Written evidence submitted by Sam Unsworth (Grantham Research Institute, LSE) and Anna Valero (Centre for Economic Performance, LSE) (PEG0090)

Summary

1. The UK and the world have suffered an unprecedented economic shock from the COVID-19 pandemic, and now face a real risk of protracted depression. Strong and timely action can increase confidence, improve expectations and channel productive investment into a sustainable, inclusive and resilient recovery across the UK. The recovery from COVID-19 provides a critical opportunity for the UK to reboot its approach to growth, shifting towards sustainable growth and investing in the infrastructure, skills and innovation needed for the next 100 years.
2. A sustainable recovery should be guided by a clear vision and strategy for both the public and private sectors, and can framed by the government's previously stated goals of levelling up across the UK; boosting productivity; investing in infrastructure; reaching net-zero greenhouse gas emissions by 2050; and forging a new role for 'Global Britain'.
3. Productive investments across physical, human, knowledge, natural and social capital can boost aggregate demand and employment in the short term, and grow productivity and competitiveness in the medium term, while contributing to efforts to reduce inequalities within and across the UK's regions.
4. A strategy that allows the UK to grow out of debt and the post-COVID recession will generate jobs, boost productivity and wages and contribute towards a more content electorate. The necessary investments, policies and finance can be delivered quickly and gain support from businesses and communities, by learning from the experience gained in the pandemic. But rapid design and delivery of policies and investment requires strong political commitment and careful planning.
5. Policy reform is required, both to deal with the UK's other current challenges, and in order to maximise the benefits of these investments, including in pricing and regulation, industrial policy, innovation, labour markets, skills and education, competition policy, and foreign policy.
6. Institutional reform is also needed. In particular, establishing a new National Investment Bank could help crowd in private finance and bring forward sustainable infrastructure projects at scale, and strengthening the institutions governing the UK's industrial strategy so that it can provide long-term direction and commitment that industry requires to rebuild.
7. A well-designed package for a sustainable recovery should help to redefine and strengthen the UK's place in the world. A domestic economic recovery that is strong, sustainable, inclusive and resilient will provide additional credibility for the UK as it assumes the leadership of the G7 and works to deliver a successful and ambitious COP26 in 2021. This can enable the UK to foster and lead collaborative efforts to build global sustainability and resilience, and accelerate the transition to zero-carbon economic growth.
8. With the recent economic recovery announcements made in the Chancellor's Summer Statement, such as the £3bn for building energy efficiency, the government is making an impactful start with investment targeted where it is needed. It is now of critical importance that this is followed in the Autumn by expanding government spending to a holistic, long term and economy-wide programme of investment.

Introduction

9. The **Grantham Research Institute on Climate Change and the Environment** was established in 2008 at the London School of Economics and Political Science. The Institute brings together international expertise on economics, as well as finance, geography, the environment, international development and political economy to establish a world-leading centre for policy-relevant research, teaching and training in climate change and the environment. It is funded by the Grantham Foundation for the Protection of the Environment, which also funds the Grantham Institute – Climate Change and the Environment at Imperial College London.

10. The **Centre for Economic Performance**, established at LSE in 1990, is one of Europe's leading economic research centres. It addresses three related questions: How to foster growth? How to share growth? How to make growth sustainable? Comprising some 90 faculty, research staff and doctoral students, CEP studies the determinants of economic performance at the level of the company, the nation and the global economy by focusing on the major links between globalisation, technology, the educational system and the labour market and their impact on productivity, inequality, employment, stability and wellbeing. Since 2018 CEP has been recognised as a global centre of excellence by its main funders, the ESRC, and granted official ESRC Research Institute status.

11. This written evidence was submitted on 17th July 2020 to the Commons Select Committee inquiry on Post-Pandemic Economic Growth. This response summarises relevant research on sustainable and inclusive growth and the recovery from COVID-19 drawing on work at the Centre for Economic Performance and Grantham Research Institute on Climate Change and the Environment. In particular, this response draws on a recent report by the authors with Nick Robins, James Rydge, Nicholas Stern and Dimitri Zenghelis entitled 'Strategy, Investment and Policy for a Strong and Sustainable Recovery: An Action Plan' (Stern et al., 2020). The answers represent the views of the authors, not the Centres or their funders.

Response

Question 1. What core/guiding principles should the Government adopt/prioritise in its recovery package, and why?

12. The government's recovery package should be guided by a clear vision and strategy for investments in long-term assets that will deliver growth that is environmentally sustainable and inclusive, building resilience in the UK economy through improved productivity and living standards. As such, it can be framed by and embody the government's previously stated goals of levelling up across the UK; boosting productivity; investing in infrastructure; reaching net-zero greenhouse gas emissions by 2050; and forging a new role for 'Global Britain'. The recovery package should be embedded in an understanding of, and commitment to, 'building back better' (Stern et al., 2020).

13. A continued commitment to a net-zero emissions trajectory will be critical to the UK's economic and environmental wellbeing in the long term. To ensure that the recovery is also inclusive, it should include appropriate labour market and skills policies that can help to prevent scarring for those displaced by the current crisis, and enable a 'just transition' for those that will be displaced in the future by both the transition to zero-carbon growth and broader structural transformations such as automation.

14. In the recovery phase, borrowing for productive investment in long-term assets can be distinguished analytically from immediate and highly necessary spending on public services and general packages of support for businesses, which will continue to be required for some time given the severity of the economic shock. There is now the opportunity to form a new implicit social contract which recognises the need for higher public debt and equitable taxation. It must be emphasised that the finance raised through these means will provide material benefits to citizens in relation to the critical social issues highlighted most acutely during the crisis, such as deep and widening inequalities. Investments in productive and sustainable assets will enable the UK to benefit from strong multipliers in the short and long term, and service its increased debts via growth-driven tax revenues (Stern et al., 2020).

Question 2. How can the Government borrow and/or invest to help the UK deliver on these principles?

15. Public borrowing to fund investment can get people back to work and stimulate demand in the short run, while building capacity and supply into the medium and long run. It has been shown that GDP multipliers of government purchases are larger in recession (see, for example, Auerbach and Gorodnichenko, 2012; Blanchard and Leigh, 2013). Each percentage point of GDP spent on investment can be expected to increase GDP ultimately by around 2% to 3% (Hepburn et al., 2020).

16. There may be concerns about the growing public sector debt required to pay for these investments; and in the medium term, higher government spending is likely to crowd out private investment. If lenders fear that the government may renege on repaying public-sector debt in full, default risk premia and inflation premia on government bonds may rise sharply, tightening credit conditions and increasing the cost of public investment. But such conditions are unlikely to apply for the foreseeable future. To the extent that fiscal sustainability requires moving towards current budget balancing over the medium term, this is best achieved through private net investment increasing, allowing public borrowing to be reduced. Carbon pricing and environmental taxation can help to shift incentives towards green recovery strategies and generate valuable revenues while increasing economic efficiency (Burke et al., 2020).
17. Tightening public budgets prematurely is likely to damage growth and hence make debt sustainability even harder to achieve. Into the medium term, provided recovery plans avoid depression, higher debt remains historically affordable. The fact that the market expects yields on government bonds (gilts) to remain below zero (see Bank of England, 2020) reflects abundant investor appetite for public debt to support increased investment. The standard equation for debt dynamics helps to illustrate this (see for example Turner and Spinelli, 2012). The key message is that, for a given primary balance (public borrowing after interest payments) and initial net debt ratio, the rate of increase in the debt-to-GDP ratio is positively related to the interest rate-growth differential. Therefore, if a country's nominal GDP growth is higher than the rate of interest charged on its stock of debt, its debt-to-GDP ratio will fall.
18. But there are even greater returns to targeted public sector investments. Higher growth not only reduces the debt-to-GDP ratio by expanding GDP, it also slows the rate at which debt is likely increase. This combined effect on both the numerator and denominator of the debt-to-GDP ratio explains why, under the right conditions, borrowing to invest can be more sustainable in terms of public debt management than seeking to directly target balanced budgets. Moreover, growing out of debt and the post-COVID recession will have additional benefits of generating more jobs, boosting productivity and wages and contributing towards a more content electorate (Stern et al., 2020).
19. Investments in the vital assets necessary for an innovative, prosperous and competitive economy will help build capacity and resilience in the UK, and hence be central to a strong and sustainable recovery. Such investments should include, but not be limited to, the following (Stern et al., 2020):
    - Physical capital, boosted by leveraging private finance through creating new markets and establishing a new National Investment Bank.
    - Human capital, enhanced by creating the skills and jobs necessary for the 21st century.
    - Knowledge capital and innovation, fostered by accelerating the drive to reach a target for R&D investment of 2.4% of GDP through a mixture of increased funding and further incentives for business innovation, including enhanced incentives for clean innovation.
    - Natural capital, strengthened directly through carefully designed ecosystems creation, preservation and restoration projects.
    - Social capital, enhanced by developing a vision and strategy for an inclusive and sustainable recovery that can gain support from businesses and communities and creates opportunities for all.
20. The need for increasing investment in productive assets has been highlighted by many, and for some time (LSE Growth Commission, 2013, 2017), and there is a strong case for ensuring that such investments are made in sustainable assets (Rydge et al., 2018, Unsworth et al., 2020b and Stern et al., 2020). Public investment alone cannot deliver the structural changes the economy requires, but it can act as a catalyst to leverage in private finance. Stronger institutions - including the establishment of a National Investment Bank - will be required to extend the reach of private investment.

Question 3. What measures and support will businesses need to rebuild consumer confidence and stimulate growth that is sustainable, both economically and environmentally?

21. A clear macroeconomic vision is needed to restore confidence, create jobs and grow the economy out of post-COVID recession and debt by supporting economic activity in the short term and expanding

sustainable productive capacity in the medium term. Given the UK's legal commitments to net zero greenhouse gas emissions by 2050, and the need for investments now to be consistent with a resilient and future-proof economy, this vision should have environmental sustainability at its core.

22. Moving from rescue to recovery will require action simultaneously to restore demand and bolster supply, underpinned by close coordination between monetary and fiscal policy. Boosting demand will be particularly challenging in the current environment. The slowdown comes after a long period of poor productivity growth and surplus desired saving pushing global policy real interest rates close to zero (Rachel and Smith, 2015). With policy rates so low, and desired saving likely to rise further, the limitations of monetary policy are spurring increasingly unorthodox approaches, while also emphasising fiscal support. In some countries, some direct monetisation of public debt is under consideration.

23. Therefore, a key objective of a recovery package is to stabilise expectations and channel surplus desired saving into productive investment. This will require public spending, together with coherent and complementary industrial policies and incentives to raise investment in the private sector. A new and invigorated Industrial Strategy can help to achieve this, providing a sense of policy stability and direction for businesses (see answer to Question 7).

24. Strong, long-term institutions can boost confidence and reduce the cost of capital, by sharing and reducing risk (Baker et al., 2015) – and such institutions are needed for recovery. Most critically, the government can move quickly to establish a National Investment Bank (NIB). A UK NIB can help bring forward and prepare sound projects at scale. Such institutions can reduce and manage early stage and political risks, both through their presence and financing instruments – mobilizing private investment.

25. Beyond the suite of business support policies put in place by the government (in the initial rescue phase, and additional measures put forward in the Summer Statement) additional, strengthened and/or more targeted policies are likely to be required to help viable companies survive, adapt and grow out of the crisis. Support for innovation and its diffusion – already a key focus pre-pandemic- will continue to be important for improving the UK's productivity performance. As 'rescue' measures and support such as the Business Interruption Loan Scheme are scaled back, this will need to be accompanied by policies and investment which generate opportunities for businesses and a long-term growth pathway.

26. Innovation can be fostered by accelerating the drive to reach a target for R&D investment of 2.4% of GDP through a mixture of increased funding and further incentives for business innovation, including enhanced incentives for clean innovation. There is much discussion on the need to build regional hubs of innovation outside of the 'Golden Triangle', channelling resource to areas with key underlying potential and where network and agglomeration effects can be exploited (see, for example, Jones, 2019). As regional anchor institutions and producers of both innovation and human capital, universities must be given key roles in regional strategies for sustainable innovation and its diffusion. FE colleges also have an important role to play in the provision of technical skills. Given the important role of universities in the UK's industrial policy – as national and local suppliers of human capital and (Azmat et al., 2018), financial threats facing the sector due to negative impacts on overseas students must be addressed.

27. On the diffusion side, ongoing programmes such as the BEIS Business Basics Programme which seeks to evaluate how best to increase the adoption of productivity enhancing technologies or organisational practices will help provide evidence on the types of policy that work. The broader need for a better understanding of what works should be built into new policy design into the recovery, allowing timely evaluation that will help guide resources to where they might be most effective in the future.

Question 4. Whether the government should give a higher priority to environmental goals in future support?

28. Previous studies have highlighted the significant opportunities associated with sustainable growth (Rydge et al., 2018; Unsworth et al., 2020a), and the need for urgent action (Unsworth et al., 2020b). Given the response to COVID-19 and the extent of government support to industry it entails, there is

now the chance to build a strong partnership between the private and public sector, that can accelerate investments towards an environmentally sustainable economy.

29. With respect to direct support for businesses from government, the short-term focus of bailouts to date has rightly been on stabilisation and protection of jobs (Bhattacharya et al., 2020), but longer-term, more dynamic and forward-looking support is also likely to be needed as we move into the recovery. At this point, bailout conditions could be linked to environmental goals. Such support packages should not be used to burden firms with costly and onerous conditions. Longer-term support packages can encourage firms to embrace emerging standards and business models, direct innovation in line with societal goals, foster collaboration and spur cost-effective diffusion of the technologies which have fallen in cost and improved in quality since the 2008 recession. This can work through existing frameworks such as the Taskforce for Climate-related Financial Disclosures.

30. Adjustments to taxes into recovery should consider where it is possible to both create positive incentives for sustainable investments, and raise revenues at a time of fiscal pressure. A robust carbon price is critical for reaching net-zero emissions (Carbon Pricing Leadership Coalition, 2017). Current low oil prices present an opportunity to introduce this and build incentives to shift to cleaner sources of energy (Burke et al., 2020a). It will be important to ensure innovation and technological change continues to be directed towards zero carbon, recognising that fossil fuels will remain attractive so long as their prices remain low. A politically feasible carbon price could start at around £40 per tCO2 and rise to £100 per tCO2, or more, in 2050 (Burke et al., 2019). Furthermore, on the revenue side of the public finances, an equitably designed, economy-wide carbon tax could raise additional revenues of up to £15bn (Burke et al., 2020b) to be distributed *across* the UK economy, while still sending a price signal to decarbonise.

31. Complementing these areas, ensuring that regulation in key decarbonisation areas is growing more ambitious through the crisis – as opposed to becoming side-lined or loosened - could help to protect against low oil prices delaying the speed of the transition. For example, government could introduce minimum energy efficiency standards to bring new and existing buildings to EPC band C by 2035 (2025 for low-income households), and bring forward the phase-out date for petrol, diesel and hybrid vehicles to 2030 or soon thereafter. Such regulatory changes can be accompanied with supportive policies to ensure an orderly transition for those displaced.

Question 5. Whether the Government should prioritise certain sectors within its recovery package, and if so, what criteria should it use when making such decisions? What conditions, if any, should it attach to future support?

32. Criteria which could help the government to select specific sectors for support include size (in employment or value added), geographic distribution, international comparative advantage, future growth potential, strategic importance to the UK and nature of disruption due to COVID-19 (and the extent to which government support can alleviate this).

33. Some sectors are relatively easy to demarcate, for example - aerospace, and have suffered particular challenges due to COVID-19 due to lockdown and social distancing. Specific and targeted measures for rescue in the immediate response should give way to long-term considerations into recovery – particularly in sectors that are large emitters of greenhouse gases. This should involve exploring conditionality for support (see point 29 above).

34. Interdependencies between sectors and different parts of the economy should be considered, together with longer term impacts on UK society. Creative sectors for example, have been shown to have positive associations between growth of creative industries and growth elsewhere in urban economies (see Nathan and Gutierrez Posada, 2020). Any permanent damage to the UK's creative sectors resulting from COVID-19 closures could have significant negative impacts on local economies (direct and indirect), as well as the UK's cultural life, and its attractiveness as a tourist destination and related exports.

35. More broadly, a missions-based strategy can ensure that resources and efforts are directed towards particular societal goals, such as clean growth (and building resilience to future pandemics). This avoids

having to select specific sectors for assistance and allows government to design policies and incentives that support any businesses working towards a goal. In the case of zero-carbon goods and services, the UK can continue to build on its innovative strengths via consistent policies and incentives on both the demand and supply side, and benefit from growing global demand (Rydge et al., 2018); such issues are discussed in depth with respect to zero-carbon passenger vehicles in Unsworth et al. (2020a). The same arguments apply in other technology areas (e.g. pharmaceuticals or biotech) where the UK has comparative advantage, where the social benefits can be large, and where demand is likely to grow.

36. With regard to attaching conditions to support for firms, the importance of linking bailout conditions to sustainability objectives into recovery is discussed in Question 4. From a competition perspective, it will be important to design these packages with consistently applied criteria or indicators where possible. This can reduce the likelihood of distorting markets by making one-off or arbitrary conditional packages. Third party evidence can support this, such as the Transition Pathway Initiative which maps the carbon performance and goals of companies relative to the Paris Agreement targets, via intensity metrics.

37. It will also be important to consider the political economy of attaching conditionality to support. The recovery presents an important opportunity for government to work closely with high-emitting sectors and help them to plot a course towards sustainability. However, these conditional packages could lead to breakdowns in trust or engagement between high-emitting companies and government if the response measures required by the package are perceived to be illegitimate or adversely affecting competitiveness. It follows that a positive spirit of collaboration and ambition should be embodied in these packages. The conditions of these packages should be conceived and communicated as supporting the long-term competitiveness of recipients by preparing for a zero-carbon future.

Question 6. How can the Government best retain key skills and reskill and upskill the UK workforce to support the recovery and sustainable growth?

38. The economic shock caused by COVID-19 has hit the young and lowest paid the hardest (Adams-Prassl et al., 2020) and is expected to deepen labour market inequalities (Bell et al., 2020). The impacts of ongoing disruptions to education will also be uneven (Burgess and Sievertsen, 2020), with school closures exacerbating pre-existing gaps for students from disadvantaged backgrounds.

39. The unprecedented economic downturn caused by COVID-19 is likely to create long-term scarring where businesses become insolvent, individuals suffer periods of unemployment, and learning losses are likely to damage future educational trajectories (Elliot Major and Machin, 2020). In addition, the transition to net-zero will also have complex and multifaceted impacts upon labour markets. The jobs which will be affected are broader than those within the energy sector and will include complex interrelated supply chains and secondary industries such as the supply chain upstream and downstream of both conventional and electric vehicle production (Unsworth et al., 2020a). Looking forward, the transition to net-zero – as it intertwines with ongoing technological change, in particular automation (accelerated in many sectors during the pandemic) - risks negatively impacting specific jobs and local areas, leading to further potential labour market dislocation.

40. With the right mix of proactive labour market and skills policies to enable a 'just transition', these risks of dislocation can be managed and structural shifts may generate new, more resilient, employment opportunities in emerging areas.

41. Part-time work and short-term measures, together with job guarantees, including in sustainable projects (many of which will create job opportunities, even in the short term), should play a key role in the recovery. A focus on training so that individuals can build their human capital through such programmes will be key, and the 'Kickstart' programme for 16-24 year olds announced in the Summer Statement is a good example of the interventions that are likely to be needed for some time. Similarly, the government support for energy efficiency improvements should create new sustainable jobs and there are other examples where this will be possible (restoration of natural capital and rolling out electric vehicle charging infrastructure). Consideration should be given to the opportunities for women and men of new jobs created in such programmes, as well as the broader gender dimensions of the crisis for the

workforce (see for example Hupkau and Petrongolo, 2020 and McKinsey, 2020). Based on current labour market structures, jobs in zero carbon infrastructure construction, for example, would most likely be male dominated.

42. For those permanently displaced by the current crisis, technological change or the zero-carbon transition, new approaches for adult skilling and lifelong learning are needed, including exploring human capital tax credits (LSE Growth Commission, 2017) to incentivise employers to train their workers.

43. In addition, further efforts in the education system to address longstanding educational gaps for students from disadvantaged backgrounds, likely to be exacerbated by the current crisis, will be needed (Elliot Major and Machin, 2020).

Question 7. Is the Industrial Strategy still a relevant and appropriate vehicle through which to deliver post pandemic growth?

44. The policies and investments needed in an effective recovery package are interdependent and complementary. They must therefore be coherent and part of an overarching strategy for sustainable and inclusive growth which can be more than the sum of its parts. The scale of government support to industry in response to COVID-19 implies that there is now the chance to build industrial policy that represents a strong partnership between the private and public sector. To build such a partnership, with clear direction and longevity that will help to reduce uncertainty for businesses, policies around innovation, labour markets, skills and place can be shaped by the UK's Industrial Strategy. Into recovery, this can be re-emphasised, updated and relaunched at the national and local levels - and be informed by the work of the Industrial Strategy Commission that is building data and evidence. At the same time, the institutions governing industrial policy can be strengthened further, putting it on a par with other areas of economic policy (LSE Growth Commission, 2017).

45. To ensure that net zero is positioned at the heart of this, the existing 'Clean Growth' grand challenge, and the currently separate Clean Growth Strategy can be built upon and merged together. Evidence based on analysis of the USA's post-2008 package of green industrial policy measures shows the package to have been broadly successful in protecting jobs, boosting export competitiveness and restructuring industry towards green (Mundaca and Richter, 2015).

Question 8. How should regional and local government in England, (including the role of powerhouses, LEPs and growth hubs, mayoralties, and councils) be reformed and better equipped to deliver growth locally?

46. The impacts of COVID-19 will be determined by a complex range of region-specific factors which are difficult to account for in decision making (Overman, 2020), as is the case with other processes of structural change such as decarbonisation and automation. Therefore, regional and local governments can be further empowered to lead locally-appropriate policy responses to COVID-19 and the recovery alongside the government's broader objectives including net-zero and levelling up.

47. The government can seek to devolve decision making and delivery mechanisms of a sustainable recovery package to the local level, utilising the latest innovations in public participation such as Citizens' Assemblies to ensure that recovery policies and projects are fair and focused on people and their local needs and perspectives.

48. To ensure this is possible, local governments need the appropriate resources, capabilities and capacity. With respect to the zero-carbon transition, local governments can be encouraged to adjust relevant national regulation on a regional basis e.g. setting higher building efficiency standards earlier to stimulate growth of zero carbon skills. Better resourced local bodies, or those that have already made progress on issues such as clean growth, are likely to want more powers devolved to them (Bulleid et al., 2019). For others, more resources and sharing of best practice will be important in the short term.

Question 9. What opportunities does this provide to reset the economy to drive forward progress on broader Government priorities, including (but not limited to) Net Zero, the UK outside of the EU and

the 'levelling up' agenda? What should the Government do to ensure that delivering on these priorities does not exacerbate the vulnerability of businesses, consumers and communities/workers that have been impacted by COVID-19?

49. As set out in the answer to Question 1, the recovery should be framed by the government's previously stated goals of levelling up across the UK; boosting productivity; investing in infrastructure; reaching net-zero greenhouse gas emissions by 2050; and forging a new role for 'Global Britain'.

50. Implementing these strategic goals provides a pipeline of investments which can help the UK recover from the impacts of COVID-19. The government's net zero programme, consistent with meeting the UK's carbon budgets, provides a number of specific investment-focused plans that meet these criteria. Key projects include building energy efficiency retrofits; active travel infrastructure and natural capital investments. In light of the COVID-19 crisis and the urgent requirement to generate both employment opportunities and boost growth, potential investments can be assessed based on a set of key criteria including speed of implementation, labour intensity (and hence job creation potential), evidence on multipliers and consideration of how investments may deliver broader benefits to growth and wellbeing (Annex 1 in Stern et al. (2020) sets out key evidence on the extent to which such investments generate these benefits). The evidence supports the strategic case for net-zero aligned investments in the recovery, which – due to the localised nature of many of these projects – could also help government deliver on the levelling up agenda.

51. Nonetheless, maintaining and enhancing popular support for decarbonisation and other government objectives in light of COVID-19 will be a critical challenge. The UK entered this crisis in a climate of erosion of public trust due to inequality and capture. The government's promise to level up the UK will be challenged by the fact that this crisis will have highly unequal effects across the economy. It will be important to emphasise that the lockdown-induced economic impacts are the result of a disorderly transition, and to ensure that the public do not perceive this to be akin to what might be expected from an orderly zero carbon transition (Stern et al., 2020). Delivering on the substantial job creation potential (National Grid, 2020) and co-benefits of decarbonisation could help to ensure that climate policy is perceived as being an integral part of a strong and sustainable recovery from the impacts of COVID-19.

52. With regard to reaching net zero emissions, it will be important to ensure that the impact of carbon pricing is harmonised with COVID-19 support mechanisms to ensure it does not exacerbate the vulnerability of companies on the edge of collapse or passthrough to low-income consumers. This could be managed by announcing a net-zero-aligned carbon price now so that it can begin informing company investment decisions, but not levying the tax until a future date – such as 2025 – to avoid it having short term impacts on business cash flows during a challenging period (Martin and Van Reenen, 2020).

53. Into recovery, the UK will need to improve its productivity record in order to achieve sustained growth in living standards (Valero and Van Reenen, 2019). The limited adoption of productivity enhancing technologies has been a longstanding issue amongst the 'long tail' of UK SMEs and has held back their productivity, prompting a number of initiatives that seek to address this (including the BEIS Business Basics Programme). There are current opportunities in this area - for many businesses, the diffusion of innovation via the adoption of new technologies has been a major lifeline during this crisis. This has included digital technologies for remote working and online ordering. However, access to such technologies will be uneven and runs the risk of widening the gap between London-based businesses (with a high concentration of tech businesses) and those around the country (Beauhurst, 2020). The viability of these technologies is likely to depend on company and region-specific considerations such as the quality of digital infrastructure, the availability of finance, knowledge and management practices within firms. Business support policies (often locally delivered) including vouchers, or free advice could help address barriers to adoption faced by businesses (and households) and help to encourage persistence in positive innovation responses beyond the current crisis.

54. But more broadly, coming out of the crisis, there will be tensions between the desire to preserve jobs in businesses according to the pre-crisis status quo, and the need to re-build business dynamism (already in

decline in advanced economies before the crisis, see Akcigit et al., 2019) into recovery. Effective policies to support entrepreneurs accessing finance and expertise will be necessary, including support for younger generations now entering the world of work.

55. Across all of the areas of investment highlighted in Stern et al. (2020): physical, human, knowledge capital and innovation, natural capital and social capital, there are clearly strong place-based elements which calls for an appropriate mix of national and local policies. Done right, such policies can help level up economic activity without merely causing displacement of resources from one area to another. Key to this will be channelling investments to generate spillovers (over and above direct economic gains), within and across regions. The existence of spillovers is a key justification for investments in both human capital and innovation, and the patterns of these need to be better understood. For example, analysis of patents has shown that spillovers for clean innovations in the energy production and transport sectors are over 40 per cent greater than in conventional technologies (Dechezleprêtre et al., 2013) supporting investments in these types of innovations from both an economic and environmental perspective. Unsworth et al. (2020a) reports similar analyses comparing spillovers in technologies related to clean cars. Potential synergies and spillovers between innovation into COVID-19 response measures and zero carbon technologies or practices should also be identified and promoted e.g. digital technologies which can reduce business travel and hence emissions.

56. With respect to the UK outside of the EU, economic analyses suggest that in its negotiations with the EU (Dhingra and Sampson, 2019), the UK should seek to remain close to its largest and closest trading partner on issues of trade. To meet climate commitments and crowd in investments in clean technologies, the UK should maintain strong environmental protections and regulation.

Question 10. What lessons should the Government learn from the pandemic about actions required to improve the UK's resilience to future external shocks (including – but not limited to – health, financial, domestic and global supply chains and climate crises)?

57. The pandemic has demonstrated the impact of the global economy on nature, highlighting the fact that the likelihood and prevalence of zoonotic diseases such as COVID-19 is likely to increase with increased erosion of the world's natural capital. The UK should lead by example by safeguarding and enhancing its natural capital through policymaking, placing environmental goals and protection at the centre of the UK's growth trajectory, thereby also helping to build resilience to future climate shocks.

58. More broadly, COVID-19 has further illuminated that the inherent systems we have in place around the world to deal with different types of emergencies need to be re-evaluated. There is an urgent need to adjust financial flows towards increased investment into ways to reduce the risk from a hazard event before it has happened (known as 'pre-event' or 'ex-ante' disaster risk reduction). However, for policymakers or investors the old adage that 'prevention is better than cure' does not always hold water: preventative measures tend to be seen as a cost, with uncertain or distant rewards, and they lose out to more immediate action (Surminski, 2020). In several areas, including the interlinked priorities of climate change and pandemics, there is a clear need to better focus efforts on prevention. To enable this, there must be an emphasis on articulating the case for investment in resilience, such as multiple co-benefits which come from strong and early action.

59. This is a truly global pandemic economic crisis and there is an urgent need for an internationally coordinated response to avoid a global depression, strengthening resilience to future pandemics (including prevention and response) and enabling economies to build back better. There is clear need for stronger international institutions and multilateral action as the global economy seeks to recover from COVID-19. Institutions such as the IMF will be essential in servicing the fiscal needs of many countries in the rescue and recovery period, and the IMF will need the resources and capabilities to meet this demand. The UK can use its influence and role in international institutions and multilateral development banks such as the World Bank to step up lending to regions around the world which are vulnerable to the virus and its economic repercussions. This could also consider new instruments for rapid disbursements with low conditionality. Furthermore, the UK's leadership of the COP and G7 could be

used to ensure these institutions are adequately capitalised. They have a significant role to play in emerging and developing country recovery plans and preventing a permanent slide in living standards.

60. The UK government has formulated largescale rescue packages, with continued support and new programmes necessary for different sectors and parts of the economy. The rapid deployment of resource to build the Nightingale hospitals highlighted what can be achieved when there is political will and public support. Lessons can be drawn from this in other areas for the recovery from COVID-19 and beyond – including investments to reduce carbon emissions, air pollution, waste and build resilience to climate and other shocks in the future. A key conclusion to draw this experience is that speed of implementation is a function of political will and commitment. If the private sector receives a clear and compelling policy signal from government, it can quickly mobilise resources in this direction.

61. The recent experience has demonstrated that there is a strong case for strengthened domestic supply chains in areas of national security (Tirole, 2020) – key medical supplies and equipment being a key example. Building resilience to future shocks will require better coordination within and across sectors, and this will require increased knowledge of technological and scientific capabilities and capacity across the system, including across the research system, industry and public sector institutions.

62. However, open trade and participation in global value chains should still be a priority, allowing UK companies to enjoy the productivity benefits associated with being part of global markets. Furthermore, the economic case for UK decarbonisation is significantly strengthened by trade-enabled markets for zero carbon goods and services around the world (this is highlighted in the case of zero carbon passenger vehicles in Unsworth et al., 2020a).

63. As discussed in Stern et al. (2020), monetary policy measures taken so far in response to the COVID-19 crisis offer a rich set of options that could be calibrated by the Bank of England to take account of climate and wider sustainability factors. These range from collateral frameworks, open market operations and asset purchase programmes to micro- and macro-prudential measures as well as specific sustainable finance initiatives. Prior to the crisis there was already debate about the extent to which central banks would be able to use such instruments when facing climate risks. The precedent in this current crisis can now be built upon into recovery. Monetary and financial authorities can take immediate steps that will both contribute to sustainable crisis responses and prevent a further build-up of climate risks in the balance sheets of financial institutions. Key actions, set out in more detail in Dikau et al., (2020), include; amending collateral frameworks to better account for climate change-related and other environmental risks, aligning asset purchases and refinancing operations with Paris Agreement goals; and adjusting prudential measures to avoid a manifestation of transition risks on the balance sheets of financial institutions.

64. Resilience at the individual level must also be strengthened. We have seen that the impacts of both the health and economic shock have been uneven. ONS data have shown that death rates have been higher in poorer areas (ONS, 2020). Lower paid individuals and the self-employed have suffered more in the labour market (Adams-Prassl et al., 2020, Blundell and Machin, 2020). The disruption to education due to school closures is also likely to be felt far more amongst disadvantaged children (Eyles et al., 2020). It seems clear then that addressing inequalities in education and opportunity will not only be important to address pre-existing gaps, and prevent longer term scarring from the current crisis, but also to help build resilience to future shocks and labour market disruptions due to technological change.

65. During the COVID-19 crisis, digital technologies and skills have been crucial for communications, remote working across many sectors and occupations, and remote schooling. Positive innovation responses since the onset of the crisis – for example increased digital adoption and remote working – can be encouraged into recovery where they increase labour productivity, flexibility and hence resilience to future shocks. But access to digital technologies is uneven (see, for example Eyles et al., 2020 for discussion on inequalities in access to online learning technologies in schools), and this must be addresses through infrastructure and digital skills investment.

Question 11. What opportunities exist for the UK economy post Brexit and the pandemic for export growth?

66. The UK could use its domestic green recovery programme as the foundation of credible international leadership and impetus for the global recovery. This leadership could be built through key diplomatic processes such as the UK COP26 Presidency and the G7 Presidency. In its negotiations with the EU, the UK should seek to remain close to its largest and closest trading partner on issues of trade and security.

67. Consistent with the aspiration for a 'Global Britain', the UK can lead an internationalist trade response to COVID-19. As discussed in the answer to Question 10, while there is a strong case for strengthened domestic supply chains in areas of national security open trade can and should still be a priority.

68. By being an early mover on zero-carbon products and services, the UK can seize economic opportunities from the global transition that is already underway, and from the markets that are growing around the world. The coming years will be a critical period for the UK as it seeks to redefine its place in the world while maintaining a focus on sustainable and inclusive growth. The UK's recent commitment to achieve net-zero annual emissions of greenhouse gases by 2050 presents an opportunity to drive growth through investment, innovation and creativity.

69. This goal gives a clear signal to the private sector for how it should focus its activities long-term, which can now be reinforced with an effective recovery package. Market forces combined with rising government ambitions internationally are unleashing demand for zero-carbon goods and services (Ricardo-AEA, 2017). If the UK sets policies which drive it to decarbonise comparatively quickly, these domestic decarbonisation activities can incubate and foster industries and skills which can subsequently translate into export opportunities as the zero-carbon transition takes hold globally. The industries and skills fostered by the recovery package, if focused on key areas such as energy efficiency, carbon capture and storage and electric vehicle charging infrastructure, could create export opportunities in the future for UK goods and services. Unsworth et al. (2020a) highlights how the UK can capture opportunities in zero carbon passenger vehicles goods and services, with an appropriate balance of demand and supply side policies, including retaining close ties with the EU's single market. This could play a key role in the UK's recovery. Evidence from the 2008 financial crisis has shown how recovery packages can support future industries and contribute towards comparative advantage. For instance, Tesla received a $465 million federal loan at a critical point in the company's development which enabled them to design and build electric vehicles. This loan was issued under the US government's recovery package from the 2008 financial crisis, which sought to support businesses and industries which could enable decarbonisation.

Question 12. What role might Government play as a shareholder or investor in businesses post-pandemic and how this should be governed, actioned and held to account?

70. The incentive and opportunity for vested interests to seek favours from the political system are greater than usual in an economic recession (Vickers, 2008), and as the UK creates its own state aid rules as it leaves the EU, it will be important to take into account competition-distorting effects of state aid (acknowledging that flexibility is required during the crisis and into recovery - as reflected by the EU's temporary framework).

71. As discussed in the answers to Questions 4 and 5, it is also important to consider perverse effects of support for high emissions firms, and explore the potential for attaching conditionality related to lowering emissions or, beyond the crisis, offering extended support packages for businesses transitioning their production to net-zero. From a competition perspective, these packages should be designed with consistently applied criteria or indicators where possible. This can reduce the likelihood of distorting markets by making one-off or arbitrary conditional packages. Third party evidence can be drawn upon for this, such as the Transition Pathway Initiative which maps the carbon performance and goals of companies relative to the targets of the Paris Agreement, via carbon intensity metrics.

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