### UK2070 Futures Post-COVID Scenario Modelling

Main Report October 2020

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### Abstract

This post-COVID scenario modelling work at Cambridge University aims to understand a wide spectrum of longer-term spatial development prospects that the UK is facing, and consider cogent strategic policy interventions amidst an unprecedented period of uncertainties.

The new scenario analyses set out in this report update its previous research for the UK2070 Commission, in order to:

- Test rates of recovery under far more challenging economic conditions the scenarios tested include on the one hand, the possibility of protracted low growth over many years and on the other, a dynamic recovery that continuously builds its own momentum;
- Investigate the policy implications of 'levelling-up' across the UK in terms of the distribution of economic activities, jobs, housing, population, skills and infrastructure in real and physical geography;
- Test the roles of local improvements that are currently being made in a dynamic recovery;
- Test the effects of investments upon all communities, not just national capitals and big cities; and
- Take account of potentially changing business practices and leisure preferences.

Given a potential resurgence of the coronavirus pandemic and Brexit negotiations, it makes little sense to predict in any way the UK's short and medium-term economic outlook. Instead, we consider a wide range of longer term eventualities. Also, if one stands back and looks beyond the immediate event horizons, there are still many longer term, steady trends which will continue to shape in a fundamental way the growth and development in the UK's constituent countries and regions.

Our scenario design starts from the emerging trend of global population stabilisation: as urbanisation sweeps through the globe, the rates of population growth have reduced markedly. In another generation, this stabilisation is expected to occur in countries currently undergoing rapid urbanisation, just like what has already happened to a large number of urbanised nations. This implies that we are witnessing the start of a new, urbanised world where improvements in environmental sustainability, wealth and quality of life have to be increasingly driven by a continued rise in per person productivity, or through attracting migrants from poorer, more disadvantaged countries and regions.

The current trends in productivity do not bode well. Even the most prosperous parts of the UK have not seen any rise in average per person productivity since 2007. This means that a big jolt in policy interventions may be needed to relaunch the UK onto a sustainable growth trajectory.

In the aftermath of the COVID-19 pandemic, it does not make sense (and at any rate, would have little chance) to design this big policy jolt purely on the basis of a large sum of borrowed cash. This is in spite of the fact that interests are likely to stay low for some considerable period and borrowing to invest in highly productive ventures is justifiable. Would the current system with flat-lining productivity respond well to an ad hoc cash injection that has no guarantee to sustain itself over time? Instead, this report follows the tradition of spatial planning that was established more than a

century ago in the UK, and considers what has made its prosperous areas productive since the Victorian times. In particular, it examines how those areas can raise productivity faster and spread this growth momentum to all countries and regions in the UK.

Out of a large number of alternative options considered, this report is focused on four distinct spatial planning scenarios that demonstrate that the differences in policy outcomes between them could imply making or breaking the UK. The central finding that emerges from the scenario work is that a regional reconfiguration of jobs, housing and transport, making use of the essential endowment and resources already present in the countries and regions, would not only increase average per person productivity, but also establish new engines of growth and prosperity outside London and the Wider South **East.** The differences in productivity growth that arise from the readjustments to the spatial layout of growth and transport connections, when assessed with HM Treasury and DfT applomeration elasticities, show the potential to increase longer term average per person productivity by 1.7% per year for the UK as a whole, and more than 3% per year for knowledge-based sectors. This contribution through spatial planning, when coordinated with a forward-looking future jobs programme and wider policies, could thus raise UK's GDP growth from well below 1% today to more than 3% longer term.

All the usual caveats apply in terms of prediction uncertainties, of course, but the scenario work reported here helps work out what smaller scale, local but persistent interventions would be needed alongside big jolts in policy and investment, and how to package coherent programmes of action. The significance of those programmes would ultimately determine the overall potential for the UK's environmental sustainability, wealth and quality of life, and whether the UK's constituent parts could prosper together or diverge in their separate ways.

**Main Report** 

### **1. Context and Approach to Scenario Design**

The post-COVID scenario modelling work reported here aims to understand a wide spectrum of longer-term spatial development prospects that the UK is facing now, and consider cogent strategic policy interventions amidst an unprecedented period of uncertainties. This main report is written in non-specialist language, and for the technical details see Cities and Transport Group (2020).

Since the original <u>UK2070 Futures work</u> (Jin, Denman and Wan, 2019)<sup>1</sup> the context for scenario design has become a magnitude more challenging. This is becoming especially so, given a potential resurgence of the coronavirus pandemic and Brexit negotiations. In the circumstances, it would make little sense to predict in any way the UK's short and medium-term economic outlook. Instead, we will focus on considering a wide spectrum of longer-term eventualities, and the potential pathways of recovery and growth in a fifty-year time scale.

In spite of all the uncertainties, if one stands back and looks beyond the immediate event horizons, there are still many longer term, steady trends which are continuing to shape in a fundamental way the growth and development in the UK's constituent countries and regions. The scenarios in this study are designed in such a way to help us work out what national, regional and local scale interventions would be required and how to package coherent programmes of action. In essence, this is a proactive approach to exploring the future by design it (Batty, 2018)

The scenario design starts from the emerging trend of global population stabilisation: as urbanisation sweeps through the globe, the rates of population growth have reduced markedly. For instance, Vollset et al (2020) have identified these scenarios across 195 countries and territories after considering fertility, mortality and migration factors; similarly the UN Habitat would foresee a long term stabilisation of the global population as its median projection to 2100 (2019; see Figure 1). In a generation, this stabilisation is expected to occur in countries currently undergoing rapid urbanisation, just like what has already happened to a large number of urbanised nations including the UK. This means, increasingly, improvements in environmental sustainability, wealth and quality of life will have to be driven by a continued rise in per person productivity, or through attracting migrants from poorer, more disadvantaged countries and such regions within each country.

The current trends in productivity in the UK (and a large number of OECD countries) do not bode well. Even the most prosperous parts of the UK have not seen any rise in average per person productivity since 2007. This means that a big jolt in policy interventions may be needed to relaunch the UK onto a sustainable growth trajectory.

This follow-up report has therefore sought to update the earlier scenario design work in this context. In the first instance, the following four groups of issues have been recognised as having emerged since the previous UK2070 Futures scenario tests:

1) The risk of far more challenging economic conditions post the pandemic than were assumed previously. The UK faces real prospects of economic recession, a slow and protracted recovery process and potentially low rates of economic growth for many years. Under such situations, the productivity gap

<sup>&</sup>lt;sup>1</sup> Jin, Denman and Wan (2019) also provides the technical details of the LUISA recursive spatial equilibrium model of the UK that has been used for this set of scenario tests, as well as the previous UK2070 Futures tests.

between rich and poor regions would widen, which creates an even more challenging context to stabilise and improve the regional economies, especially outside London and the Wider South East (WSE). The scenarios need to build from this harsher reality. They must also respect the logic of innovation and growth, building from the ground up (see Sainsbury, 2020)

- 2) Need to investigate what the policy of 'levelling-up' means in terms of real physical and economic geography. Since the original UK2070 Futures scenarios which were reported in the UK2070 Commission reports last year, the UK government has come out strongly in favour of a broad goal for 'levellingup' the UK. The need remains to consider what the 'levelling up' means if it is to be translated into effective policy (e.g. for the geographic distribution of economic activities, jobs, housing, population, skills, and how all this distribution is to be supported by transport and telecommunications). Scenarios are a good way to spell out these in real geography for discussion and debate.
- 3) **The need to build and enhance resilience of at a local level**. The previous scenarios were at the time focused on the national capitals and main regional cities as the drivers of growth. Post pandemic, regional and local resilience has become a central concern in the process of recovery, not only for public health and social care, but also for building back local trade and services to enable the main cities to have the necessary local eco-systems supporting innovation and growth, to ensure the benefit of investments in recovery reaching out to all communities, and to dovetail efforts of recovery and levelling-up.
- 4) Changing practices for work and leisure. The unprecedented Lockdown has provided opportunities for businesses, local communities and government to experience en masse tele-working, distance learning, remote shopping and procurement, and online social interactions. The rapid advancement of online technology and business models would mean hybrid physical-virtual interaction would seep more deeply into many more realms of business and social life. This may pose a different set of conditions for achieving urban agglomeration which has proven vital in fostering innovation and growth since the Industrial Revolution.

#### Two long standing issues are also cogent to this discussion:

- 5) A greater emphasis on per person productivity growth would be required. In 1900, the UK had the second highest per capita GDP (behind Switzerland), and since WWII, the US, Germany, Canada, Japan and France have caught up with the UK, and the UK now has one of the lowest per capita GDP in G7 (see Figure 2). Given that the main drivers for growth in the longer term are likely to further shift to per person productivity rather than population growth, raising productivity is becoming a critical issue of the UK's future prosperity. This should also take into account of the specific structures and patterns of disparity in regional productivity in the UK (see Martin et al, 2019).
- 6) Connected to the above, much of the UK also has a skills gap (see UK2070 Commission, 2020). England, for example, has one of the largest proportions of low-skilled young workers among advanced economies (OECD, 2016). Furthermore, the skills profiles of young English workers are no better than

older employees, which implies that the skills problem is to persist, if unaddressed.

#### **Design of the post-COVID scenarios**

The overarching principle for the previous UK2070 Futures scenarios has been to adopt a wide though realistic range of possible growth rates and geographic patterns of distribution; this provides the users of the research with the scope to interpolate the reported scenario test results. It would seem that this principle remains valid, but the numerical range of the growth rates and geographic patterns of distribution would need to be reviewed.

This means that tor overall UK economic growth, we will continue to define a lower and an upper bound for economic growth scenarios, but a constant rate of high growth is no longer appropriate because of the need for the UK to recover gradually. Instead the lower and upper bound should be defined thus:

- **Low Growth** should cover the lowest possible rates of population and productivity growth that could materialise.
- Instead of a constant high growth upper bound, it would seem that a trajectory of a **Gradual Recovery** would be more appropriate, gradual building up the rates of growth.



#### **FIGURE 1** WORLD POPULATION PROSPECTS 2019: THE GLOBAL POPULATION SIZE IS EXPECTED TO STABILISE IN THE NEXT FEW DECADES Source of data: UN Habitat (2019).



FIGURE 2 AN INTERNATIONAL COMPARISON OF THE GROWTH IN GDP PER CAPITA: IS IT A PURE COINCIDENCE THAT SWITZERLAND, THE US, GERMANY, CANADA AND JAPAN ALL HAVE MULTIPLE GROWTH CENTRES, WHILST THE UK, FRANCE, ITALY AND SPAIN HAVE INCREASINGLY FOCUSED ON ONE?

Source of data: Maddison Project (2018).

For geographic spread of economic activities, a base case that represent minimal policy change would still be needed (as this could be a real possibility!), and the alternative reconfiguration of future growth would need to take account in more depth of the aspirations of levelling up goals, i.e.:

- **Business-as-Usual** where the growth trends in each local council area persist as observed over the period 1991-2019.
- **Convergent Economy** that sees the rates of jobs growth across the nations and regions gradually converging towards the UK average, and at the same time, the national and regional average profiles of productivity, skills and occupations converging towards those of London and the Wider South East (WSE) from now through 2071.

The combination of the above assumptions leads to four scenarios that are then tested in the UK2070 Futures Model for the UK – the four scenarios A to D are summarised in Table 1 below.

	Rates of overall economic growth in the UK				
	Low Growth Gradual Reco				
Geographic spread					
Business as Usual	Scenario B Continued Regional Recession	<b>Scenario A</b> Persistent Regional Imbalance			
Convergent Economy	Scenario C Slow Levelling-up	<b>Scenario D</b> Dynamic Recovery			

#### TABLE 1 SUMMARY OF FOUR POST-COVID SCENARIOS

## 2. Scenario assumptions

This chapter presents the main assumptions made in the four scenarios.

**2.1 Population, jobs, and total economic output in terms of GVA/GDP** To structure the main model assumptions, we first consider population, jobs and total economic output in terms of gross value added (GVA) for the countries and regions and gross domestic product (GDP) for the UK as a whole. Defining the population, jobs and total economic output together clarifies the underlying assumptions about per person and per job productivity.

As discussed above, we assume two levels of growth – low and gradual – with the low scenario having less economic output, productivity, jobs and net in-migration, and the gradual scenario with the same list of variables but at a higher rate of population growth and a gradually increasing levels of growth in economic output.

To maintain comparability with the previous UK2070 Futures scenarios, the population assumptions are kept the same as previously, with the low growth scenario having an average rate of 0.1% of growth per year and the higher one of 0.55% per year. In our judgement these set realistic lower and upper bounds around the ONS's principal population projection which has an average rate of 0.24% per year.

It should be noted that we assume overall labour participation rate (i.e. employed people divided by total population) to remain constant, which implies that the growth rates for population and workers would be the same from 2019 onwards, and employed people would retire later as the population ages. For the actual assumptions at the UK level and by broad regions, see Table 2. The employment assumptions we have made cover a slightly wider range (from 30.7m at the low to 40.2m at the high growth for workplace employed population excluding full time students in 2071) than the OBR projections (which are from 33m at the lowest to 39.4m at the highest for those employed age 16+ in 2068).

To determine the numerical range of overall economic growth rates, we first compare recent OBR and IMF growth projections (published in May and June 2020 respectively) with those assumed in the previous UK2070 Futures scenarios. This shows that in spite of the recent hiatus of the GDP growth trajectory, the existing UK2070 Low-High growth range is still wide enough to cover all the eventualities currently under consideration and debate, including the symmetry V, asymmetry V, W, U shaped recovery and the assorted combinations thereof.

In particular, the UK2070 Futures Low Growth assumption (with an annualised GDP growth rate of 0.6% per year till 2071 and could thus be called a 'pear shaped' one) would see the UK getting back to the 2011 output levels in real terms only in 2045 and is more pessimistic than any of the current projections; on the other hand, the High Growth assumption (with an annualised rate of GDP growth of 2.35%) would see the UK economy getting back to the 2011 levels by 2026, and thus slightly surpassing the most optimistic V-shaped recovery e.g. the economy would get back to its 2019 level by the end of 2021. In other words, this Low-High range is still wide enough to cover the GDP growth projections under discussion.

To maintain comparability with the previous scenario tests, we therefore adopt the same range of growth assumptions as demarcated by the Low and High Growth. However, some adaptations are necessary to account for the changing context and the need to define a Gradual Recovery pathway, as follows:

- For Low Growth, we now incorporate the drop in the overall output that has been estimated by OBR in May 2020 (i.e. a reduction in UK GDP by 12.8% relative to 2019);
- For Gradual recovery, the GDP growth rates are assumed to start low during 2021-2026 at 1.1% and they would gradually rise to 3.5% for 2066-2071. This leads to the same overall size of the UK economy in 2071, thus maintaining the same overall annualised average of 2.35% per year.

The growth assumptions are summarised in Table 2 and Figure 3 below.

Annualised growth rates 2020-2071	GDP / worker	Population & workers	Implied GDP growth	Growth in earnings per worker
Low Growth (as previously defined and applied for Scenario A and B below)	0.5%	0.10%	0.60%	0.25%
High Growth (defined for previous tests and not used in Scenarios A-D below)	<b>1.8%</b> (annualized constant rate)	0.55%	<b>2.35%</b> (annualized constant rate)	<b>0.9%</b> (annualized constant rate)
Gradual Recovery (New assumptions; used for Scenario C and D below)	0.55%- 2.95% (with an overall average of 1.8%)	0.55%	<ul> <li>1.1% - 3.50% (with an annualised average of</li> <li>2.35% per year over 2020-2071)</li> </ul>	<b>0.28%-1.48%</b> (with an overall average of <b>0.9%</b> per year)

## TABLE 2 ANNUALISED GROWTH RATE ASSUMPTIONS FOR GDP PER WORKER, POPULATION,NUMBER OF WORKERS AND OVERALL GDP GROWTH



## FIGURE 3 ALTERNATIVE GDP GROWTH TRAJECTORY ASSUMPTIONS TO 2071: LOW GROWTH, HIGH GROWTH AND DYNAMIC RECOVERY

#### 2.2 Regional spread of jobs and economic activity

For the regional spread of economic and jobs growth, we assume two contrasting patterns of geographic distribution:

- The first, Business-as-Usual, follows the regional and local jobs growth trends since 1991. The share of future jobs growth or decline in each local authority or local council districts (including local authority districts, unitary authorities, local council areas, etc) are computed accordingly. Because the expected overall rates of jobs growth (assumed to be 0.1% under Low Growth and 0.55% under Gradual Recovery) would be only a fraction of the historic growth (e.g. annualised growth of employment was 1.1% for 1991-2011 according to the Census, and 1.5% for 2011-2019 according to the ONS Business Register and Employment Survey), those areas that had weak growth as well as those had suffered decline historically would suffer net reductions in total jobs under this assumption. This is particularly so under Scenario B (which is a combination of Low Growth and Business-as-Usual distribution of new jobs);
- By contrast, **Convergent Economy** assumes that the growth in jobs picks up gradually, including areas outside London and WSE as a result of proactive investment and business innovation among the countries and regions, to the extent that by 2031, the rate of jobs growth in all countries and regions would converge to the UK average rates (i.e. 0.1% per year under Scenario C (with Low Growth) and 0.55% per year under Scenario D (with Gradual Recovery), and by 2051 the broad skill profile of the new jobs start to converge to upskilled profile in terms of the socio-economic classification as defined by the population census (i.e. the ONS's NS-SeC grouping of skill and occupation profiles).

Since the **Convergent Economy** assumption are a new introduction to scenario tests, it is useful to explain the grounds upon which it could be considered a realistic proposition. Without doubt, the **Convergent Economy** assumption is a radical departure from the historic and recent trends for the UK. In the last five decades, the best job opportunities and talents were increasingly doing precisely the opposite and gravitating towards London and WSE, so much so that many if not most people have already taken this as a fact of life. This needs to be considered also within the context of the suggestions of moving of jobs out of London in significant numbers, e.g. the government's plans to move out some of its own officials to the countries and regions.

Historically, there has indeed been a contra-flow of jobs out of London to an area covered by a circle of about 100km in radius. This includes not only the WSE but also the nearer fringes of South West and Midlands. In the past five decades areas around the M4/Great Western corridor, Oxford, Milton Keynes, Cambridge, Chelmsford, Colchester, Canterbury, Gatwick-Crawley, Guildford and Southern Hampshire saw their share of high productivity jobs surge, where their ever closer connections with London helped to turn these areas into distinct centres of innovation in their own right, with the quality of life in those areas converging to, and in some cases surpassing, the best in London. This experience, albeit with a more limited geographic scope, does indicate that it is not inevitable that the 'best' jobs have to follow a one-way flow to central London.

This regional scale convergence which has been taking place in both the rate of jobs growth and the quality of jobs in the WSE, has been facilitated by a range of factors including:

- A general consensus, since the Garden City Movement, that it is feasible to have **a radically different alternative model of urban development** that avoids both overcrowding in London and multiple deprivation in under-developed areas, whilst creating a new lifestyle that combines the benefits of the town and the country;
- The existence of historic cities, towns and villages with attractive and well-protected natural and cultural environment practically, every new centres of innovation mentioned above have sprung up from or close to such a historic city, town or village;
- Fast improving travel from those cities, towns and villages to core business activities in London and to one another – it is no coincidence that the M4/Great Western corridor which benefited from the earliest Intercity125 trains became the first to attract good quality jobs in large numbers, and all the main regional cities are now within two hour of door-to-door travel time to central business and administrative areas of London;
- Fast improving travel connections within each journey to work catchment area that provides the skills and services necessary for the growing businesses – in the past fifty years, this was mainly through the spread of a strategic road network, which – cogent to the discussion here – has reached a critical threshold of traffic congestion in the WSE and now requires significant investment and demand management to accommodate any further growth;
- The willingness of the local communities to supply affordable housing and the availability of suitable land space to build the housing in order to support employment growth – since 1971, the WSE has added many times more new housing relative to that within London, although practically all local/unitary authority areas in the Home Counties – covering practically all the areas of strong jobs growth, can no longer keep building housing at the national average, let alone the rate deemed necessary for catching up with the housing supply backlog;
- Often, though not exclusively, **close connections to local universities and wider innovation** have played a role in seeding and catalyzing this spread of good quality jobs
- As the quality of the jobs improved in the WSE, schools, hospitals, social care, local government and businesses benefited from the spill-over of skills, which in turn led to improvements in the overall quality of life, nature conservation and a virtuous cycle that continues to add good quality jobs increasingly through attracting unique global investments that London alone would not have been able to secure alone.

This historic experience of London and the WSE, a region of 25 million, needs to be set in the context of the need for levelling up the UK as a whole, as the sixth largest global economy. The UK has 68 million people, and by 2071, its population size could reach close to 90 million<sup>2</sup> if there is sustained population growth at our High Growth rate. This could well materialise if there has been excellent recovery and growth. Could a successful city-region level experience be repeated at the level of a whole nation of around 90 million people?

<sup>&</sup>lt;sup>2</sup> For instance, the ONS high population projection expects the UK population to reach 88.1 million by 2071.

From a global perspective, integral city regions (which have historically been called 'megacity-regions') now routinely involve more than 100 million residents as daily commuters and supply-chain provisions today. A prominent example for spatial planning at this scale is Japan, where air and high-speed rail have been successfully used to support the coordination and balance of regional growth since the 1960s. This effort is still continuing today – a new high-speed rail project, the Chuo Shinkansen bullet train is currently under construction to bring Japan's two biggest cities, Tokyo and Osaka, which are 500 km apart to be within one hour of train travel time within this decade.

Compared with Japan, the UK would have two notable advantages: first, the UK is spatially more compact: the physical distances between the main cities are all below 650km (e.g. London to Derry or London to Aberdeen) whereas in Japan the crow-fly distance from Sapporo to Fukuoka is over 1,400km; secondly, the UK still has a window of opportunity to grow: it expects to grow substantially whereas Japan's total population has been reducing and the economy had a growth rate much less than the Low Growth scenario since the late 1980s.

In the age of prolific online communications, why would one still be concerned by physical geography and travel time? Research on this topic so far suggests that transport and telecommunications tend to complement each other – i.e. where people go, online connections are better established and vice versa. Specifically, in the UK, the work of Chen and Hall (2011) is an insightful retrospect of the long-term benefits of Intercity125 trains on economic growth: their findings show that the effects of Intercity125 falls off sharply beyond a 2-hour radius from central London.

Since the Lockdown, even with dramatically better online communications, the needs for face-to-face business and social meetings do not seem to diminish for strategic and complex discussions, although there is an ample scope to substitute routine meetings with online calls. This means that online communications may extend the reach of innovation activities whilst cutting down the demand for travel per unit of economic activity – this would represent excellent news for spreading jobs and economic activity from London and WSE.

In designing the Convergent Economy assumption, it would therefore be appropriate to consider whether the UK would be able to replicate the successful experience within London and WSE, and spread jobs, economic activity and in particular high-quality jobs and living standards to the rest of the UK within the next half century. Strategically, this would mean re-coupling of the countries and regions as one closely integrated economic area, reversing the past decoupling described and explained in McCann (2019) for the UK2070 Commission.

Here a simple logic is applied with the specification of the Convergent Economy assumption. We postulate that as a first approximation, if the conditions that enabled the economic convergence to take place in London and the WSE in the last 50 years are met in the wider UK, then a similar convergence could take place in the next 50 years in this wider area. Of course, the scale of this UK-wide convergence is much more ambitious, but there is also now better transport and telecommunications technology to overcome the greater extent of distance and area.

The process of specifying the conditions for a UK-wide Convergent Economy is necessarily an iterative one, as the first approximations would need to be tempered and refined to take account of the real circumstances of each and every countries and regions in the UK. However, we cannot straightaway think of a show-stopper, a barrier that would prevent the realization of a Convergent Economy if all the conditions are met.

The practical purpose of discussing the conditions is precisely to identify if such barriers would exist, as well as fleshing out further details of the conditions. This process would then help policy makers and citizens alike to gauge by when and by dint of what the supporting conditions could be met, if they would have the ambitions to achieve the level of re-coupling underlying the Convergent Economy assumptions.

To start this process off here we confirm the first approximation of the conditions to achieve the level of reconfiguration of jobs and economic activities:

- A general consensus that it is necessary and feasible to engender a radically different alternative model of spatial development that makes appropriate use of the resources and endowment already present in each local area, raises productivity and benefits the whole of the UK;
- There are existing historic cities, towns and villages with attractive and well-protected natural and cultural environment where new business innovation could take hold and spread to the wider region;
- Fast improving travel from the new centres to existing centres of business and innovation, and through persistent improvements over half a century all the main regional cities are within one hour and 45 minutes door-to-door travel time to one another, so that all critical face-to-face meetings can take place with the same convenience as currently within London and WSE;
- Fast improving travel connections within each journey to work catchment area that provides the skills and services necessary for the growing businesses in all countries and regions;
- The willingness of the local communities to supply affordable housing and the availability of suitable land space to build the housing in order to support employment growth in areas that are outside London and the WSE, including gradually catching up with the housing supply backlog where this has not been addressed through the spatial reconfiguration of jobs and economic activity;
- Establish and enhance local universities and wider innovation to train and supply the skills base needed, as well as seeding and catalyzing the spread of good quality jobs
- As the quality of the jobs improved, engender the spill-over of skills, invest in schools, hospitals, social care and other local services to improve the overall quality of life, nature conservation and to create a virtuous cycle that continues to add good quality jobs increasingly through attracting unique global investments that London and the WSE alone would not have been able to secure.

The resulting Convergent Economy assumptions in terms of jobs are shown below in Table 3, and the convergent skills profile in terms of the shares of higher skilled jobs (equivalent to the ONS Higher level professional and managerial jobs today) are shown in Table 4.

<b>Area</b> London and	2011	2031	2051	2071
WSE	10.8	13.3	14.2	15.0
Midlands	4.4	5.3	6.1	7.0
South West	2.4	2.9	3.3	3.8
N England	6.5	7.6	8.8	10.1
Wales	1.3	1.5	1.7	2.0
Scotland	2.4	2.7	3.1	3.6
N Ireland	0.8	0.8	1.0	1.2
All UK	28.5	34.2	38.2	42.7

#### TABLE 3 **CONVERGENT ECONOMY: ASSUMPTIONS FOR TOTAL JOBS**

#### TABLE 4 **CONVERGENT ECONOMY: ASSUMPTIONS FOR SHARES OF HIGH SKILLED JOBS**

Area	% share 2011	% share 2031	% share 2051	% share 2071
London and				
WSE	16.5%	24.1%	36.0%	54.0%
Midlands	11.8%	19.3%	32.6%	50.6%
South West	12.5%	20.0%	32.6%	50.6%
N England	11.7%	19.3%	34.2%	50.4%
Wales	10.4%	18.0%	31.1%	48.5%
Scotland	11.8%	19.4%	33.4%	50.0%
N Ireland	10.1%	17.5%	33.5%	49.9%
All UK	13.5%	21.2%	34.2%	51.6%

Figure 4 Changes in the shares of higher skilled workers: 2011-2071



2011 (as recorded in Census) 2031 (Dynamic Growth)

	2	NORTH SEA
REPUBLIC OF		2
CELTIC SEA	ENGLISH CHANNEL	FRANCE



Salenan Salenan



2071 (Dynamic Growth)

4.5 - 7.5% 7.5 - 15.0% 15.0 - 25.0% 25.0 - 35.0% 35.0 - 45.0% 45.0 - 55.0% 55.0 - 62.5%

Among the conditions above there is no doubt that, prima facie, the biggest policy 'jolt' would seem to be the transport improvements required. At a closer look, the other conditions are no easier, either. The three sections below deal respectively with each category of assumptions.

#### 2.3 Assumptions regarding transport

Whilst we follow the usual assumptions that the door-to-door travel time for people and goods remain constant into the future for Scenarios A, B and C<sup>3</sup>, we have specified a separate transport assumption for achieving a gradual convergent economy under Scenario D (Dynamic Recovery).

The transport improvements under Dynamic Recovery consists of mainly two categories of improvements:

(1) At the inter-regional level, to reduce gradually the travel times between the core of the regional cities through the most appropriate means of transport, such that by 2071, the door-to-door travel times among all such regional cities are at or below 1 hour 45 minutes (i.e. the time currently taken between central London and all main centres of innovation in the WSE; Where appropriate, such improvements would leverage an enhanced version of the HS2 programme as a central spine. This is however built on the capabilities of a fully integrated multimodal transport system with low carbon road and air modes all playing a part. Given the necessary lead time for the necessary investment, the scenario assumes that the interregional travel times would not reduce significantly until late 2020s when the HS2 services and low carbon road and air modes.

(2) At the intra-regional level, through current initiatives of local and regional transport improvements and land use readjustments, gradually reduce travel times and shorten the distances of journeys, such that each year, the effective density (as defined by DfT's wider transport impact guidance) of each region would increase by 0.5% a year in the 2020s and 2030s.

The above specification represents a more realistic programme for gradual transport improvements focusing on continual and persistent investments that are value for money. The programme would also account for emerging low carbon and green transport technology that is expect to come on line in the next 50 years.

Because of the existing emphasis on a London centric interregional network, the specification would introduce a more balanced pattern of improvements. This would particularly benefit the regional capitals (see e.g. the example of Manchester below).

<sup>&</sup>lt;sup>3</sup> That is, under these three scenarios we assume that the road capacity expansion etc are counterbalanced by increased traffic volumes, and for public transport, reduced travel times on board the vehicles are counterbalanced by greater catchment at either end of the services within each local authority area.

Figure 5 The UK's interregional transport network is currently highly focused on London



#### Figure 6 A comparison of the door-to-door travel times to/from London: 2020

However, not only is this network London centric, it is also exclusionary – in terms of average door to door travel time, only the regional centres in the Wider South East are within or close to 2 hours. All other national and regional centres are beyond 3 hours or more, making it difficult for face to face contacts that are essential for complex decisions.

Geographic location

Relative location in travel time annuli benchmarked to the distance between London and Milton Keyes (see below)

Direction of shift from geographical to relative travel time location

Benchmark length for travel time ann London-Milton Keyes: Distance: 44 miles (71 kms) Train time: 35 minutes Door to door time: 105 minutes

Relative location of national and regional centres according to ravel times to London - **2020** 

#### Figure 7 Regional capitals like Manchester tend to have less direct connections



#### Figure 8 A comparison of the door-to-door travel times to/from Manchester: 2020



#### Figure 9

A vision for radically reduced door-to-door travel times to/from Manchester through environment- and climate-friendly means of transport



#### 2.4 Assumptions regarding housing development

The housing development assumptions have benefited from the insights of the MHCLG data on total net additional dwellings data since 2004 (Figure 10). The scenario assumptions follow respectively the low and higher population growth assumptions (at 0.1% and 0.55% per year respectively, and the level of growth in each local authority follows the patterns observed in the past decade, with adjustment made to account for short term spurs that are not expected to continue. The patterns reflect in particular the relatively lower delivery of housing per year in a large number of local authorities in London and WSE, as well as the relatively high delivery in the Midlands and beyond.

#### Figure 10 MHCLG Net Additional Dwellings for England



#### Figure 11 Housing development assumptions for low and higher population growth scenarios



Assumptions for low population growth scenarios Assumptions for the higher population growth scenarios

# Table 5Housing growth assumptions for the low population growth scenarios

Dwellings (million)	2011	2020	2031	2051	2071
London & WSE	9.6	10.3	10.4	10.6	10.7
Midlands	4.3	4.7	4.8	4.9	5.1
South West	2.4	2.6	2.6	2.7	2.8
N England	6.6	7.0	7.1	7.3	7.5
Wales	1.4	1.4	1.4	1.4	1.4
Scotland	2.5	2.5	2.5	2.5	2.5
All Britain	26.8	28.5	28.8	29.4	30.0

% change/year	2011-20	2020-31	2031-51	2051-71
London & WSE	0.86%	0.07%	0.08%	0.07%
Midlands	0.78%	0.20%	0.18%	0.17%
South West	0.92%	0.14%	0.16%	0.17%
N England	0.64%	0.11%	0.11%	0.12%
Wales	0.12%	0.04%	0.04%	0.05%
Scotland	0.10%	-0.04%	-0.02%	0.00%
All Britain	0.69%	0.10%	0.10%	0.10%
Table 6				

Housing growth assumptions for the higher population growth scenarios

Dwellings (million)	2011	2020	2031	2051	2071
London & WSE	9.6	10.3	11.0	12.2	13.5
Midlands	4.3	4.7	5.0	5.7	6.4
South West	2.4	2.6	2.8	3.1	3.5
N England	6.6	7.0	7.5	8.4	9.4
Wales	1.4	1.4	1.5	1.6	1.8
Scotland	2.5	2.5	2.6	2.8	3.1
All Britain	26.8	28.5	30.3	33.8	37.7
% change/year		2011-20	2020-31	2031-51	2051-71
% change/year London & WSE		<b>2011-20</b> 0.86%	<b>2020-31</b> 0.52%	<b>2031-51</b> 0.53%	<b>2051-71</b> 0.52%
% change/year London & WSE Midlands		<b>2011-20</b> 0.86% 0.78%	<b>2020-31</b> 0.52% 0.66%	<b>2031-51</b> 0.53% 0.63%	<b>2051-71</b> 0.52% 0.62%
% change/year London & WSE Midlands South West		<b>2011-20</b> 0.86% 0.78% 0.92%	<b>2020-31</b> 0.52% 0.66% 0.59%	<b>2031-51</b> 0.53% 0.63% 0.61%	<b>2051-71</b> 0.52% 0.62% 0.62%
% change/year London & WSE Midlands South West N England		2011-20 0.86% 0.78% 0.92% 0.64%	2020-31 0.52% 0.66% 0.59% 0.56%	2031-51 0.53% 0.63% 0.61% 0.56%	2051-71 0.52% 0.62% 0.62% 0.57%
% change/year London & WSE Midlands South West N England Wales		2011-20 0.86% 0.78% 0.92% 0.64% 0.12%	2020-31 0.52% 0.66% 0.59% 0.56% 0.49%	2031-51 0.53% 0.63% 0.61% 0.56% 0.49%	2051-71 0.52% 0.62% 0.62% 0.57%
% change/year London & WSE Midlands South West N England Wales Scotland		2011-20 0.86% 0.78% 0.92% 0.64% 0.12% 0.10%	2020-31 0.52% 0.66% 0.59% 0.56% 0.49%	2031-51 0.53% 0.63% 0.61% 0.56% 0.49%	2051-71 0.52% 0.62% 0.62% 0.57% 0.50%

The scenario assumptions presented here have not explicitly considered issues like historic supply backlogs. The net growths in housing are assumed in terms of overall population growth (i.e. under low population growth, the total amount of housing needed would be low) and the observed, historic patterns of housing delivery. We acknowledge that current provision of housing has been slower than the outturn demand, despite the stated objective by all parties to provide c. 300,000 dwelling units per year.

The on-going higher growth in population in London and many parts of the WSE has led to the estimation that new housebuilding in London and the Wider South East needs to increase by c.90,000/year if the regional disparity status quo continues. Unless there is a change in the trajectory, housing costs in London and the Wider South East would continue to rise more sharply relative to the rest of the UK. This could be further reinforced by maintaining existing policies which indirectly subsidise the overheating of housing markets and disparities in wealth. For example, 80% of Homes England funding is currently targeted at 'highest affordability pressure' areas, which are mostly in London and the WSE.

The advantage of scenario modelling for the housing supply debate is that it can introduce new variables to be considered. In this case if the growth in jobs would become more convergent across the UK in the longer term, there could be a gradual easing of the housing pressures in London and WSE, as well as the potential of healthier housing demand across the rest of the UK.

#### 2.5 Summary

In the post-pandemic context, the above assumptions would appear to be a fairly realistic range of starting points for population, jobs, economic growth, and housing assumptions. These are input into the UK2070 Futures model along with broadly unchanged transport conditions for the business-as-usual and low growth scenarios (i.e. A, B and C), and a big jolt transport improvement for the Dynamic Recovery (D) scenario. The specific profiles and the findings of the modelled scenario tests are presented in Chapter 3 below.

## **3. Main Findings from Scenario Tests**

The scenarios tests seek to answer:

- What would the effects be if the UK would face a prolonged period of low growth, if the trend distribution of business activities and sustained imbalance were to persist?
- To what extent would a geographically more convergent growth strategy help or hinder growth, productivity and quality of life?
- To what extent could the environmental capacities of the existing UK growth hotspots cope with the different distributions of jobs and housing?
- What roles could a geographically more convergent growth strategy play in fostering or hindering a green economic recovery stimulate local economies and embed upskilling at a regional level?
- Could a long-term strategy inform the design of short term, 'shovel ready' investments?

The model test results show that the geographic configuration does matter, and the difference between Continued Regional Recession and Convergent Discovery is as stark as it can be, with the former diminishing the UK's long-term growth potential and the latter enabling the UK to grow sustainably within the environmental capacity of each of the local areas.

The scenario profiles and findings are presented below for each of the scenarios A, B, C and D.

#### **3.1 Scenario A: Sustained Imbalance**

Even though an overall higher growth would be expected to help all regions, there would be expected to be significant differences in the rates of growth between the regions and nations, as well as a continued erosion of job quality outside the areas of high growth (linked to low wage economies).

The traffic congestion and housing cost pressures become wide spread in London and WSE, with real housing costs increasing at a rate that is 140% above that of the national average earnings, compared with, for example, 17% above in the North of England to 2031. The longer-term trend suggests even worse disparities. This shows that a geographically more convergent growth strategy is badly needed to ease the growth pressures in the high growth areas, as well as to improve job opportunities in the rest of the UK.

# Table 7Scenario A: Sustained Regional Imbalance - Distribution of jobs by mega-region

Jobs (million) London &	1981*	1991*	2001	2011	2020	2031	2051	2071
WSE	7.6	8.7	9.9	11.2	12.8	14.0	16.6	19.6
Midlands	3.4	3.9	4.1	4.6	4.9	5.2	5.6	6.1
South West	1.6	2.0	2.3	2.5	2.7	2.8	3.2	3.5
N England	5.4	5.7	6.1	6.8	7.1	7.3	7.6	7.9
Wales	0.9	1.1	1.2	1.3	1.4	1.4	1.5	1.6
Scotland	2.1	2.1	2.3	2.5	2.5	2.6	2.7	2.8
All Britain	19.2	23.4	27.3	28.9	31.4	33.4	37.2	41.6
% change/year London &		1981- 91	1991- 01	2001- 11	2011- 20	2020- 31	2031- 51	2051- 71
WSE		1.36%	1.31%	1.27%	1.44%	0.85%	0.85%	0.85%
Midlands		1.26%	0.64%	0.98%	0.85%	0.39%	0.41%	0.43%
South West		2.45%	1.27%	1.16%	0.62%	0.55%	0.53%	0.49%
N England		0.52%	0.60%	1.07%	0.57%	0.25%	0.21%	0.16%
Wales		1.36%	0.76%	1.41%	0.47%	0.38%	0.34%	0.28%
Scotland		0.24%	1.04%	0.94%	0.17%	0.25%	0.22%	0.18%
All Britain		2.02%	1.53%	0.59%	0.93%	0.55%	0.55%	0.55%

# Table 8Scenario A: Sustained Regional Imbalance - Distribution of dwelling stock bymega-region

Dwellings					
(million)	2011	2020	2031	2051	2071
London & WSE	9.6	10.3	11.0	12.2	13.5
Midlands	4.3	4.7	5.0	5.7	6.4
South West	2.4	2.6	2.8	3.1	3.5
N England	6.6	7.0	7.5	8.4	9.4
Wales	1.4	1.4	1.5	1.6	1.8
Scotland	2.5	2.5	2.6	2.8	3.1
All Britain	26.8	28.5	30.3	33.8	37.7
		2011-	2020-	2031-	2051-
% change/year		20	31	51	71
London & WSE		0.86%	0.52%	0.53%	0.52%
Midlands		0.78%	0.66%	0.63%	0.62%
South West		0.92%	0.59%	0.61%	0.62%
N England		0.64%	0.56%	0.56%	0.57%
Wales		0.12%	0.49%	0.49%	0.50%
Scotland		0.10%	0.41%	0.43%	0.45%

#### Figure 12

## Scenario A: Sustained Imbalance: Rising tide lifts all boats but London and WSE face unsustainable growth pressures



# Table 9Scenario A: Sustained Regional Imbalance - Changes in average dwellingrents

Dwelling rents (annualised £/unit in 2011 prices)									
	2011	2020	2031	2051	2071				
London & WSE	11,200	12,519	14,653	19,115	27,491				
Midlands	6,359	6,670	7,239	8,353	10,702				
South West	7,841	7,951	8,840	10,431	13,456				
N England	6,201	6,385	6,906	7,745	9 <i>,</i> 465				
Wales	4,839	5,100	5,644	6,588	8,377				
Scotland	5,519	5,813	6,351	7,259	9,047				
All Britain	8,027	8,687	9,831	12,093	16,410				
Average Earnings	8,027	8,720	9,327	11,550	15,806				
% change/year		2011-20	2020-31	2031-51	2051-71				
London & WSE		0.56%	0.79%	1.34%	1.83%				
Midlands		0.24%	0.41%	0.72%	1.25%				
South West		0.07%	0.53%	0.83%	1.28%				
N England		0.15%	0.39%	0.57%	1.01%				
Wales		0.26%	0.51%	0.78%	1.21%				
Scotland		0.26%	0.44%	0.67%	1.11%				
All Britain		0.40%	0.62%	1.04%	1.54%				

#### **3.2 Continued Regional Recession**

Combining low growth, without change in current policies, would result in continued regional recession beyond the immediate effect of the COVID-19 economic shock. If recent trends in the regional concentration of jobs were to continue under a prolonged period of low growth, London and Wider South East could be the only region to grow. The South West might hold steady, but all other areas of the UK could see decline in the overall number of jobs, with likely erosion in good quality and better paid jobs. Across the whole of the UK there could be net growth of only 400,000 jobs, whilst London and Wider South East could see 500,000 additional jobs. Housing costs would be expected to rise in London and Wider South East and the South West, well above national average, but with the risk of house price deflation elsewhere.

# Table 10Scenario B: Continued Regional Recession - Distribution of jobs by mega-region

Jobs (million) London &	1981*	1991*	2001	2011	2020	2031	2051	2071
WSE	7.6	8.7	9.9	11.2	12.8	13.3	14.4	15.6
Midlands	3.4	3.9	4.1	4.6	4.9	4.9	4.9	4.8
South West	1.6	2.0	2.3	2.5	2.7	2.7	2.7	2.8
N England	5.4	5.7	6.1	6.8	7.1	7.0	6.6	6.3
Wales	0.9	1.1	1.2	1.3	1.4	1.4	1.3	1.3
Scotland	2.1	2.1	2.3	2.5	2.5	2.5	2.4	2.3
All Britain	19.2	23.4	27.3	28.9	31.4	31.8	32.4	33.1
% change/year London &		1981- 91	1991- 01	2001- 11	2011- 20	2020- 31	2031- 51	2051- 71
WSE		1.36%	1.31%	1.27%	1.44%	0.40%	0.40%	0.39%
Midlands		1.26%	0.64%	0.98%	0.85%	0.06%	0.04%	0.02%
South West		2.45%	1.27%	1.16%	0.62%	0.10%	0.08%	0.04%
N England		0.52%	0.60%	1.07%	0.57%	- 0.20% -	- 0.24% -	- 0.29% -
Wales		1.36%	0.76%	1.41%	0.47%	0.07%	0.11%	0.17%
Scotland		0.24%	1.04%	0.94%	0.17%	0.20%	0.23%	0.26%
All Britain		2.02%	1.53%	0.59%	0.93%	0.10%	0.10%	0.10%

# Table 11Scenario B: Continued Regional Recession - Distribution of dwelling stock bymega-region

Dwellings (million)	2011	2020	2021	2051	2071
London &	2011	2020	2031	2051	2071
WSE	9.6	10.3	10.4	10.6	10.7
Midlands	4.3	4.7	4.8	4.9	5.1
South West	2.4	2.6	2.6	2.7	2.8
N England	6.6	7.0	7.1	7.3	7.5
Wales	1.4	1.4	1.4	1.4	1.4
Scotland	2.5	2.5	2.5	2.5	2.5
All Britain	26.8	28.5	28.8	29.4	30.0
		2011-	2020-	2031-	2051-
% change/year		20	31	51	71
WSE		0.86%	0.07%	0.08%	0.07%
Midlands		0.78%	0.20%	0.18%	0.17%
South West		0.92%	0.14%	0.16%	0.17%
N England		0.64%	0.11%	0.11%	0.12%
Wales		0.12%	0.04%	0.04%	0.05%
			-	-	
Scotland		0.10%	0.04%	0.02%	0.00%
All Britain		0.69%	0.10%	0.10%	0.10%

#### Figure 13 Scenario B: Polarisation of housing markets in the UK under low growth



# Table 12Scenario B: Continued Regional Recession - Changes in average dwellingrents

Dwelling rents (annualised £/unit in 2011 prices)									
	2011	2020	2031	2051	2071				
London & WSE	11,200	12,519	13,266	14,707	16,276				
Midlands	6,359	6,670	6,551	6,411	6,312				
South West	7,841	7,951	8,000	8,017	7,951				
N England	6,201	6,385	6,250	5,950	5,588				
Wales	4,839	5,100	5,099	5,042	4,909				
Scotland	5,519	5,813	5,742	5,574	5,319				
All Britain	8,027	8,687	8,898	9,296	9,701				
Average Earning	8,027	8,720	8,962	9,421	9,904				
% change/year		2011-20	2020-31	2031-51	2051-71				
London & WSE		0.56%	0.29%	0.52%	0.51%				
Midlands		0.24%	-0.09%	-0.11%	-0.08%				
South West		0.07%	0.03%	0.01%	-0.04%				
N England		0.15%	-0.11%	-0.25%	-0.31%				
Wales		0.26%	0.00%	-0.06%	-0.13%				
Scotland		0.26%	-0.06%	-0.15%	-0.23%				
All Britain		0.40%	0.12%	0.22%	0.21%				

#### 3.3 Scenario C: Slow Levelling-up

Scotland

All Britain

In Scenario C (Slow Levelling-up) there would be some redistribution of growth away from London and the south to address the growth pressures but at such a slow rate that the effects are negligible.

The lower growth would also require resources to be found to invest in transport and IT infrastructure under sustained very subdued market conditions. As a result, a scatter of the new jobs would be expected to fail to achieve the level of business agglomeration that would be required for innovation.

In a period of sustained low growth, even with regional development policies to stimulate convergence there would be limited impact on the overall balance of the economy. As a result, there would be a slow levelling-up of the UK with some redistribution of growth away from London and Wider South East to address the growth pressures but at a low rate.

Jobs								
(million)	1981*	1991*	2001	2011	2020	2031	2051	2071
London &								
WSE	7.6	8.7	9.9	11.2	12.8	12.7	12.3	11.9
Midlands	3.4	3.9	4.1	4.6	4.9	5.0	5.3	5.6
South West	1.6	2.0	2.3	2.5	2.7	2.7	2.9	3.0
N England	5.4	5.7	6.1	6.8	7.1	7.3	7.7	8.1
Wales	0.9	1.1	1.2	1.3	1.4	1.4	1.5	1.6
Scotland	2.1	2.1	2.3	2.5	2.5	2.6	2.7	2.9
All Britain	19.2	23.4	27.3	28.9	31.4	31.8	32.4	33.1
0/		1981-	1991-	2001-	2011-	2020-	2031-	2051-
% change/year	r	91	01	11	20	31	51	/1
		1 260/	1 210/	1 270/	1 / / 0/.	-	-	- 160/
WSE		1.30%	1.51%	1.2/%	1.44%	0.04%	0.15%	0.10%
Midlands		1.26%	0.64%	0.98%	0.85%	0.20%	0.26%	0.26%
South West		2.45%	1.27%	1.16%	0.62%	0.19%	0.26%	0.26%
N England		0.52%	0.60%	1.07%	0.57%	0.19%	0.26%	0.26%
Wales		1.36%	0.76%	1.41%	0.47%	0.19%	0.26%	0.26%

0.24% 1.04% 0.94%

# Table 13Scenario C: Slow Levelling-Up - Distribution of jobs by mega-region

0.17%

2.02% 1.53% 0.59% 0.93% 0.10% 0.10% 0.10%

0.18% 0.26%

0.26%

## Table 14 Scenario C: Slow Levelling-Up - Distribution of dwelling stock by mega-region

DWCIIIIg5					
(million)	2011	2020	2031	2051	2071
London & WSE	9.6	10.3	10.4	10.6	10.7
Midlands	4.3	4.7	4.8	4.9	5.1
South West	2.4	2.6	2.6	2.7	2.8
N England	6.6	7.0	7.1	7.3	7.5
Wales	1.4	1.4	1.4	1.4	1.4
Scotland	2.5	2.5	2.5	2.5	2.5
All Britain	26.8	28.5	28.8	29.4	30.0
		2011-	2020-	2031-	2051-
% change/year		20	31	51	71
% change/year London & WSE		<b>20</b> 0.86%	<b>31</b> 0.07%	<b>51</b> 0.08%	<b>71</b> 0.07%
% change/year London & WSE Midlands		<b>20</b> 0.86% 0.78%	<b>31</b> 0.07% 0.20%	<b>51</b> 0.08% 0.18%	<b>71</b> 0.07% 0.17%
% change/year London & WSE Midlands South West		<b>20</b> 0.86% 0.78% 0.92%	<b>31</b> 0.07% 0.20% 0.14%	<b>51</b> 0.08% 0.18% 0.16%	<b>71</b> 0.07% 0.17% 0.17%
% change/year London & WSE Midlands South West N England		20 0.86% 0.78% 0.92% 0.64%	<b>31</b> 0.07% 0.20% 0.14% 0.11%	<b>51</b> 0.08% 0.18% 0.16% 0.11%	<b>71</b> 0.07% 0.17% 0.17% 0.12%
% change/year London & WSE Midlands South West N England Wales		20 0.86% 0.78% 0.92% 0.64% 0.12%	<b>31</b> 0.07% 0.20% 0.14% 0.11% 0.04%	<b>51</b> 0.08% 0.18% 0.16% 0.11% 0.04%	<b>71</b> 0.07% 0.17% 0.17% 0.12% 0.05%
% change/year London & WSE Midlands South West N England Wales Scotland		20 0.86% 0.78% 0.92% 0.64% 0.12% 0.10%	<b>31</b> 0.07% 0.20% 0.14% 0.11% 0.04% -0.04%	51 0.08% 0.18% 0.16% 0.11% 0.04% -0.02%	<b>71</b> 0.07% 0.17% 0.12% 0.05% 0.00%

#### Figure 14

Slow Levelling-up: A gradually convergent growth pattern does affect the balance of growth, but the lower rates of overall growth constrain the resources available for major interventions



#### Table 15 Scenario C: Slow Levelling-Up - Changes in average dwelling rents by mega region

Dwelling rents (annualised £/unit in 2011 prices)									
	2011	2020	2031	2051	2071				
London & WSE	11,200	12,519	12,730	12,899	13,060				
Midlands	6,359	6,670	6,848	7,363	7,924				
South West	7,841	7,951	8,223	8,855	9,517				
N England	6,201	6,385	6,638	7,250	7,907				
Wales	4,839	5,100	5,330	5,878	6,470				
Scotland	5,519	5,813	6,119	6,849	7,641				
All Britain	8,027	8,687	8,913	9,352	9,813				
Average Earnings	8,027	8,720	8,962	9,421	9,904				
% change/year		2011-20	2020-31	2031-51	2051-71				
London & WSE		0.56%	0.08%	0.07%	0.06%				
Midlands		0.24%	0.13%	0.36%	0.37%				
South West		0.07%	0.17%	0.37%	0.36%				
N England		0.15%	0.19%	0.44%	0.44%				
Wales		0.26%	0.22%	0.49%	0.48%				
Scotland		0.26%	0.26%	0.57%	0.55%				
All Britain		0.40%	0.13%	0.24%	0.24%				

#### **3.4 Scenario D: Dynamic Recovery**

In Scenario D (Dynamic Recovery) an increasingly more convergent spread of growth would ease growth pressures in London and the South, and increase economic performance in the rest of the UK, reducing patterns of inequality and skills gaps. New jobs, linked to higher incomes and productivity, would be created outside the London and the South first in growth hubs, and then spread from there to the wider region.

Higher levels of growth would be expected to result in dynamic recovery of the UK despite the COVID-19 shock. This would be reflected in a more spread of growth easing excessive growth pressures in London and Wider South East and increasing local economic performance in the rest of the UK and reducing the patterns of inequality and skills gap across the nations and regions of the UK.

Dynamic Recovery also implies a demand for new jobs, linked to higher incomes associated productivity levels, through the creation and expansion of new growth hubs outside the London and the Wider South East (the centres of excellence for example referred to in the UK2070 Final Report). To use an analogy, the economy moves from flying with one big, highly strained engine to an economy which is driven by multiple and distributed engines, increasing the overall capacity, performance and resilience to risk.

Jobs								
(million) London &	1981*	1991*	2001	2011	2020	2031	2051	2071
WSE	7.6	8.7	9.9	11.2	12.8	13.3	14.2	15.0
Midlands	3.4	3.9	4.1	4.6	4.9	5.3	6.1	7.0
South West	1.6	2.0	2.3	2.5	2.7	2.9	3.3	3.8
N England	5.4	5.7	6.1	6.8	7.1	7.6	8.8	10.1
Wales	0.9	1.1	1.2	1.3	1.4	1.5	1.7	2.0
Scotland	2.1	2.1	2.3	2.5	2.5	2.7	3.1	3.6
All Britain	19.2	23.4	27.3	28.9	31.4	33.4	37.2	41.6
% change/year London &		1981- 91	1991- 01	2001- 11	2011- 20	2020- 31	2031- 51	2051- 71
WSE		1.36%	1.31%	1.27%	1.44%	0.41%	0.30%	0.29%
Midlands		1.26%	0.64%	0.98%	0.85%	0.65%	0.71%	0.71%
South West		2.45%	1.27%	1.16%	0.62%	0.64%	0.71%	0.71%
N England		0.52%	0.60%	1.07%	0.57%	0.64%	0.71%	0.71%
Wales		1.36%	0.76%	1.41%	0.47%	0.64%	0.71%	0.71%
		-						
Scotland		0.24%	1.04%	0.94%	0.1/%	0.63%	0./1%	0./1%
All Britain		2.02%	1.53%	0.59%	0.93%	0.55%	0.55%	0.55%

## Table 16Scenario D: Dynamic Recovery - Distribution of jobs by mega-region

## Table 17 Scenario D: Dynamic Recovery - Distribution of dwelling stock by mega-region

Dwellings					
(million)	2011	2020	2031	2051	2071
London & WSE	9.6	10.3	11.0	12.2	13.5
Midlands	4.3	4.7	5.0	5.7	6.4
South West	2.4	2.6	2.8	3.1	3.5
N England	6.6	7.0	7.5	8.4	9.4
Wales	1.4	1.4	1.5	1.6	1.8
Scotland	2.5	2.5	2.6	2.8	3.1
All Britain	26.8	28.5	30.3	33.8	37.7
		2011-	2020-	2031-	2051-
% change/year		20	31	51	71
London & WSE		0.86%	0.52%	0.53%	0.52%
Midlands		0.78%	0.66%	0.63%	0.62%
South West		0.92%	0.59%	0.61%	0.62%
N England		0.64%	0.56%	0.56%	0.57%
Wales		0.12%	0.49%	0.49%	0.50%
Scotland		0.10%	0.41%	0.43%	0.45%
All Britain		0.69%	0.55%	0.55%	0.55%

#### Figure 15 Scenario D: Dynamic Recovery: A rapid convergent growth pattern creating more balanced growth



# Table 18Scenario D: Dynamic Recovery - Changes in average dwelling rents by megaregion

Dwelling rents (annualised £/unit in 2011 prices)								
	2011	2020	2031	2051	2071			
London & WSE	11,200	12,519	14,060	16,762	22,045			
Midlands	6,359	6,670	7,570	9,593	13,479			
South West	7,841	7,951	9,087	11,522	16,179			
N England	6,201	6,385	7,337	9,438	13,491			
Wales	4,839	5,100	5,899	7,679	11,236			
Scotland	5,519	5,813	6,768	8 <i>,</i> 935	12,999			
All Britain	8,027	8,687	9,849	12,167	16,653			
Average Earnings <sup>-</sup>	8,027	8,720	9,327	11,550	15,806			
% change/year		2011-20	2020-31	2031-51	2051-71			
London & WSE		0.56%	0.58%	0.88%	1.38%			
Midlands		0.24%	0.64%	1.19%	1.72%			
South West		0.07%	0.67%	1.19%	1.71%			
N England		0.15%	0.70%	1.27%	1.80%			
Wales		0.26%	0.73%	1.33%	1.92%			
Scotland		0.26%	0.76%	1.40%	1.89%			
All Britain		0.40%	0.63%	1.06%	1.58%			

#### Figure 16

## The most stark comparison of dwelling rent patterns is between Scenario B and D



'Continued Regional Recession'

'Dynamic Recovery'

### 4. Wider impacts: effects on productivity

A long term, gradual reconfiguration of the jobs, along with a rise in the higher skilled jobs, would create many more highly dense areas at a density of central London, Birmingham, Manchester, Edinburgh and Glasgow. This raises the effective economic density (which can be understood as the level of economic mass), and according to HM Treasury and DfT transport project assessment guidance, this increase in effective economic density and mass raises per job productivity through urban agglomeration effects.

The increase in per job productivity under modest population growth is important, because it generates the wealth and taxes to pay for major infrastructure investment. The reconfiguration of jobs and housing growth also makes better use of the environmental capacity of the UK regions and countries, which would ensure more sustainable longer-term development.



#### Figure 17 Distribution of the density of higher skilled workers: 2071 vs 2011

2071 Dynamic Recovery Scenario

Figure 18 tells the story of productivity effects through the following:

(1) the historic trends of 1960-2007 when per job productivity grew by 2.2% a year

(2) the trends of 2010-2019 which saw average growth of 0.6% a year (but the 2007-2020 (Q1) average was 0.04% a year)

(3) the black line, which divides areas A and B, indicates the trajectory of the Dynamic Recovery Scenario: according to the assumptions for this scenario, the target for per job productivity is for it to rise gradually from 0.5% per year in 2021 to 2.95% in 2070; If there is more progress made in the 2030s, the UK could make up more loss from the current crisis, and the path to 2070 would become less steep

(4) In other words, the Dynamic Recovery scenario represents a lower growth trajectory than the pre-COVID the High Growth upper bound, which was expecting a 1.8% a year continuous growth; Area A is a theoretical loss from COVID-19.

(5) How does the Dynamic Recovery scenario target compare with the growth that we are likely to generate from the reconfigured economic activities and transport improvements? Area D in Figure 18 shows that the effective economic density effects from the reconfigured economic activities and transport improvements would generate up to 1.7% of productivity growth per year by 2071. Table 19 traces through this contribution over the years, and shows that this part of the contribution account for 100% in 2021 (because local transport improvements could bring an immediate productivity effect) and its share gradually declines to 39% by 2071 even though the magnitude of the effect grows – the decline in the share of contribution is simply because effects from skills and other policies pick up

(6) The increase in the share of higher skilled jobs would generate an additional productivity uplift which starts from a 6% share in the total productivity contribution in 2031 to 27% in 2071

(7) The combined effects of spatial planning and skills would not by themselves reach the productivity targets for this scenario – additional productivity gains need to be generated in wider policy areas, e.g. through the promotion of AI technology, business management, market competition, etc. This would account for between 42% in 2031 to 34% in 2071 of the total contribution.

#### Figure 18 Agglomeration effects from spatial reconfiguration of jobs and transport improvements: a comparison with the historic trends and scenarios of productivity growth



Additional productivity uplift as a result of the share of high skilled jobs rising from 17% in Productivity uplift increases up to 1.7% a year by 2070 as the

Sources: 1960-2020 (Q1): ONS output per filled job of the whole UK economy; 2020 (Q1) – 2070: UK2070 Futures scenario tests

## Table 19Per Person Productivity Levels 2020-2071: A Comparison among Scenarios

	2020 Q1	2021	2031	2041	2051	2061	2071
Productivity levels in percentage indicies (2020 Q1 = 100)							
Low Growth Scenario	100.0	100.5	105.6	111.0	116.7	122.7	129.0
Pre-COVID High Growth Scenario	100.0	101.8	121.7	145.4	173.9	207.8	248.4
Dynamic Recovery Scenario	100.0	100.6	109.0	124.0	147.8	184.7	248.4
Differences among scenarios							
Theoretical loss: compared with Pre-COVID High Growth	0.00	1.25	12.6	21.4	26.0	23.1	0.0
Growth over and above the Low Growth Scenario	0.00	0.05	3.4	13.0	31.1	62.1	119.5
Contribution from spatial planning	0.00	0.05	1.7	6.2	14.2	27.0	46.2
Contribution from up-skilling	0.00	0.00	0.2	1.4	4.9	13.5	32.5
Contriubtion that needs to come from other policy areas	0.00	0.00	1.4	5.4	12.0	21.5	40.7
Contribution from all policy areas	0.00	0.05	3.4	13.0	31.1	62.1	119.5
Percentage share of contributions (%)							
Contribution from spatial planning		100%	51%	48%	46%	44%	39%
Contribution from up-skilling		0%	6%	11%	16%	22%	27%
Contribution that needs to come from other policy areas		0%	42%	42%	39%	35%	34%
Contribution from all policy areas		100%	100%	100%	100%	100%	100%

Convergent high growth would imply not only raised incomes, but also better social inclusion. Through the creation and expansion of new growth areas outside London and the WSE the level of social deprivation would also reduce (see Figure 19).

In a manner of speaking, this is like to move from flying with one big, highly strained engine (London and the South East) to multiple and distributed engines. This would still allow London and WSE to grow sustainably, and at the same time increase the overall capacity for growth. This would significantly enhance the productivity performance of the UK, and ensure better resilience. Similarly, it can be compared refitting the navy with a dependency on a single flagship with limited support vessels to a high-performance complementary fleet with capacity and flexibility to respond to multiple tasks.

#### Figure 19 Modelled income and employment deprivation levels: a comparison of the 2020 Base Condition with the 2031, 2051 and 2071 Dynamic Recovery Scenario



Index of income and jobs deprivation 2017-2019

 % rank (2017-2019)

 0.0 - 12.5%

 12.5 - 25.0%

 25.0 - 37.5%

 37.5 - 50.0%

 62.5 - 75.0%

 62.5 - 75.0%

 > 87.5%





Sterner ME



2031 Dynamic Recovery

2051 Dynamic Recovery

2071 Dynamic Recovery

## 4. Conclusions

The new scenario analyses set out in this report update its previous research for the UK2070 Commission, in order to:

- o Test rates of recovery under far more challenging economic conditions the scenarios tested include on the one hand, the possibility of protracted low growth over many years and on the other, a dynamic recovery that continuously builds its own momentum;
- o Investigate the policy implications of 'levelling-up' across the UK in terms of the distribution of economic activities, jobs, housing, population, skills and infrastructure in real and physical geography;
- o Test the roles of local improvements that are currently being made in a dynamic recovery;
- o Test the effects of investments upon all communities, not just national capitals and big cities; and
- o Take account of potentially changing business practices and leisure preferences.

Given a potential resurgence of the coronavirus pandemic and Brexit negotiations, it makes little sense to predict in any way the UK's short and medium-term economic outlook. Instead, we consider a wide range of longer-term eventualities. Also, if one stands back and looks beyond the immediate event horizons, there are still many longer term, steady trends which will continue to shape in a fundamental way the growth and development in the UK's constituent countries and regions.

Our scenario design starts from the emerging trend of global population stabilisation: as urbanisation sweeps through the globe, the rates of population growth have reduced markedly. In another generation, this stabilisation is expected to occur in countries currently undergoing rapid urbanisation, just like what has already happened to a large number of urbanised nations. This implies that we are witnessing the start of a new, urbanised world where improvements in environmental sustainability, wealth and quality of life have to be increasingly driven by a continued rise in per person productivity, or through attracting migrants from poorer, more disadvantaged countries and regions.

The current trends in productivity do not bode well. Even the most prosperous parts of the UK have not seen any rise in average per person productivity since 2007. This means that a big jolt in policy interventions may be needed to relaunch the UK onto a sustainable growth trajectory.

In the aftermath of the COVID-19 pandemic, it does not make sense (and at any rate, would have little chance) to design this big policy jolt purely on the basis of a large sum of borrowed cash. This is in spite of the fact that interests are likely to stay low for some considerable period and borrowing to invest in highly productive ventures is justifiable. Would the current system with flat-lining productivity respond well to an ad hoc cash injection that has no guarantee to sustain itself over time? Instead, this report follows the tradition of spatial planning that was established more than a century ago in the UK, and considers what has made its prosperous areas productive since the Victorian times. In particular, it examines how those areas can raise productivity faster and spread this growth momentum to all countries and regions in the UK.

Out of a large number of alternative options considered, this report is focused on four distinct spatial planning scenarios that demonstrate that the differences in policy outcomes between them could imply making or breaking the UK. The central idea that emerges from the scenario work is that a regional reconfiguration of jobs, housing and transport, making use of the essential endowment and resources already present in the countries and regions, would not only increase average per person productivity, but also establish new engines of growth and prosperity outside London and the Wider South East.

The differences in productivity growth that arise from the readjustments to the spatial layout of growth and transport connections, when assessed with HM Treasury and DfT agglomeration elasticities, show the potential to increase longer term average per person productivity by 1.7% per year for the UK as a whole, and more than 3% per year for knowledge-based sectors. This contribution through spatial planning, when coordinated with a forward-looking future jobs programme and wider policies, could thus raise UK's GDP growth from well below 1% today to more than 3% longer term.

All the usual caveats apply in terms of prediction uncertainties, of course, but the scenario work reported here helps work out what smaller scale, local but persistent interventions would be needed alongside big jolts in policy and investment, and how to package coherent programmes of action. The significance of those programmes would ultimately determine the overall potential for the UK's environmental sustainability, wealth and quality of life, and whether the UK's constituent parts could prosper together or diverge in their separate ways.

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### 6. Study Team, Acknowledgements and Disclaimers

The Study Team for this work comes from the Cities and Transport Research Group, within the Martin Centre for Architectural and Urban Studies, Dept of Architecture, University of Cambridge.

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The usual disclaimers apply and the Study Team is solely responsible for the model analyses, views expressed and any remaining errors.