[14]

Created in 2006 in the Paris Metropolitan Areas as a non-profit organization, Cap Digital is the biggest cluster in Europe and one of the largest collectives of innovators in the global digital ecosystem. It is composed of more than 1,000 members located primarily around the Paris region, and has leveraged more than €1.6bn since its creation.

Cap Digital Offers a set of services to support for R&D funding grants, business coaching and acceleration, digital transformation and open innovation models for start-ups and strategic studies.

4. Creating new intermediary knowledge institutions: Intermediary knowledge institutions such as technology centres and other research and technology organizations can play a fundamental role in both generating targeted knowledge that can be used by companies, notably SMEs, as well as in brokering knowledge flows between knowledge creators and users. These organizations have traditionally played an important role in regional and national innovation systems for decades. Currently, in response to the new opportunities and challenges opened by the rise of digitalization, some countries have created new institutions closely focused on digitally enabled innovations and their diffusion. The Digital Catapult, as part of a broader initiative in the creation of a broad network of catapult centres in the UK, and Data61, a network by Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO), are key examples.

Digital Catapult–UK[15]

Digital Catapult is the UK's leading advanced digital technology innovation centre. It drives the early adoption of digital technologies to make UK businesses more competitive and productive to grow the country's economy. Its objectives are to 1) accelerate the number of trailblazer companies working with advanced digital technologies, and 2) deliver increased applied research, development and innovation in advanced digital technologies.

With these objectives in mind, Digital Catapult delivers three core technology programmes, across two industry sectors in manufacturing and creative industries, driven by three regional centres and a national centre in London.

More precisely, Digital Catapult promotes the development and early adoption of advanced digital technology by providing physical and digital facilities for experimentation and testing for small companies; driving stronger collaborations across innovation stakeholders; convening collaborative research; and leveraging public funding to mobilize private funding.

Data61- Commonwealth Scientific and Industrial Research Organisation-CSIRO in Australia[16]

Data61 is Australia's leading data innovation network and seeks to transform industries with data science research and technology development. With more than 1,000 employees, including 300 PhD students from 70 countries, combined with the talent embedded in 30 partner universities, Data61 represents one of the world's largest data-driven digital research and development teams.

Data61 is a single-entry point to, and collaborative partner with a range of government and private-sector stakeholders focused on seeding and scaling new 21st century data-driven platforms, business models and projects. Data61 has built a searchable database called Expert Connect, which contains profiles of 45,000 research and engineering experts from research organizations in Australia. It is continually evolving with additional data sets such as global patent data provided by an agreement with IP Australia.

5. Opening up science and innovation for stronger knowledge flows: It is widely acknowledged that making research results more accessible to all stakeholders results in stronger knowledge flows that can help diffuse innovation. However, making research results publicly available can interfere with intellectual property rights (IPR) or privacy concerns that are fundamental for providing the right incentives to engage in science and innovation activities for companies. In recent years, some public funding organizations, such as the European Commission, have developed pilot programmes that can improve science openness while still preserving IPR and privacy protection.

Open Research Data in European Commission's Research Programmes[17]

The European Commission has been running a pilot programme on access to data as part of its Research and Innovation Programme, Horizon 2020: The Open Research Data. This initiative applies to making publications publicly available, while allowing grant beneficiaries to voluntarily make other datasets open. Begun in 2017, the programme covers all thematic areas of Horizon 2020.

6. **Developing future-proof regulation:** Regulation is crucial for ensuring that economic activity meets the environmental and social objectives that societies establish for themselves. In an era of accelerated technological change, smart regulation that balances the ability to spur innovation and meet societal objectives can be challenging because of the lack of sufficient information and enhanced uncertainty on the expected and potential outcomes of many rising technologies. Early regulation can help set standards and potentially accelerate innovation creation and diffusion by providing legal certainty. At the same time, regulation may also stifle innovation if too restrictive, hampering future potential avenues for unforeseen applications. Against this backdrop, policy-makers need to strike the right balance at the right time and also consider the adoption of regulatory sandboxes, where specific technologies can be tested in a controlled environment with limited regulations, so that more information about the specific effects of many technologies can be observed and tested before wide regulation. Many countries—e.g. Denmark, Lithuania, United Kingdom, Poland, the Netherlands, Korea, Rep. and Argentina—have already adopted regulatory testbeds and sandboxes for the Fintech industry, and their application for other tech-enabled innovation in the areas of blockchain or cryptocurrency are also being tested in different countries. Still other countries are experimenting with regulatory testbeds outside financial markets; the Singapore Autonomous Vehicle Initiative is one example.

The Singapore Autonomous Vehicle Initiative (SAVI)[18]

The Singapore Autonomous Vehicle Initiative is a joint partnership between the Land Transportation Authority (LTA) and A*STAR to provide a technical platform for industry partners and stakeholders to conduct research, development and test-bedding of Autonomous Vehicles technology, applications and solutions.

One of SAVI's focus areas is to prepare technical and statutory requirements for future deployment of Autonomous Vehicles in Singapore. Demarcated routes in Singapore's one-north business park have been identified by LTA and JTC to support the testing of Autonomous Vehicles by interested parties.

Providing direction to innovation to achieve societal goals with stronger citizen and user involvement

The role of innovation as a key engine to address societal challenges, such as environment, health or inclusiveness, has been recognized for years. Large public R&D programmes have focused on funding public research in these areas, in programmes such as the European Commission's Framework Programmes or the United States' Grand Challenges Programme. For social inclusiveness, traditional approaches believed that through the process of creative destruction that innovation generates, new knowledge would result in higher economic growth and more and better jobs that in turn would improve inclusiveness. However, in recent years, a growing understanding that technology is not naturally neutral and that it can lead to a process of 'destructive creation', coupled with the persistent underachievement in addressing some of the most pressing societal challenges, have called for new approaches to actively shape socioeconomic and environmental transitions. These new approaches see governments not only as mere funders of public R&D around a list of societal challenges, but as enablers of desired transformation that shape markets and create the demand for the desired outcomes, with a much closer involvement from users or citizens who will feel the effects of these innovations.

1. **Transformative Innovation:** So-called 'transformative innovation' is in its infancy and only a handful of initiatives and projects have started testing its application in policy-making. Many of these initiatives have adopted a mission-oriented approach.[19] The Energiewende initiative in Germany, for example, takes aim at the country's energy transformation in order to curb carbon emissions. Other approaches focus on fostering digitalization, food security and safety, like the mission-oriented research proposals in the European Union.

Energiewende: Energy Transition in Germany

The "Energiewende" (in English, energy transformation) is Germany's planned transition to a low-carbon, nuclear-free economy through a mission-oriented approach. The initiative started as Germany's answer to the Paris Agreement, the global effort to reduce greenhouse gas emissions to fight climate change. While the initiative has raised some concerns in terms of its complex implementation, the Energiewende involves a large number of sectors in order to trigger innovation through investment and regulation beyond renewable sectors and in traditional sectors such as the steel industry that would otherwise not be geared towards lowering carbon emissions.

Mission-Oriented Research in the European Union

The European Commission, in its proposal for the next Research and Innovation Framework Programme 2021–2027, Horizon Europe, has also proposed the adoption of a mission-oriented approach based on the work of economist Mariana Mazzucato at University College London.

Innovation missions are instruments where the government sets the objective of solving a certain technological or societal problem within a defined time frame that is currently out of reach and requires significant technological advances across different sectors. Rather than focusing on particular sectors, innovation missions focus on problem-specific societal challenges, that require the collaboration of many different sectors to solve. New types of collaboration between public and private sectors need to be brokered to implement them.

According to the Jacques Delors Institute, some of the key characteristics of this new approach are: (1) innovation missions should have a verifiable target as an objective; (2) a mission should elevate technologies from early stages close to market-readiness; (3) missions should be implemented by active and assertive public agents; (4) implementing agencies should be able to rely on strong technical in-house capacities; and (5) missions require visible and stable political backing.

With a budget of €1.2bn per mission, the European Commission intends to work on an initial set of five key missions: digitalization, health, "clean Europe", and food and agriculture. These missions will be defined in close cooperation with member states, stakeholders and citizens.

Other pioneering initiatives that are being tested to better orientate innovation towards transforming societies come from the Nordic countries. These include Sweden's Challenge Driven Initiative and Norway's Responsible Research and Innovation programme. These initiatives are particularly interesting in providing frameworks for ensuring that the outcomes of innovation are in sync with societal values, and thus end users need to be deeply engaged throughout the process.

Challenge Driven Initiative in Sweden

VINNOVA, the Swedish Innovation Agency, launched a policy initiative in 2011 to fund projects that provide sustainable solutions to key societal challenges on four key areas: Future Healthcare, Sustainable and Attractive Cities, Information Society and Competitive Industries. The originality of this approach is that the funded projects cut across multiple thematic and sectoral areas and must identify how end users are engaged and involved throughout the three stages of the projects.

Responsible Research and Innovation Programme in Norway

Responsible Research and Innovation (RRI) is a policy framework that guides funding, research and innovation activities by the Norway Research Council. The basic assumption is that science and innovation results need to meet a set of social responsivity that need to be better aligned with what society wants, needs and is prepared to embrace. This framework does not contain moral codes or checklists that already govern science and innovation with, for example, ethics criteria or health and safety. It is more an open framework that identifies practices for encouraging researchers to focus on the societal context in sight when undertaking their research activities. This has implications for how institutions are governed and the type of knowledge and skills that are needed, and underpins the process, with stronger involvement of stakeholders, as well as the products and enhancing legitimacy of science.

Other efforts to better direct innovation towards transforming societies with input from innovation users or citizens have also been adopted in emerging economies, such as the A Ciencia Cierta initiative in Colombia.

"A Ciencia Cierta" Programme in Colombia[20]

In 2013, Colciencias, the Colombia Science and Innovation Agency, launched "A Ciencia Cierta" under the National Strategy for Social Appropriation. Funded by the Inter-American Development Bank, this initiative aims to engage local communities in identifying solutions to social and environmental problems.

In 2018, the programme granted 60m Colombian pesos (approximately US$19,000) to 28 local communities that identified and selected projects that would help improve local sustainability thanks to science, technology and innovation.

2. **Broadening the innovator base:** In addition to adopting new approaches to ensure a better directionality of innovation towards societal challenges, measures broadening the base of innovators to achieve more inclusive results can also be promoted. When it comes to achieving more inclusive innovation outcomes, influencing the composition of the research

community (i.e. 'innovation inputs') is as important as providing direction for innovation processes and outcomes. In particular, recent research has shown that socioeconomic class, race and gender are important factors that influence the ability of an individual to become an innovator—in particular, a top innovator.[21] Thus, policies should be directed towards exposing all segments of the population to innovation from an early age. As the pool of innovators becomes more diverse, innovations should serve the needs and preferences of more diverse demographic groups. This can help align incentives for socially beneficial innovation, which complements the external alignment through mission-driven innovation approaches that target outcomes more directly. Recent research conducted under the Equality of Opportunity project suggests that much innovative talent goes unnoticed[22]; not all population groups are exposed to innovative environments from an early age. Efforts to diversify the innovator base are therefore needed as an important, decentralized mechanism for reaching underserved markets and ensuring innovations are socially beneficial.

One of the segments of the population that has traditionally been underrepresented in innovation is women. New initiatives, such as the UN She Innovates Global Programme are aiming at bridging that gap.

UN She Innovates Global Programme[23]

Launched in March 2019 under the UN Women's Global Innovation Coalition for Change, the "She Innovates Global Programme" aims to support women innovators across the world. The initiative will provide access to tools and resources that are targeted at addressing some of the biggest barriers women and girls face when innovating. The programme will launch a She Innovates App and organize global events to connect women innovators, boost visibility through awards for women-led solutions and create innovation labs to connect women innovators with support and expertise from established businesses.

Notes

1 Braconier, Nicoletti and Westmore, 2014.

2 There is a lively debate on the reasons behind the low aggregate productivity growth rates. While our current statistics may not cover value creation in an intangible economy as accurately as desired, and therefore current productivity statistics may be underestimated, there is a broad consensus that innovation mismeasurement may not be able to explain recent productivity growth slowdown.

3 For a review of evolving dynamics in competition, see World Economic Forum, 2019.

4 For a review on the future of fiscal policy, please, see page 23.

5 For a review on the role of skills, please see the Future of Fiscal Policy on page 23.

6 https://ec.europa.eu/research/eic/index.cfm.

7 https://technation.io/programmes/upscale/.

8 https://dubaismartcity.org/.

9 https://www.plattform-i40.de/PI40/Navigation/EN/Home/home.html.

10 https://ec.europa.eu/growth/tools-databases/dem/monitor/sites/default/files/DTM_Industrie%204.0.pdf.

11 http://pilotfabrik.tuwien.ac.at/en/.

12 https://www.mise.gov.it/index.php/it/incentivi/impresa/bando-fabbrica-intelligente-agrifood-e-scienze-vita.

13 https://www.export.gov/article?id=Korea-Manufacturing-Technology-Smart-Factory.

14 https://www.capdigital.com/en/.

15 https://www.digicatapult.org.uk/.

16 https://www.innovationpolicyplatform.org/system/files/imce/Data61_Australia_TIPDigitalCaseStudy2019_2.pdf.

17 https://ec.europa.eu/research/openscience/index.cfm.

18 https://www.lta.gov.sg/content/ltaweb/en/roads-and-motoring/managing-traffic-and-congestion/intelligent-transport-systems/savi.html.

19 For a thorough review of mission-oriented research and innovation, see Mazzucato, 2018a and 2018b.

20 http://www.acienciacierta.gov.co/.

21 Bell, et al, 2019.

22 http://www.equality-of-opportunity.org/.

23 https://www.unwomen.org/en/how-we-work/innovation-and-technology/un-women-global-innovation-coalition-for-change/she-innovates-global-programme.

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The Future of Labour Policy

Summary

As the world of work transforms rapidly, existing labour policies are falling out of step with the nature of employment in today's hyper globalized and digitalized labour markets. While the long-term effects of digitalization have the potential to be highly beneficial for consumers, business and workers, the short-term disruptions created by the transition could be painful for many current and future workers, if preparations for these disruptions are inadequate.

Labour policy will need to become more agile and innovative. Policy-makers are being challenged to think more broadly than the traditional focus on rights, responsibilities and protections linked to full-time permanent employment. Policy attention needs to shift from jobs alone to work more broadly, including access to quality work, transitions between employers, continuous retraining, upskilling and lifelong learning, and support during periods of inactivity. This chapter provides examples of existing and proposed policy responses to these challenges and opportunities, focusing on two core labour policy objectives today: enhancing the quality of work and cultivating talent.

What is the Current State of Play?

Across economies, policy-makers are contending with how to develop and implement labour policy relevant for a rapidly changing new world of work.

The window of opportunity to put in place a new labour framework is short. Labour markets are being reshaped by globalization and technology. The pool of talent is being altered by demographic trends such as ageing populations, the expansion of education access, migration and shifting values and attitudes to work. At the same time, work itself is being transformed by technological advances, not least high-speed mobile internet, artificial intelligence and the widespread adoption of big data analytics and cloud technology, which are set to dominate the 2019–2022 period.[1] The consequences include job losses, a growing gap between the skills of workers and the skills needed in the workplace, and a lack of adequate talent in high-growth roles, especially in new sectors of economic activity.

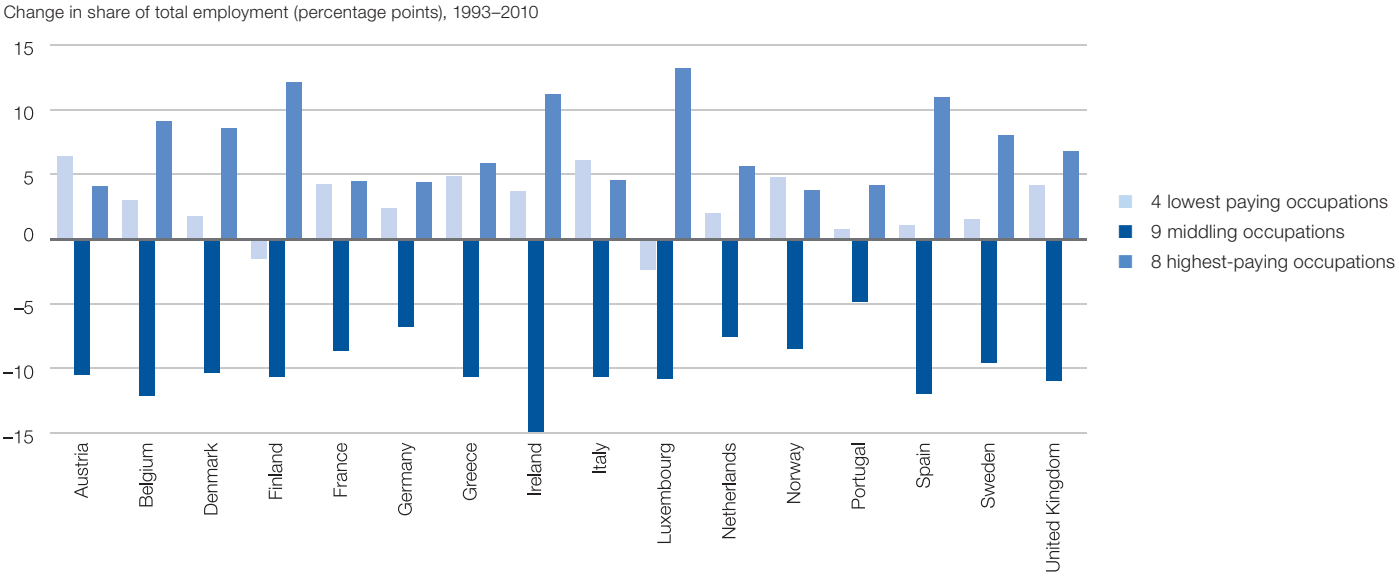
Five major emerging trends relating to the quality of work and the cultivation of talent can be identified:

Digitalization is expanding access to both upskilling opportunities and work. Education technology—including online learning technologies, training resources and open university courseware—are providing more workers with opportunities to re- and upskill. Digital skills assessment and micro-certification schemes have also emerged to complement and challenge publicly regulated qualifications that sometimes lag behind.[2] In parallel, digital labour platforms have lowered entry barriers for many workers who may have previously had difficulty accessing labour markets. They have also opened new opportunities to geographically remote workers, enabling them to migrate 'virtually' to urban labour markets or even to other continents.[3]

New technology offers tremendous potential to enhance work quality. Information and communication technology are increasingly penetrating all aspects of work and work relationships, allowing more time and location flexibility. Technology offers the potential of a productivity and quality step change, with automation and collaborative robots—'cobots'—taking on the more repetitive or physically challenging aspects of job roles. Digitally enabled platform work is also enabling workers to engage in new and varied flexible work opportunities. Technology-enabled solutions have the additional potential to be more effective at matching talent to opportunities and can serve to support the transition from informal to formal work arrangements.[4]

If not properly prepared for, however, digitalization could reduce job roles to discrete tasks and commodities, undermining job quality and career progression through new types of informality and deskilling.[5] Businesses

Figure 2: Job polarization in selected European countries, 1993–2010



Source: Data from Goos, et al, 2014, Table 2.

are set to expand their use of contractors doing task-specialized work, engaging workers in a more flexible manner, utilizing remote staffing beyond physical offices and decentralizing operations.[6] According to a recent report by the European Commission, part-time and temporary employment increased from 12.5% to 15.8% in the European Union since 2002 and whereby 2% of adults across 14 EU member states are now relying on platform work as their main source of income.[7] This increasing diversity in working arrangements can be attributed to both choice and necessity on the part of workers: 77% of European freelancers report being freelancers by choice (43% found work through online labour platforms)[8]; however, others resort to this work due to a reduction in standard employment opportunities.

Automation and globalization are also driving skills polarization and related inequality. The shift from humans to technology for the delivery of routine tasks is also changing the composition of employment across skill levels, resulting in job polarization (Figure 2). The least-skilled jobs which often involve non-routine tasks (such as cleaning) remain because they cannot easily be undertaken by machines, whereas routine work that can be automated is heavily concentrated in the middle of the skills distribution, leading to higher levels of job displacement there. Digitalization, at the same time, augments the productivity of the most highly skilled workers and leads to a rising relative demand for high-skilled workers. The wage premium of high-skilled workers relative to low-skilled workers therefore increases, leading to growing wage inequality.

This skills polarization has particularly profound effects in those economies lacking the institutions and policies to prevent or mediate this impact on inequality. Indeed, the growth of the low wage sector has been more pronounced in countries where labour movements, payroll taxes and unemployment benefits are relatively weaker (e.g. in the United Kingdom, as opposed to Germany, Spain or Switzerland, where the low wage sector has expanded less).[9]

The impact of technology also has consequences for worker well-being. As the organization of labour becomes more fluid, some workers benefit from more flexibility and choice yet others are experiencing the shifts as greater job uncertainty and involuntary job displacement.[10] Anxiety about job security has a highly negative and lasting impact.[11] While rising incidences of stress and mental health issues create higher demand for welfare support, informal work arrangements simultaneously lead to missing tax contributions and reduced access to employer sponsored health and wellness programmes, with potential policy implications for the provision and funding of mental health services for the digital age.

These drivers of change are of course connected to and act upon each other. While this chapter focuses on globalization and technological disruptions in labour markets, importantly, the scale and speed of this transformation and the impact it has on workers will depend on the political and economic context and the policy choices that are made. In every economy there will be implications for future labour policy design and implementation as a result of these shifts. In both OECD and emerging economies alike, labour policy has traditionally been focused on creating and promoting a framework for a 'gold standard' of full-time permanent employment with associated social benefits and protections. Yet policy-makers now need to move beyond attempting to simply capture 20th century rights for workers in the Fourth Industrial Revolution.

As noted in our first Dialogue Series White Paper, *Shaping the New Economy in the Fourth Industrial Revolution,* it is crucial to adapt for the changing nature of work and to focus on the quality of jobs being reshaped and created to both stimulate productivity and promote social cohesion and equality. The current challenge for policy-makers is to guarantee standards on different dimensions of work quality across a growing number of contractual arrangements. While there is currently no consensus definition of work quality, pay, working hours and work environment are important factors. Beyond ensuring that the long-term effects of openness and digitalization on labour markets are positive for businesses and workers, cushioning the short-term disruptions created by the transition is equally important and becoming more urgent.

Two central objectives for policy-makers seeking to facilitate the transition and to shape this new landscape are thus discussed below: 1) anchoring standards to make work in the new economy both high-quality and productive, and 2) providing individuals with up- and reskilling opportunities so they can equip themselves for the future of jobs.

Policy Pathways Towards Inclusive Change

Globalization and technological change affecting labour markets and skills demands is not a new phenomenon. However, the speed of the current transformation requires timely, responsive and bold policy to ensure that the benefits are widely distributed.

To guide policy-makers in responding to current labour market changes the OECD has devised a set of principles to underpin reforms: i) Promoting an environment in which high-quality jobs can thrive; ii) Preventing labour market exclusion and protecting individuals against labour market risks; iii) Preparing for future opportunities and challenges in a rapidly changing economy and labour market.[12] The European Commission has outlined what it believes are the three main policy levers for adapting and reforming labour markets in light of technological transformation: funding; regulation, at both the national and regional levels; and revived collective action and dialogue with labour movements to ensure a more equal distribution of gains from digitalization.[13] Most recently, the ILO's *Report by the Global Commission on the Future of Work* outlines key policy pillars to enable a fair transition, including a lifelong learning entitlement.[14]

New policy responses being proposed and implemented are highlighting that innovation and adaptability are essential ingredients for achieving positive outcomes; and, just as technology is a central driver of change in labour markets, it can also enable new solutions. What follows are examples of emerging pathways that are under consideration or recently applied, organized into two broad categories representing the central objectives outlined above: 'enhancing job quality' and 'cultivating talent'.

Pathways towards enhancing job quality

1. Broadening policy focus beyond full-time jobs to apply to careers comprising different types of work arrangements. Traditionally, policy has been focused overwhelmingly on legislating to protect and promote full-time permanent jobs. In high-income economies the focus has been to protect this status even as non-standard work increases without recourse to similar benefits and protections; in low- and middle-income economies it has been to promote formal work, formalizing employment in line with development objectives. Today however, we need a change of policy mindset. A policy programme looking holistically at the protections and support individuals need throughout their working lives regardless of their status is likely to be more effective in the current context. As globalization and digitalization continue to reshape work, policy-makers are challenged to facilitate more flexible work relationships and job transitions without sacrificing rights. Such a move away from policy promoting job security in isolation towards dynamic work security is necessary to support the resilience of workers and labour markets.[15]

Previous attempts to liberalize labour markets to increase opportunities for freelance work have often kept the legal status of standard jobs largely unchanged. This can create an incentive for employers towards offering more 'atypical' work and has widened the gap in rights and social support offered between those in full-time standard

employment and the rest. Similarly, policy targeted at specific categories of jobs, for example legislating to restrict the operation of digital labour platforms or to create a new status of worker, may also prove to be time-limited as work continues to transform and can entrench a detrimental delineation of this sector and its workers. Previous labour market disruptions offer valuable lessons; for example, the regulation of agency work represented a shift towards introducing quality and transferable rights that followed the individual in and out of contracts.[16]

EU Directive on Transparent and Predictable Working Conditions

The recently adopted EU Directive on Transparent and Predictable Working Conditions applies to all workers in all types of work and thereby fills important gaps in protecting workers doing zero-hour contracts (employment contracts with no guaranteed hours), domestic work, voucher-based work or platform work. It builds on the proclamation of the European Pillar of Social Rights and was adopted by the European Parliament in April 2019 and by the Council in June 2019. It will now need to be transposed into national legislation in all EU member states by 2022. The directive is intended to make contracts and working conditions more transparent and predictable for all types of work and in particular on-demand or part time work. For instance, it states that workers with variable working schedules determined by the employer (i.e. on-demand work) should know in advance when they can be requested to work. Outside the agreed working time, they retain full rights to refuse calls and have protection against unfair treatment. The directive also limits the length of probationary periods, bans exclusivity clauses and contains anti-abuse legislation for zero-hour contracts. It further sets out the right of all workers to receive mandatory training from the employer free of cost.[17]

Co-Sourcing and Pooling Schemes[18]

Current policy efforts aimed at providing support to employees in navigating increasingly fragmented work opportunities include co-sourcing and pooling schemes. An extension of agency work, co-sourcing schemes allow employees to work for several employers simultaneously, while keeping the benefit of a formal, unified employment contract. In a similar vein, several countries, including Austria, France, Germany and the US, have implemented employee pooling as a legal framework. Service providers exist who coordinate the actual tasks under one contract and ensure that protection of employees is seamless in such an arrangement.

2. Facilitating effective transitions into and within changing labour markets will be a major determinant of an economy and society's success. One recent estimate suggests that 75 million people worldwide will need to switch occupations by 2030 in selected developed and emerging markets.[19] In addition, there is an ongoing need to integrate workers following periods of inactivity (such as long-term care responsibilities, protracted unemployment or migration). Enabling positive transitions should become a significant short-term mission of labour policy, essential for inclusion and for meeting changing demands for talent. Meeting this challenge will require labour policy that takes account of the broader mission and adopts a cross-domain, collaborative approach, bringing in initiatives from other areas of policy, including education, social protection and public services.

The European Pillar of Social Rights

The European Pillar of Social Rights was introduced in November 2017 and confers new and more effective rights to citizens regarding access to the labour market, fair working conditions and social protection. It has begun to set out what rights could underpin new approaches to supporting labour market transitions. For example, it states that everyone has the right to timely and tailor-made assistance to improve employment or self-employment prospects. This includes the right to receive support for job search, training and re-qualification and the right to transfer social protection and training entitlements during professional transitions.[20]

Career Accounts[21]

Several European countries are currently exploring the concept of career accounts as a tool to facilitate labour market transitions and to increase the fluidity of social protection. Career accounts rest on the three-way collaboration between governments, employers and employees. Yet rather than relying on the collective tax system, they are partly personalized and allow employees to save both money and time for later use on training, education, reduced working hours and periods of inactivity. Different financing mixes are possible. Governments can also contribute to career accounts, earmarking funds for expenditures in line with policy

objectives or even using the accounts for the purpose of wage insurance, family or social policy measures.

Fostering Social Dialogue and "Social Digilogue"

Productive dialogue between social partners can also smooth transitions for workers. The European Commission encourages the use of moderated online spaces for workers to raise and discuss issues, in addition to a broader ongoing exchange with unions, employers, as well as platform operators for improved collective outcomes.[22] A number of so-called "social digilogue" groups have already self-organized in this vein and have been able to influence different gig economy disputes across Europe.[23]

Pathways towards cultivating talent

Supporting the development of talent should become a core focus of labour policy. The evolving division of labour between workers and machines is transforming current job profiles and shifting the skills required to perform them. Global average skills stability—the proportion of core skills required to perform a job that will remain the same—is expected to be about 58%, meaning an average shift of 42% in required workforce skills over the 2018–2022 period.[24]

Talent development—the continual process of learning and upskilling—should become an integral part of employment relationships, with new actors, financing and delivery models brought to bear. Ensuring workers have the opportunity and right to upskill throughout their careers will be essential to meet future skills demands and to prevent workers falling out of the labour market. Moving past siloed policy-making, whereby public responsibility for learning and training policy sits predominantly with education ministries, together with public investments in education technology, can help deliver talent development that is lifelong and blended with careers. The cultivation of 'hybrid skills'—a mixture of basic technical knowledge, cognitive skills and personal attitudes—will support workers to engage positively with technology and transition with it.

Examples of policies and new approaches introduced or proposed to empower individuals to upskill include the following:

Personal Training Accounts

The French government has introduced a Personal Training Account, financed through contributions by employers.[25] Each employee is required to have an account from entry into the labour force until retirement, accumulating funds to be spent on personal development and training of their choice. From 2020 employers will credit up to €500 (with a maximum of €5000) to employees if they work at least half of the contractual working time per year. The policy was designed with a view to ensuring gender parity in terms of uptake.

Similarly, in Singapore a Skills Future Credit is granted to all citizens above the age of 25, paid as income support reserved for this use.[26]

Worker Training Tax Credit

The Aspen Institute's Future of Work Initiative proposes that Federal and state policy-makers consider using tax incentives to encourage additional workforce training investments. The Worker Training Tax Credit they envisage is estimated to cost roughly $146.5 million over 10 years and should lead businesses to increase training investments by 8.5%. The tax credit is directly targeted at providing greater opportunity to low- and middle-income workers and is not available to high income earners.[27]

Three Skilling Investment Proposals

The Adecco Group proposes that encouraging companies to rethink how they invest in re- and upskilling and treat those activities as an investment rather than a cost could lead to increased provision of skilling opportunities for workers. Adecco proposes multiple models to deliver this skilling, including: a Training Fund model, in which employers set up a foundation exclusively for re- or upskilling, financed through a percentage of payroll costs; an Employability Account, in which individuals are allocated a personal, portable and transferable training account, out of which they can pay for re-/upskilling related training, paid for using money that would otherwise be used for severance costs; and an amortization model in which employers pay for an employee's re- or upskilling, capitalizing it as an asset, after which he or she is required to stay for a set number of years, reflecting the amortization period of the asset.[28]

Efforts are also being made to improve both policy-maker and employee knowledge of skills changes and demands:

Understanding Skills Demand

MIT's Skillscape applies big data and machine learning techniques to better inform individual workers about their specific skill set, help them find jobs that better match those skills and help employers find workers that better fit their skill requirements, thereby reducing skill gaps. MIT employs a completely data-driven approach using high-resolution occupational skill surveys carried out by the US Department of Labor. The tool has the potential to inform worker retraining programmes and urban policy aimed at maintaining employment opportunities in an increasingly competitive economy.[29]

A focus on measuring and driving up activity rates can promote the inclusion of hard-to-reach and/or non-active groups in the labour market. Factors including levels of education and skills, gender, age, geographic region and sector will all influence how profoundly technological change impacts an individual's opportunities. Existing labour market age and gender gaps could widen without preventative measures in place. An appropriate combination of guidance, training, work flexibility and accessibility to jobs and professions will be required to narrow gaps in access to work and to support the reactivation.

Activating and Skilling Marginal Groups

Skills Norway is the country's agency for lifelong learning, housed in Norway's Ministry of Education and Research. It offers individually adapted online training in literacy, numeracy, ICT and oral communication for adults; in particular, those currently inactive. Its activities are embedded in Norway's 2017–21 National Skills Strategy, which rests on a binding agreement by the government, industry, employees, civil society organizations and Parliament, and is designed to support on-the-job learning, skills-matching, and developing the skills of adults outside the active labour market.[30] The institution actively contributes to future skills policy development by sharing its knowledge and learnings with relevant government agencies.

Notes

1 World Economic Forum, 2018.

2 European Commission, 2018.

3 Ibid.

4 Chacaltana, et al, 2019.

5 On the risk of new types of informality and deskilling, see Berg, et al, 2018, and ILO, 2018.

6 World Economic Forum, 2018.

7 European Commission, 2018.

8 Malt and EFIP, 2019.

9 European Commission, 2018.

10 Ibid.

11 McKinsey, 2018.

12 OECD, 2018.

13 European Commission, 2018.

14 ILO, 2019a and 2019b.

15 DeVos, 2018.

16 Ibid.

17 https://ec.europa.eu/social/main.jsp?catId=1313&langId=en.

18 DeVos, 2018.

19 McKinsey, 2018.

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The Future of Fiscal Policy

Summary

As globalization has progressed, the tax burden in many high-income countries has shifted in ways that have compounded some of the polarizing effects of globalization. In particular, the relative burden on middle-income earners has increased while the burden on high-income earners as well as on capital has fallen. The effects of automation in the labour market are introducing additional polarizing forces. These have created new demands for government spending to facilitate the transition to an inclusive digital economy. At the same time, the tax base available to governments is shifting, particularly due to new digital business models.

The key tension to resolve will be enabling technology adoption and innovation on the one hand while at the same time ensuring a fair transition to the new world of work and the creation of an inclusive economy. Building more inclusive economies will also require finding the right balance between new government spending, including both pre-market measures (such as reskilling, upskilling and technology diffusion) and social protection, and an updated tax architecture that will require policy-makers to rethink relative burdens across income, wealth and corporate taxes.

What is the Current State of Play?

Technological progress and globalization have brought unprecedented improvements in living standards, yet have left them, for the most part, unevenly distributed. Indeed, greater socio-economic polarization and profound social instabilities stand out in the 2019 global risks landscape as two with the highest potential impact.[1] The economic and social transformation still needed to create an inclusive economy out of current opportunities is immense.

This current economic polarization has many faces: technological change, which is hollowing out the middle class and benefitting mainly the highly skilled[2]; a 'great decoupling' of output from pay, which has meant that productivity gains have not translated into higher wages for the vast majority of workers[3]; and precarious working conditions and greater volatility of career paths for certain types of gig work[4]; but also emerging evidence of algorithm bias as a new form of automated discrimination, which may be exacerbating the situation of historically disadvantaged groups.[5] At the same time, competition in many industries has been weakening, which has been linked to a greater concentration of wealth as margins in technology-driven sectors are growing[6], all the while dividends and profits remain concentrated in the hands of a few.[7]

Exacerbating these distributional dynamics, the tax burden in many countries has shifted in ways that have reinforced these polarizing effects rather than offset them. When globalization gathered pace in the 1990s, it was thought that growing gains from trade could be used in part to compensate those whose livelihoods were disrupted. Recent evidence suggests the opposite may have happened. Research by Peter Egger, Sergey Nigai and Nora Strecker for a group of 65 emerging markets and high-income countries finds that as globalization progressed, the middle class saw their labour income tax burden increase, while it dropped steadily for the top 1% of earners. This has been true particularly for OECD countries. At the same time, corporate tax rates have been on a steady downward trajectory (Figure 3 on next page).[8] The number of OECD countries collecting a wealth tax has dropped from 12 in 1990 to 3 today.

Beyond driving distributional dynamics, the twin forces of globalization and technological change are also affecting the sum total of tax revenues and thus governments' room to manoeuvre in important ways.

While many government budgets remain overstretched from the shock of the financial crisis a decade ago, national tax bases are also shifting due to a range of evolving trends. To the extent that globalization has made high-income earners and capital more mobile internationally, it is also making them more difficult to tax.[9] In particular, some multinational corporations have

Figure 3: Average corporate and labour income tax rates across 65 selected economies, 1980–2007

Source: Egger et al, 2019.

Note: Selected economies include the OECD economies Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Great Britain, Greece, Hungary, Iceland, Ireland, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, South Korea, Sweden, Switzerland, Turkey and the United States; and the non-OECD economies Argentina, Bangladesh, Barbados, Bolivia, Cameroon, Chile, China, Colombia, Costa Rica, Cyprus, Ecuador, Fiji, Ghana, Guatemala, Honduras, India, Indonesia, Israel, Jamaica, Jordan, Kenya, Kuwait, Malaysia, Malta, Mauritius, Morocco, Nepal, Pakistan, Peru, Philippines, Senegal, Singapore, South Africa, Sri Lanka, Thailand, Trinidad, Tunisia, Uruguay and Venezuela.

been increasingly able to shift profits to the lowest tax jurisdictions. Additionally, digital business models are adding complications for existing corporate tax structures for several reasons: (i) there is now less need for physical presence to do business; (ii) in some business models, companies collect data from customers in place of a financial transaction that would otherwise be taxed; (iii) companies hold an increasing amount of intangible assets, which are difficult to value for tax purposes.[10] Finally, there is a generalized, less tangible trend of eroding empathy and trust which has accompanied the digital revolution and is contributing to the unravelling of the social fabric and weakening buy-in to national social contracts where they previously existed.

Funding the fiscal needs of the future and continuing the drive towards more inclusive economies will require fresh thinking on tax bases and public budget compositions against a backdrop of limited fiscal space in many economies.

To some extent, these dynamics might be mitigated by new considerations on the limits of government debt. In contexts where interest rates on safe assets are lower than the rate of economic growth—as is currently the case in the United States—it has been suggested that governments may be able to issue more public debt without subsequent tax increases.[11] Meanwhile, some propose taking advantage of the low inflation/low interest rate environment to fund expansive new government programs through Central Bank balance sheets. This new paradigm has come to be known as Modern Monetary Theory (MMT). Critics of MMT, however, warn that current favourable conditions cannot be assumed to last forever and that following a path of high deficits could push an economy into a new era of higher inflation. Governments would also face more difficult trade-offs in fighting a financial crisis, responding to a large-scale natural disaster or pandemic, or mobilizing for a conflict, all with negative effects on long-term growth.[12] In addition these mechanisms do not apply in countries that rely on raising debt in foreign currencies. For many scenarios therefore the old rules of debt sustainability still apply.

Important areas that have been identified for additional government spending are reskilling and upskilling efforts as well as the expansion of social safety nets to ease transitions to the new economy. First estimates of the costs are broad brush yet can give an indication of orders of magnitude. For example, the total cost of reskilling 1.3 million US workers who will likely be displaced and transitioned in the next decade has been estimated at $34 billion—an average of $24,000 per displaced worker—to be split between businesses and governments.[13] At the same time, various approaches to reinforcing social safety nets have been proposed, involving different levels of coverage and thus potential government expenditure. The International Trade Union Congress' "just transition" to a low-carbon, high-tech economy is one of the most comprehensive proposals and would involve guaranteed pensions for older workers, income support, redeployment support and continuous access to retraining and lifelong learning. Universal basic income is another proposed option. If each American adult received a yearly stipend of $10,000, the cost of the program would be close to three times the current level of US welfare spending.[14] Beyond reskilling, upskilling and reinforcing social safety nets, there have also been calls for governments to take larger stakes in mission-driven innovation and a more active role in co-shaping resulting new markets, which can yield substantial future gains but will require additional government funding in the short term.[15]

Policy Pathways Towards Inclusive Change

Two complementary pathways are available to governments to shape how the gains of open markets and technological progress can be shared more broadly—namely through: (i) spending to achieve greater equality of opportunity to participate in the new economy nd guarantee social protection; (ii) improving the progressivity of the existing tax system. Both elements will need to be part of any new policy approach.

Pre-distributive policies—such as stepping up efforts to create a level playing field for workers in the face of accelerated technological change, facilitating labour market transitions through re- and up-skilling and fostering innovation diffusion—are included only briefly here since they are discussed in detail under the Future of Labour Policy and Future of Innovation Policy chapters in this Dialogue Series.

Several measures are currently being explored by the international community and national policy-makers to address the challenges posed to governments in how they tax and offset different dimensions of inequality. The level of maturity of these proposals varies; while some are currently being designed and implemented, others remain experimental or even at the ideas stage. The discussion includes ideas along the entire spectrum of maturity. It is worth noting that as opposed to other policy areas, taxation is less amenable to experiments and pilots, not least for reasons of international coordination.

New ways for creating greater equality of opportunity

Even before market forces come into play, government spending can support broad-based participation in the economy by supporting transitions into the new world of work and providing the right incentives for investment, innovation and technology diffusion. Such approaches include:.

1. **Measures to support labour market transitions:** These are policies directly targeted at those who are at risk of being left behind by the digital transformation: emerging up- and re-skilling policies such as France's Personal Training Accounts and Singapore's Skills Future credit are examples for measures targeted at supporting workers in their transition into the new world of work. A range of options has been proposed which are discussed in the Future of Labour Policy chapter in this Dialogue Series (page 13).

2. **Addressing bottlenecks to technology diffusion:** One important source of wage polarization has been a gap in technology adoption that has opened up between a handful of frontier firms and small- and medium-sized enterprises. Emerging policy responses such as government-sponsored pilot factories where smaller companies can learn about the application of the latest technologies are discussed under the Future of Innovation Policy chapter in this Dialogue Series (page 05).

3. **Rethinking social protection:** There is also a strong case for re-imagining social protection in order to adequately support those who are experiencing greater employment volatility and spells of unemployment due to the transition to the new world of work. Emerging policy responses such as portability of social benefits, universal basic services, conditional and universal basic income are discussed in more detail under the Reimagining Social Protection in the 4IR chapter under the first Dialogue Series.

Rethinking the composition of the tax system

Several pathways for broadening the tax base and shifting tax burdens, including for income, corporate and wealth taxes, are currently under discussion. It is worth noting that most of the proposals discussed have been made out of and for the US or European context, which have seen some of the most rapid globalization- and technology-driven polarization of incomes, wealth and industry structures.

Reform proposals for expanding both the corporate and wealth tax base have two components: policy-makers are rethinking the 1) rate of taxation as well as 2) the ways in which to tackle the double challenge of base erosion and profit shifting (BEPS). As far as BEPS measures are concerned, the range of reform proposals currently on the table is comprehensively laid out by the IMF.[16] While the negotiations are mainly channelled through the OECD's BEPS intergovernmental initiative (which has broad country coverage), additional proposals have been put forward in other fora. One proposal, the sales-based profit tax, aimed at reducing profit-shifting, is discussed below.

While this paper focuses on redressing inequalities that have been driven by the forces of globalization and technological change, it is worth keeping in mind that many tax systems perpetuate historical inequalities, for example by taxing the second income in a household in a way that discourages labour force participation of the second earner—most often women. While not detailed here, other important avenues for building more inclusive economies by reforming the tax system are thus available to policy-makers and must form part of a comprehensive tax strategy.

1. **Top marginal income tax rates:** Since the late 1970s there has been a general trend in high-income countries to cut top marginal income tax rates. Two countries that saw the largest drops were the US and the UK. In the UK, top rates fell from 83% in 1979 to 40% in 1988[17]; in the US, the top rate fell from 70% in 1981 to 28% in 1988.[18] In 2018 they stood at 45% (UK) and 37% (US) respectively.[19,20] Based on a model of the relationship between tax rates and government revenue known as the Laffer curve, it was argued that such cuts would not necessarily lead to revenue loss for governments. Indeed, lower tax rates can increase government revenues if a lower rate encourages more economic activity.

Rethinking Top Marginal Tax Rates

Peter Diamond of MIT and Emmanuel Saez of the University of California Berkeley show theoretically and based on recent data for the US that there is a policy-relevant case that "very high earners should be subject to high and rising marginal tax rates on earnings." They argue for the US that the equity case for such increases has become more urgent given the extreme rises in income at the top of the distribution, and also given that there is no convincing evidence that economic activity drops as a result of higher top marginal rates.[21] This thinking has recently been picked up by US politicians, who have argued for higher top marginal income tax rates similar to what the US had up to the early 1980s.

2. Sales-based (profit) tax: Traditionally, the relevant location for levying corporate taxes was determined by the location of profits. Yet globally, 40% of multinational profits are shifted to tax havens every year, and the US, for example, loses 15% of its corporate tax revenue to such shifts.[22] More open capital markets and the fact that the volume of digital economic activity is growing has contributed to these dynamics.

A recent proposal by economist Gabriel Zucman at the University of California Berkeley aims to address this concern.[23] Zucman proposes to calculate the amount of tax owed by apportioning the global, consolidated profits of firms based on where they make their sales (e.g. if a company makes 20% of its sales in Country A, the base of corporate taxation levied by Country A will be 20% of the company's global, consolidated profits). Since the amount of tax owed is calculated based on the location of sales, the target cannot be easily shifted across borders.

Individual countries such as France and the United Kingdom, have begun experimenting with a variation of such a tax, specifically targeted at digital activity. However, rather than apportioning profits according to the proportion of sales, they propose to tax revenues directly. Aiming to achieve greater global coordination, the G20 finance ministers are working on a new set of rules to take effect in 2020, which would make digital companies pay tax regardless of physical presence or measured profits in a country. Deliberations are also under way at the OECD and the European Commission, where parties are exploring a digital tax on social media platforms, internet marketplaces and search engines.

Digital Services Tax (DST)

United Kingdom: The UK is one of the first countries in which political leadership has emerged around a more targeted taxation of digital companies based on the rationale that the corporate tax system should be fair and sustainable across different types of firms and reflect the value companies derive from UK users. The country is, therefore, planning to implement a digital services tax on UK-generated sales from April 2020 with revenues expected to reach £1.5 billion over the next four years.

A 2% tax will be levied on the revenues of specific digital business models, including search engines, social media platforms and online marketplaces, where revenues are linked to the participation of UK users. The tax will apply only to revenues earned from intermediating online sales, not from the sale itself, and will apply to online advertising only to the extent that a business model in question is within scope (i.e. a search engine, social media platform or online marketplace). The tax will apply only to businesses that generate more than £500mio in revenue globally and more than £25mio in the UK.

After the conclusion of a public consultation, the DST will be legislated for in the 2019/2020 Finance Bill. The UK government's long-term objective is an internationally coordinated reform of the global tax system through the EU, G20 and OECD. Once a global solution is in place, the DST will be discontinued.[24]

France: The French government has taken steps to implement a digital services tax and plans to implement it unilaterally unless an international solution can be found. The tax has two objectives: to raise revenue from company's use of data in order to create more budget space for financing public services and to ensure a fairer tax environment in France. Currently, the tax rate faced by small and medium-sized enterprises (SMEs) is on average 14 percentage points higher than that for large digital platforms.

The new law envisions a 3% turnover tax targeting digital platforms that provide services to French users. It affects revenues generated from online advertising, including ad targeting activities and resale of personal data for advertising purposes but excluding online sellers which sell their own products.

The size threshold for companies subject to the tax is a global turnover on their digital activities of 750 million or more euros and a turnover of over €25 million in France, effectively applying to around 30 companies.[25] The unilateral move by France comes partly as a consequence of slow progress on a coordinated approach at both the international and EU levels. France has agreed to revoke the tax, should an international agreement be reached.[26]

3. **Wealth tax:** While twelve OECD countries had wealth taxes in 1990, this number has shrunk to three today (Norway, Switzerland and Spain), with France phasing out its wealth tax in 2017. However, a dynamic of growing accumulation of wealth by a shrinking group of individuals has put them back in the spotlight. The new momentum gained more visibility and traction in 2014 when economist Thomas Piketty revived the idea. Piketty argues that wealth should be more evenly distributed but does not discourage wealth creation.

More recently, economists Emmanuel Saez and Gabriel Zucman have outlined the pros and cons of introducing a progressive wealth tax.[27] In response to concerns about tax avoidance and evasion, they propose ways for addressing these through an exhaustive definition of the tax base, as well as more comprehensive data collection, sanctions for suppliers of tax evasion services and better resources for auditing. They argue that a wealth tax would have a significant positive real economy effect in terms of reducing wealth inequality; in order for the tax to be overall beneficial, these would need to be larger than negative effects on capital stock, entrepreneurial innovation and top talent migration. In their view, such a tax could have a positive impact in terms of making investments in innovative start-ups relatively more attractive than the purchase of luxury items.

Rethinking Wealth Taxes

A proposal to impose a 2% wealth tax on individuals who hold more than $50 million in assets and 3% on net worths of more than $1 billion has been put forward in the context of the 2020 US presidential campaign. Saez and Zucman estimate that this tax will apply to approximately 75,000 individuals and raise $2.75 trillion over 10 years. In terms of percentage of GDP, their estimates suggest that, similar to Switzerland, the wealth tax should raise 1% of GDP, compared to approximately 0.2% in France and Spain.

4. **Online advertising tax:** The economist and Nobel Laureate Paul Romer proposes a tax on online advertising designed to induce a shift in business models away from being ad-based to being subscription-based. Maximizing profits from advertising income has led some businesses to favour extreme content guaranteeing clicks yet the concomitant spread of hate speech and misinformation has been severely eroding social fabrics. The tax would provide a starting point to restoring the global commons of trust by discouraging ad-based business models and the destructive growth of the attention economy.[28]

Online Advertising Tax

A tax on online advertisement revenues would be an additional source of revenue for governments (at least temporarily) while also tackling trust erosion. Romer (2019) proposes to add it as a surcharge to corporate income tax at the federal level or as a sales tax on ad revenue at the state level and suggests that it could be made progressive with respect to company size. This idea has emerged alongside proposals for taking an anti-trust approach to tackling the market power of digital platforms and thus its harmful side effects.

5. **Robot tax:** The idea of a robot tax was put forward most prominently by Bill Gates in an attempt to disincentivize socially suboptimal levels of automation and redistribute some of the gains from technological change from capital owners to workers—in particular those who are being left behind by technological progress. While the approach has been difficult to apply in practice since a precise enough definition of 'robot' is under debate, several options have been explored theoretically.[29]

A robot tax may require granting a legal personality and eventually a tax personality to robots and would legally presuppose an electronic ability to pay. There is currently, however, no consensus on the definition of a robot, only some convergence around the idea that it should involve the use of AI as well as a certain level of autonomy as main characteristics that distinguish robots from machines. To the extent that robots can perform activities that were previously carried out by workers, it has been argued that there is a rationale for imposing an income tax on an imputed robot salary and potentially even subjecting such income to social security contributions. Other rationales that have been put forward include imposing VAT based on transactions carried out by robots, an "objective" tax, comparable to taxes on cars, or a fee for the use of state infrastructure (such as a road toll).[30]

However, the idea is yet to gain traction in policy circles. Apart from the difficulty of agreeing on a precise enough definition of robot, it has been pointed out that such a tax could hurt the competitiveness and growth of countries as it would discourage new investments in this area.

Robot Tax

Political leadership on implementing this type of tax has emerged in Korea, where the first robot tax was passed by parliament in August 2017. A modification that makes the tax more easily implementable is that the law shifts incentives by reducing tax breaks that were previously awarded to investments into robotics rather than implementing a new tax.

Notes

1 World Economic Forum, 2019a.

2 Bernstein and Raman, 2015, Autor and Salomons, 2018, and Darvas and Wolff, 2017.

3 Bernstein and Raman, 2015.

4 Prassl, 2018.

5 O'Neill, 2016, and Eubanks, 2018.

6 Calligaris, et al, 2018.

7 World Inequality Lab, 2018.

8 Egger, et al, 2019, and Zucman, 2018.

9 Egger, et al, 2019.

10 IMF, 2019.

11 Blanchard, 2019.

12 Rogoff, 2019.

13 World Economic Forum, 2019c.

14 World Economic Forum, 2019b.

15 Kattel, et al, 2018, Mazzucato, 2013, and Mazzucato, 2016.

16 IMF, 2019.

17 https://www.ifs.org.uk/ff/fiscalfacts2000.xls.

18 https://taxfoundation.org/us-federal-individual-income-tax-rates-history-1913-2013-nominal-and-inflation-adjusted-brackets/.

19 https://www.gov.uk/government/publications/rates-and-allowances-income-tax/income-tax-rates-and-allowances-current-and-past.

20 https://taxfoundation.org/us-federal-individual-income-tax-rates-history-1913-2013-nominal-and-inflation-adjusted-brackets/.

21 For the US, Diamond and Saez, 2011, find: "The share of total income going to the top 1 percent of income earners (those with annual income above about $400,000 in 2007) has increased dramatically from 9 percent in 1970 to 23.5 percent in 2007, the highest level on record since 1928 and much higher than in European countries or Japan today […] The top percentile paid 40.4 percent of total federal individual income taxes in 2007 (IRS, 2009a). Therefore, the taxation of very high earners is a central aspect of the tax policy debate not only for equity reasons but also for revenue raising. For example, setting aside behavioral responses for a moment, increasing the average federal income tax rate on the top percentile from 22.4 percent (as of 2007) to 29.4 percent would raise revenue by 1 percentage point of GDP. Indeed, even increasing the average federal income tax rate of the top percentile to 43.5 percent, which would be sufficient to raise revenue by 3 percentage points of GDP, would still leave the after-tax income share of the top percentile more than twice as high as in 1970."

22 Zucman, 2018.

23 Ibid.

24 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752172/DST_web.pdf.

25 https://www.gouvernement.fr/en/taxation-the-outlines-of-the-gafa-tax-revealed.

26 https://www.euronews.com/2019/08/26/here-s-what-you-need-to-remember-from-the-g7-summit-in-biarritz.

27 Saez and Zucman, 2019.

28 Romer, 2019.

29 Oberson, 2017.

30 Ibid.

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