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# A GREEN ECONOMIC RENEWAL AFTER THE COVID-19 CRISIS

UCL Institute for Innovation and Public Purpose

## Summary

While governments seek to reboot their economies as COVID-19 lockdowns are eased around the world, the climate emergency rages on. The economic dislocation forced by the pandemic is an opportunity to reshape our economic activity along a new sustainable trajectory. It is also a wake-up call that we must transition rapidly to a more resilient mode of capitalism more in balance with the natural world (Johnson et al. 2020).

Government and business globally must accelerate our green commitments, and investment in innovation and smarter solutions, to provide a structure and clear direction for the recovery. Green economic renewal is a new way to frame the direction required. Job losses must be targeted through the creation of green employment opportunities, with the focus on bringing vulnerable and under-represented voices, and human rights issues, to the table through a Just Transition. This includes creating conditionalities on carbon reductions, green innovation and stakeholder – not shareholder – capitalist approaches as part of the government assistance packages currently being drawn up around the world.



Source: Li-An Lim, Unsplash

Government deficit spending to support a recovery thus needs to be seen as an opportunity, not a burden. Austerity measures, as put in place by many countries after the 2008 financial crisis, would be hugely damaging to long-term prosperity if implemented in the wake of COVID-19 and must be avoided (Eaton 2020). Instead, the cornerstone of COVID-19 recovery should be states assuming the responsibility to direct markets and co-shape investment towards green economic renewal.

## Summary of Proposals:

**Proposal 1:** Create ambitious green public investment packages to rejuvenate the global economy with the needed directionality. Besides direct public investments, governments should use a wide array of public policy tools to shift private finance towards green investments. These include greening procurement, regulation and taxation policies, and green conditionalities on investments.

**Proposal 2:** Shape innovation systems with patient finance and cross-sectoral collaborations for green innovation, and ambitious missions to accelerate solutions to the climate emergency. The role of governments will require rethinking to situate them as a market-shaper and co-creator of green markets, rather than in a traditional 'market-fixing' mode focused on pricing in externalities (Mazzucato and McPherson 2019).

**Proposal 3:** Ensure that the green transition is a Just Transition for workers. Multiple groups, from trade unions to faith groups and activists, must be brought to the negotiating table for a Green New Deal, with 'nobody left behind' (European Commission 2020). The 'deal' part, struck between government and businesses to create a new, mutualistic relationship between the two, is as important as the 'green' part. This requires the use of strategic conditionalities on government assistance, a mission-led industrial policy and a green jobs guarantee.

**Proposal 4:** Green the financial system. Central banks must incorporate the net zero-transition fully into their mandates by integrating climate and environmental financial risks into monetary and supervisory policy regimes. Greater coordination between fiscal, monetary and industrial policy is required, for example, by collaborating to boost the financial power of state investment banks to drive forward investment and innovation.

**Proposal 5:** Ensure that the green transition is a global Just Transition that addresses the employment and income needs of developing and emerging economies in the Global South, and recognises that efficient green technologies and other key transition assets should be made available by the Global North. Expansion and economic development plans must be created which prioritise sustainable and environmental protection, and do not follow the high-carbon industrial pathways of historical industrial revolutions.

## Context

### The green investment gap

Low-carbon investment is \$480 billion short of the sum needed per year to meet the 1.5°C temperature increase target laid down in the Paris Agreement. Biodiversity investments need to increase by up to eight times in order to meet internationally agreed targets. The transition requires an unprecedented transformation in the infrastructure that organises our modes of living, especially in capital-intensive sectors including energy, food, transport, water and waste. \$90 trillion investment in infrastructure alone will be needed to meet the needs of the low-carbon transition by 2030 (The New Climate Economy 2016). Whilst steps towards greening the financial sector have been made in recent years, the flow of such urgently needed finance remains inadequate and unpredictable.

### The gamble of failing on climate mitigation

Global heating entails large systemic risks, including natural catastrophes, forced climate migration and biodiversity disruptions, that must be mitigated to avoid social and economic chaos. The green transformation of our economies is not a luxury we cannot afford due to COVID-19, but the only way through the crisis that ensures resilience against future risks of the same size, scale and severity. These risks disproportionately affect Global South developing countries with warmer weather and a higher frequency of natural disasters; countries which rely on oil exports are also facing heightened risks.

### COVID-linked structural overhaul of the energy sector

COVID-19 disruption threw the oil sector into a historical crisis, which reached an unprecedented nadir in April as West Texas Intermediate oil prices turned negative. The price shock was a repercussion of pandemic-induced lower oil demand in combination with an aggressive production strategy by Saudi Arabia (to upset less profitable producers) resulting in a lack of storage capacity. The crisis has revealed the inflexibility of the oil supply system, as wells are difficult to seal and unseal in response to fluctuating demand (Denning and Bloomberg 2020). We are now in a post-COVID-19 world of dramatically lowered oil prices, which impairs the profitability of the entire industry, and raises significant energy security and geopolitical questions. Higher investor awareness of stranded assets (Chasan 2020), falling investment and lower demand could carry the potential to start a long-term industrial decline.

## Employment displacement and the Just Transition

The COVID-19 crisis has led to immense displacement in labour markets. Some countries have avoided mass unemployment temporarily through job retention schemes, while others have seen unemployment surge due to either policy choice or the informal employment in national labour markets (UCL IIPP Covid Briefing Paper 02). This dislocation requires urgent political action to avoid harmful losses of income, and prevent scarring of the productive capacity of the economy and hysteresis, e.g. through loss of relevant skills. Yet the climate crisis requires an economic stimulus that transforms economic structures towards a sustainable economic model rather than restores the former model. It ensures that the restoration of activity has the needed sustainable directionality (Mazzucato et al. 2020).

## Green Deals and green economic renewal

The Green New Deal discussion was building momentum in the US, but, with the green leadership role of the US diminished by the Trump administration, regional and state actors in the US are engaging more so than at federal level. Cities and regions have been emerging as green growth catalysts around the world, too: organisations like C40 Cities bring together mayors from around the world to pledge on a Global Green New Deal (C40 Cities 2020).

Of all international actors, Europe was most firmly on route to a green and digital transition pre-COVID-19, and now looks set to lead the way with the 'world's greenest recovery', via the continued support for its continent-wide Green Deal. It mobilises around the aim to be carbon-neutral by 2050, incorporating a Just Transition mechanism to support the phasing out of fossil fuel industries and a green-driven Industrial Strategy, which, together, are being seen as the 'compass' and 'motor for recovery' (Mazzucato, Dibb and McPherson 2020). Supporting EU Farm to Fork (food) and Biodiversity strategies were launched in May 2020.

The European Investment Bank has pledged to become the world's 'climate bank', aiming to provide €1tn of investment in climate action and environmental sustainability from 2021 to 2030. The challenge facing the EU is to get buy-in from its 27 member states. Poland, whose economy relies heavily on coal, did not agree to the 2050 goal, for example.

## Recommendations

### 1. Governments must use a wide array of tools to advance the transition

Governments have a wide variety of tools in their arsenal to redirect economic activity towards a green transition and must adopt a portfolio approach, engaging across the gamut of financial and non-financial levers.

#### *Green fiscal stimulus*

Corporates have been left indebted and weakened by the pandemic, and investment intentions are likely to remain subdued for some time. Fiscal stimulus will be necessary to inject demand back into the economy and ensure the green transition does not lose steam.

An early 2020 survey of 231 economic experts and government officials highlighted five fiscal policies with high potential to combine economic stimulus with a green transition: "Clean physical infrastructure, building efficiency retrofits, investment in education and training, natural capital investment and clean R&D" (Hepburn et al. 2020). Projects such as retrofitting buildings with energy efficiency measures are both urgently needed and labour-intensive, and the work is frequently well-distributed geographically across countries. Furthermore, training workers for new green sectors will deliver a boost to productivity in the longer term (van Lerven et al. 2020). Without such policies with a green mission-oriented scope, the economy will resume its unsustainable model due to the inherent path-dependency of carbon-based infrastructure and supply chains (Mazzucato 2018; Mazzucato and McPherson 2018).

#### *The key role of public financial institutions*

Building out the green economy will require firms to be able to access patient, long-term and committed finance, yet this is poorly provided for by private banks – a situation likely to be worsened by the insolvency issues induced by the Covid-19 crisis. State and regional investment banks, such as KfW and the Landesbanken in Germany, can fill this gap, providing early-stage investment to create and shape new markets. Far from crowding out private activity, such public banks crowd in private investment by 'de-risking' and establishing a long-term path of certainty (Mazzucato and Macfarlane 2018).

As firms become more indebted due to pandemic emergency loans, governments should consider using equity financing as a more appropriate tool for supporting viable businesses. Public investment banks can manage such stakes at an arms' length from short-term politics and ensure strategic industries are managed for public value. This is especially important in the context of carbon-intensive industries, where the need to maintain employment must be balanced with the longer-term transition challenge.

### *Economic renewal via industrial policy and other market-shaping policy tools*

A green public investment programme should be guided by a mission-oriented industrial strategy. Moving beyond a narrow sectoral focus, such an industrial strategy seeks to break down silos and mobilise different actors across the economy. Numerous historical examples, from the moon landings to the development of the iPhone, have shown how mission-oriented public investment can stimulate innovation in strategic areas, resulting in long-term economic and technological spillovers (Mazzucato 2013). Harnessing this market-shaping potential of state investment will be critical to accelerating the innovation and investment needed for a green transition.

Now more than ever is the moment for inclusive, mission-oriented, industrial policy of the nature we have been researching and advising on at IIPP for some time. This means governments engaging not just in fixing the failures of markets after they occur, but directly creating or shaping markets to directly address the world's most pressing challenges.

### *Conditionalities towards a symbiotic and mutualistic public-private ecosystem*

Ambitious cross-sectoral industrial policy must be crafted to create new job opportunities and re-skilling to enable workers to make the shift. This requires extensive stakeholder cooperation among labour unions, business representatives and civil society groups. COVID-19 has activated extensive discussion about the future of work and of welfare, raising ideas of state intervention in both areas that have previously been far from mainstream. Spain is trialling a universal basic income as mitigation to the virus, whilst New Zealand has begun discussions around a four-day working week. Government bailouts to fossil fuel industries are also – in some cases, although this is far from widespread and there are multiple loopholes – being accompanied by green conditionalities. This directs the market towards innovation within existing industries, potentially a quicker route to transition than the creation of new jobs. The French government has put green conditions on Air France to decrease CO<sub>2</sub>

emissions in domestic flights by 50% by 2024 and to stop flying domestic routes where there are rail competitors; conditions for Austrian Airlines could include securing jobs, in addition to green commitments; and the US CARES Act conditions include limits on compensation for the highest paid airline employees and maintenance of employee pay (UCL IIPP Covid Briefing Paper 01).

Government spending can also support nascent green markets by awarding public contracts based on environmental quality or compliance with the United Nations Sustainable Development Goals. Green public procurement can accelerate emissions reductions, especially in construction, education and healthcare, where public spending is a significant component of final demand. Regulations and standard-setting have proven effective to improve energy efficiency in housing and automobiles, capturing both shared and individual gains otherwise neglected due to myopia and bounded rational behaviour.

Finally, global taxes on direct and indirect energy use (\$566bn in 2018) are completely dwarfed by continued subsidies to the energy sector (\$5,200bn in 2017) (Coady et al. 2019). As part of an effective green industrial strategy, governments should use their tax, subsidy and regulatory tools to realign distorted incentives in energy markets.

## **2. The greening of the financial sector must radically pick up pace**

Many unsustainable sectors, including the fossil fuels sector, continue to be widely supported by banks and asset managers with changes in this sector developing slowly; approximately 30% of the market value of the FTSE 100 stock exchange is still derived from oil, gas and mining companies. The financial sector is often inherently risk-averse and short-termist in its outlook, with financial models typically focussed on a maximum of two to five years in the future rather than the longer time horizon required for dealing with climate change – the so called 'tragedy of the horizon' (Carney 2015).

Central banks and financial supervisors have a significant role to play. This has been recognised recently, with former and current central bankers of the Bank of England, Banque de France and Nederlandsche Bank writing in June 2020 that the crisis offers a 'once in a lifetime opportunity to rebuild our economy in order to withstand the next shock coming our way: climate breakdown' (Bailey et al. 2020). Currently, however, these institutions are not just aiding companies with short-term liquidity, but they are also providing longer-term support by purchasing – with newly created money – companies' bonds and short-term loan notes (Kedward 2020). The European Central Bank, Bank of Japan and Bank of



England have increased the scale and pace of their existing asset purchase programmes, called quantitative easing (QE), whilst the Federal Reserve plans to inject up to \$750 billion into the private sector. The assets eligible for purchase include several speculative markets, such as junk bonds, asset-backed securities and private equity (Financial Times, 2020).

This expansion of central bank interventions into markets presents an excellent opportunity to re-channel financial flows more strategically towards greener, zero-carbon alternatives. The criteria used by central banks to purchase financial assets should be adjusted to incorporate the climate-related risk associated with the companies that are being financed (e.g. loans to fossil fuel companies would be classified as highly risky given the risk of stranded assets) (Monnin 2018).

Central banks could also coordinate their policies more closely with industrial policy, for example by purchasing green bonds from development banks, green banks or similar public intermediaries such as the European Investment Bank. These intermediaries could then finance lending for green infrastructure investments or green loans for small- and medium-sized companies. Green refinancing where central banks offer favourable interest rates for refinancing of green lending is another option, particularly in the Eurozone area.

From a regulatory perspective, there has been much focus on how to calculate the risks to the financial sector posed by climate change. However, there is huge uncertainty around such risks, meaning a precautionary approach – assuming a worst-case scenario – is preferable (Chenet et al. 2019). The capital adequacy risk weights on lending to unsustainable activities need to be made prohibitively high (Finance Watch 2020). Quantitative credit guidance policies, for example quotas for green versus brown lending, could also be used (Bezemer et al. 2018).

### **3. The green economy must ‘design in’ equitable economic growth, with a green jobs guarantee and a Just Transition to achieve it**

COVID-19 has led to extensive job losses and income drops. The International Labour Organisation estimates that in the second quarter of 2020, reductions in global working hours will add up to the equivalent of 305 million jobs being lost and that 1.6 billion people – many in the informal economy – are in ‘severe danger’ of losing 60-80% of their income. Many of these roles are in carbon-intensive sectors such as aviation, shipping and car manufacturing, with workers furloughed and laid off.

Ongoing border controls and social distancing requirements may decimate the transport industry further.

It is therefore paramount that the economic recovery is not only green, but also just. A Just Transition framework must be implemented to ensure that no one is left behind. Those working in brown industries cannot simply be displaced, but must be supported via re-skilling and job programmes for the transition, particularly in a time of mass unemployment and economic distress. The transition programmes ought to accommodate the spatial impact of the reorganisation of economic activity to prevent drastic upheaval of local communities. Labour unions should be supporting the role of governments in thinking in forward-looking ways to make sure the green renewal is co-created and co-shaped, rather than either imposed without buy-in or overlooked altogether. The rights of workers in the fossil fuel-based economy and the wider human right for all to have access to clean air, water and natural resources are the underpinning concepts of the Green New Deals being developed across the world.

Newly created jobs in the green sector could support a rapid recovery of these jobs. Data from the International Labour Organisation indicate the shifts to green production and energy use could lead to an extra 24 million jobs by 2030.

The “right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment” is enshrined in the UN Declaration of Human Rights (article 23.1). It has since been advocated by the US civil rights movement and, most recently, as a part of plans for a Green New Deal programme (Mazzucato and McPherson 2018).

A job guarantee programme (JGP) would ensure that all unemployed persons receive the opportunity to contribute their labour to solving societal challenges, while the economy rebounds (Tcherneva 2018). The vast increase in unemployment is a waste of potential that could immediately be targeted to environmental protection and restoration, health care needs, Covid-19 test-and-trace operations, training and re-skilling in accordance with the prerequisites of a green industrial strategy, and other tasks tailored to local community needs. A JGP is a societal infrastructure that expands in times of need. If this infrastructure and public sector capability to mobilise the unemployed for the public purpose was already in place, governments would have been able to rapidly scale up test-and-trace undertakings to limit the contagion, provide additional social care and deliver necessities to the isolated.

Such an employment programme will work on the macro level as a strong automatic stabiliser, as it expands spending immediately in response to layoffs (ibid). Furthermore, a stabilising psychological effect will arise from the lower uncertainty of income in uncertain times. This will lower people's precautionary motive to save in times of crisis. The targeted approach to unemployment is crucial since we have witnessed several 'jobless recoveries' in recent decades, where unemployment has not recovered in tandem with GDP.

#### **4. A fair and achievable green transition for the Global South**

Both the historical ecological debt owed by advanced economies, and the current imbalances in per capita carbon emissions and other resource use, obligates the developed world to shoulder a greater part of the burden of the transition.

Importantly, developing countries do not have the same financial or productive capacity to embark on a vigorous green transition, even as significant proportions of their populations are still deprived of the means to live securely and with dignity. This means that expansion of the material consumption of the poor in developing countries is necessary, but it must be achieved in sustainable ways and without further damaging the natural environment. It will be decisive for global heating that they do not lock in to polluting legacy technologies. Also, countries still in the process of urbanisation need to be encouraged to develop more eco-friendly and sustainable patterns of urban development that reduce energy dependence and waste, as well as allow more pleasant and liveable environments. These goals must be supported by financial means, as well as access to new green technologies and capital goods. Intellectual property rules are being used to deny governments and private investors in the Global South the right to access relevant technologies needed for an effective green transition.

#### **A Green – and Healthy – New Deal: next steps**

The COVID-19 pandemic has raised some barriers to the growing momentum around the climate emergency. However, a green-directed economic renewal is the route through to a positive, sustainable recovery for businesses, workers and citizens, and the pandemic comes at a point where green market-shaping opportunities are plentiful.

Governments around the world must determine to take up ambitious long-term green renewal goals. The state has the upper hand for the first time in decades – it should use this wisely for directed economic growth, which takes on one of the biggest social and economic challenges

of our time. There is a massive need to redirect and provide finance for green and sustainable projects, and still too much reluctance in the financial sector to finance the needed green investments, although this has been shifting in positive direction. States must therefore 'tip the financial playing field' in a greener direction to enable a healthy pipeline of green projects to be financed. They must also use the full suite of tools available, from industrial strategy (integrated with monetary and fiscal policy) to procurement, and to innovation-generation incentives and the creation of risk-welcoming, mission-oriented institutions. Markets will not find a green direction on their own. Only when there is a stable and consistent direction for investment will regulation and innovation converge along a green trajectory, and enable us to build a climate-resilient economy.

#### **Enquires**

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## References

- Bailey, A., Carney, M., Galhau, F.V. de and Elderson, F. (2020). The world must seize this opportunity to meet the climate challenge. *Guardian*. Available at: <https://www.theguardian.com/commentisfree/2020/jun/05/world-climate-breakdown-pandemic> (Accessed: 10 June 2020).
- Bezemer, D., Ryan-Collins, J., van Lerven, F. and Zhang, L. (2018). Credit where it's due: A historical, theoretical and empirical review of credit guidance policies in the 20th century. UCL Institute for Innovation and Public Purpose Working Paper Series (IIPP WP 2018-11). Available at: <https://www.ucl.ac.uk/bartlett/public-purpose/wp2018-11>.
- C40 Cities. (2020). The Global Green New Deal. Available at: <https://www.c40.org/other/the-global-green-new-deal> (Accessed: 27 May 2020).
- Carney, M. (2015). Breaking the tragedy of the horizon – climate change and financial stability. Speech.
- Chasan, E. (2020). Stranded assets are now everywhere. *Financial Post*. Available at: <https://business.financialpost.com/pmn/business-pmn/stranded-assets-are-now-everywhere>.
- Chenet, H., Ryan-Collins, J. and van Lerven, F. (2019). Climate-related financial policy in a world of radical uncertainty: Towards a precautionary approach. UCL Institute for Innovation and Public Purpose Working Paper Series (IIPP WP 2019-13). Available at: <https://www.ucl.ac.uk/bartlett/public-purpose/wp2019-13>.
- Coady, D., Parry, I., Le, N.-P. and Shang, B. (2019). Global fossil fuel subsidies remain large: An update based on country-level estimates. IMF Working Paper No. 19/89. Available at: <https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509>.
- Denning, L. and Bloomberg, N.B. (2020). Negative oil is positive for clean power. *Washington Post*. Available at: [https://www.washingtonpost.com/business/energy/negative-oil-is-positive-for-clean-power/2020/05/10/f681cd5e-92be-11ea-87a3-22d324235636\\_story.html](https://www.washingtonpost.com/business/energy/negative-oil-is-positive-for-clean-power/2020/05/10/f681cd5e-92be-11ea-87a3-22d324235636_story.html) (Accessed: 27 May 2020).
- Eaton, G. (2020). Top economists warn the UK not to repeat austerity after the Covid-19 crisis. *New Statesman*. Available at: <https://www.newstatesman.com/politics/economy/2020/05/top-economists-warn-uk-not-repeat-austerity-after-covid-19-crisis> (Accessed: 9 June 2020).
- European Commission. (2020). Launching the Just Transition Mechanism - for a green transition based on solidarity and fairness. Available at: [https://ec.europa.eu/info/news/launching-just-transition-mechanism-green-transition-based-solidarity-and-fairness-2020-jan-15\\_en](https://ec.europa.eu/info/news/launching-just-transition-mechanism-green-transition-based-solidarity-and-fairness-2020-jan-15_en) (Accessed: 9 June 2020).
- Finance Watch. (2020). Breaking the climate-finance doom loop: How banking prudential regulation can tackle the link between climate change and financial instability. Available at: [https://www.finance-watch.org/wp-content/uploads/2020/06/Breaking-the-climate-finance-doom-loop\\_Finance-Watch-report.pdf?mc\\_cid=67cb023665&mc\\_eid=d608eeeffc](https://www.finance-watch.org/wp-content/uploads/2020/06/Breaking-the-climate-finance-doom-loop_Finance-Watch-report.pdf?mc_cid=67cb023665&mc_eid=d608eeeffc).
- Financial Times. (2020). The Fed's radical policies are uncharted territory: Untangling the distortions to free market capitalism will take time. Available at: <https://www.ft.com/content/70a0d2ca-7987-11ea-af44-daa3def9ae03>.
- Hepburn, C., O'Callaghan, B., Stern, N., Stiglitz, J., and Zenghelis, D. (2020). Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change? Smith School Working Paper 20-02. Available at: <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf>.
- Institute for Innovation and Public Purpose (2020) Stakeholder capitalism during and after COVID-19, UCL IIPP COVID-19 Briefing Papers 01 (April 2020). Available at: <https://www.ucl.ac.uk/bartlett/public-purpose/publications/2020/apr/stakeholder-capitalism-during-and-after-covid-19>.
- Institute for Innovation and Public Purpose (2020) Inequality, unemployment and precarity, UCL IIPP COVID-19 Briefing Papers 02 (May 2020). Available at: <https://www.ucl.ac.uk/bartlett/public-purpose/publications/2020/may/inequality-unemployment-and-precarity-0>.
- Johnson, C.K., Hitchens, P.L., Pandit, P.S., Rushmore, J., Evans, T.S., Young, C.C.W. and Doyle, M.M. (2020). Global shifts in mammalian population trends reveal key predictors of virus spillover risk. *Proceedings of the Royal Society B: Biological Sciences*, 287(1924), p.20192736.
- Kedward, K. (2020). Central banks have a duty to provide 'green forward guidance' Available at: <https://medium.com/iipp-blog/central-banks-have-a-duty-to-provide-green-forward-guidance-fd947a77045b> (Accessed: 9 June 2020).
- van Lerven, F., Stirling, A. and Krebel, L. (2020). Recession Ready: A green plan to beat tomorrow's downturn. New Economics Foundation. Available at: <https://neweconomics.org/2020/01/recession-ready>.
- Macfarlane, L. and Mazzucato, M. (2018). State investment banks and patient finance: An international comparison. UCL Institute for Innovation and Public Purpose Working Paper Series (IIPP WP 2018-01). Available at: <https://www.ucl.ac.uk/bartlett/public-purpose/publications/2018/feb/state-investment-banks-and-patient-finance-international-comparison>.

Mazzucato, M. and McPherson, M. (2019). The green entrepreneurial state: What the Green New Deal can learn from the IT revolution. UCL Institute for Innovation and Public Purpose Policy Brief Series (IIPP PB 08). Available at: <https://www.ucl.ac.uk/bartlett/public-purpose/publications/2019/aug/what-green-revolution-can-learn-it-revolution>.

Mazzucato, M. (2019). How industrial strategy can drive a Green New Deal. IPPR. Available at: <https://www.ippr.org/blog/industrial-strategy-drive-green-new-deal-mariana-mazzucato> (Accessed: 9 June 2020).

Mazzucato, M. and McPherson, M. (2018). The Green New Deal: A bold, mission-oriented approach. UCL Institute for Innovation and Public Purpose Policy Brief Series (IIPP PB 04). Available at: <https://www.ucl.ac.uk/bartlett/public-purpose/publications/2018/dec/green-new-deal-bold-mission-oriented-approach>.

Mazzucato, M. (2013). The Entrepreneurial State: Debunking Public vs. Private Sector Myths. London, New York: Anthem Press.

Mazzucato, M. (2018). Mission-oriented innovation policies: challenges and opportunities. *Industrial and Corporate Change*, 27(5), pp.803–815. DOI: <https://doi.org/10.1093/icc/dty034>.

Mazzucato, M., Dibb, G., and McPherson, M. (2020). The path to COVID recovery: the urgent need for the EU Green Deal and a new approach to Industrial Strategy. Available at: <https://medium.com/iipp-blog/the-path-to-covid-recovery-the-urgent-need-for-the-eu-green-deal-and-a-new-approach-to-industrial-e91a4ad5ae7> (Accessed: 9 June 2020).

Monnin, P. (2018). Integrating climate risks into credit risk assessment: Current methodologies and the case of central banks corporate bond purchases. *SSRN Electronic Journal*. DOI: 10.2139/ssrn.3350918.

Salako, T. (2020). Nearly half of world's workers risk losing their livelihoods, says ILO. Euronews. Available at: <https://www.euronews.com/2020/04/29/coronavirus-nearly-half-of-world-s-workers-risk-losing-their-livelihoods-over-covid-19-loc> (Accessed: 9 June 2020).

Tcherneva, P. R. (2018). The job guarantee: Design, jobs and implementation. *Levy Economics Institute Working Papers Series* (No. 902). Available at: <http://www.levyinstitute.org/publications/the-job-guarantee-design-jobs-and-implementation>.

The New Climate Economy. (2016). The Sustainable Infrastructure Imperative. Available at: <https://newclimateeconomy.report/2016/>.

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