The University Of Sheffield.

Crook Public Service Fellowship & the UK2070 Commission January 2022

Measuring, monitoring, and improving the resilience of places to economic shocks across the UK

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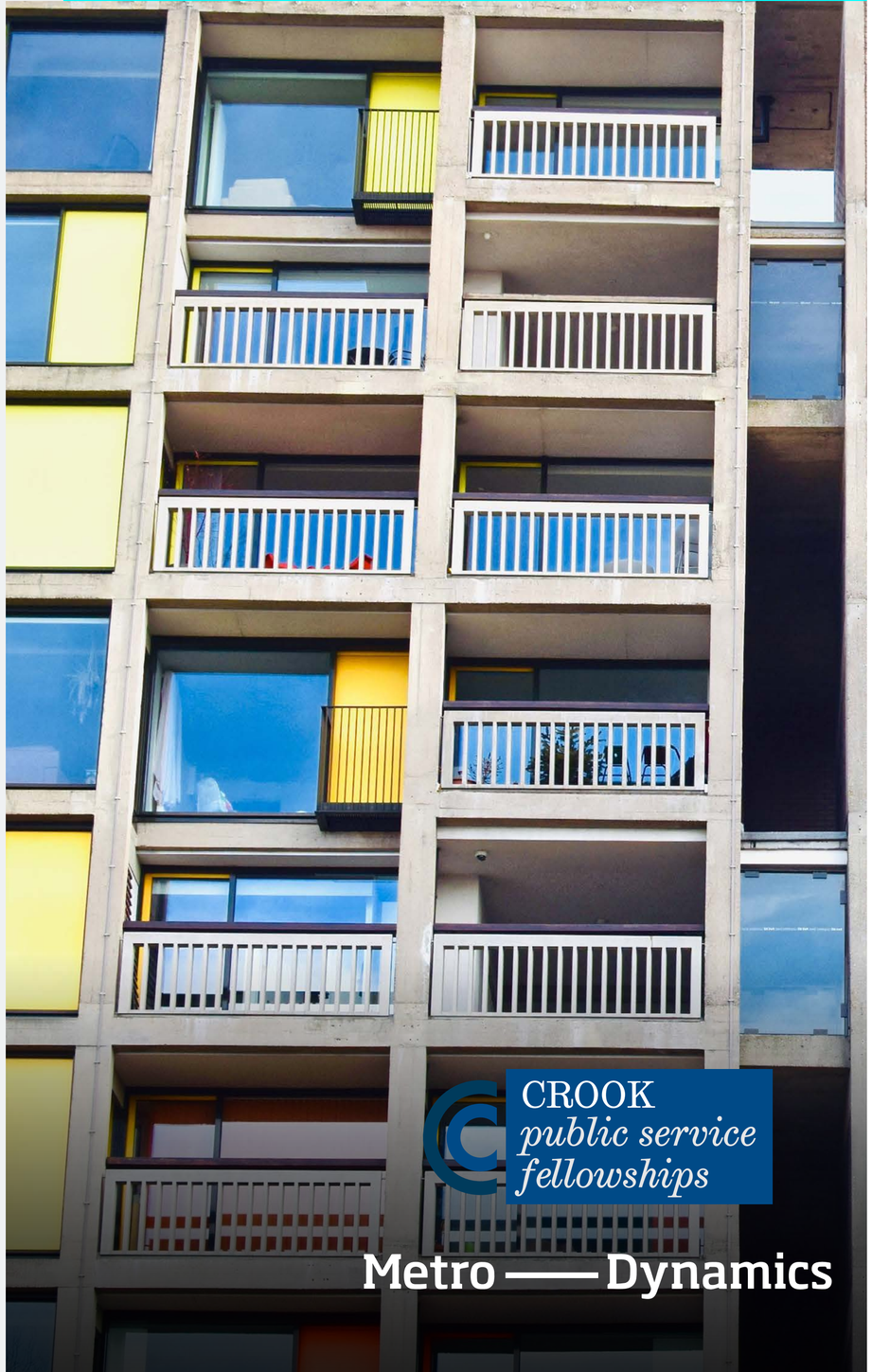


In recent years there has been growing academic and policy interest in the ability of local and national economies to respond to major shocks such as the 2008 global recession or the COVID pandemic. However, assessing – and quantifying - the capacity for resilience before a shock happens is a significant research challenge.

The following paper explores how the concept of resilience might be used to help anticipate the divergent pathways of different places in the UK to economic shocks in order to monitor and improve resilience planning.

The paper makes three main recommendations: 1) that before the next shock arrives, local authorities should lead regular stress-testing exercises, publishing the results of where they are most vulnerable, 2) during a shock, we need authorities to publish local-level real-time economic data to identify quickly which areas have been hit hardest; and 3) that after the shock, policymakers should continue to give special support to these areas (such as a local-level furlough scheme), even as national metrics suggest a recovery is underway.

This paper is prepared in partnership with the UK Commission 2070 –which was set up in 2019 to focus on addressing spatial inequality within the UK over the next fifty years. As this paper shall argue, regional resilience is a vital part of this mission.

Introduction: the pitfalls of measuring resilience

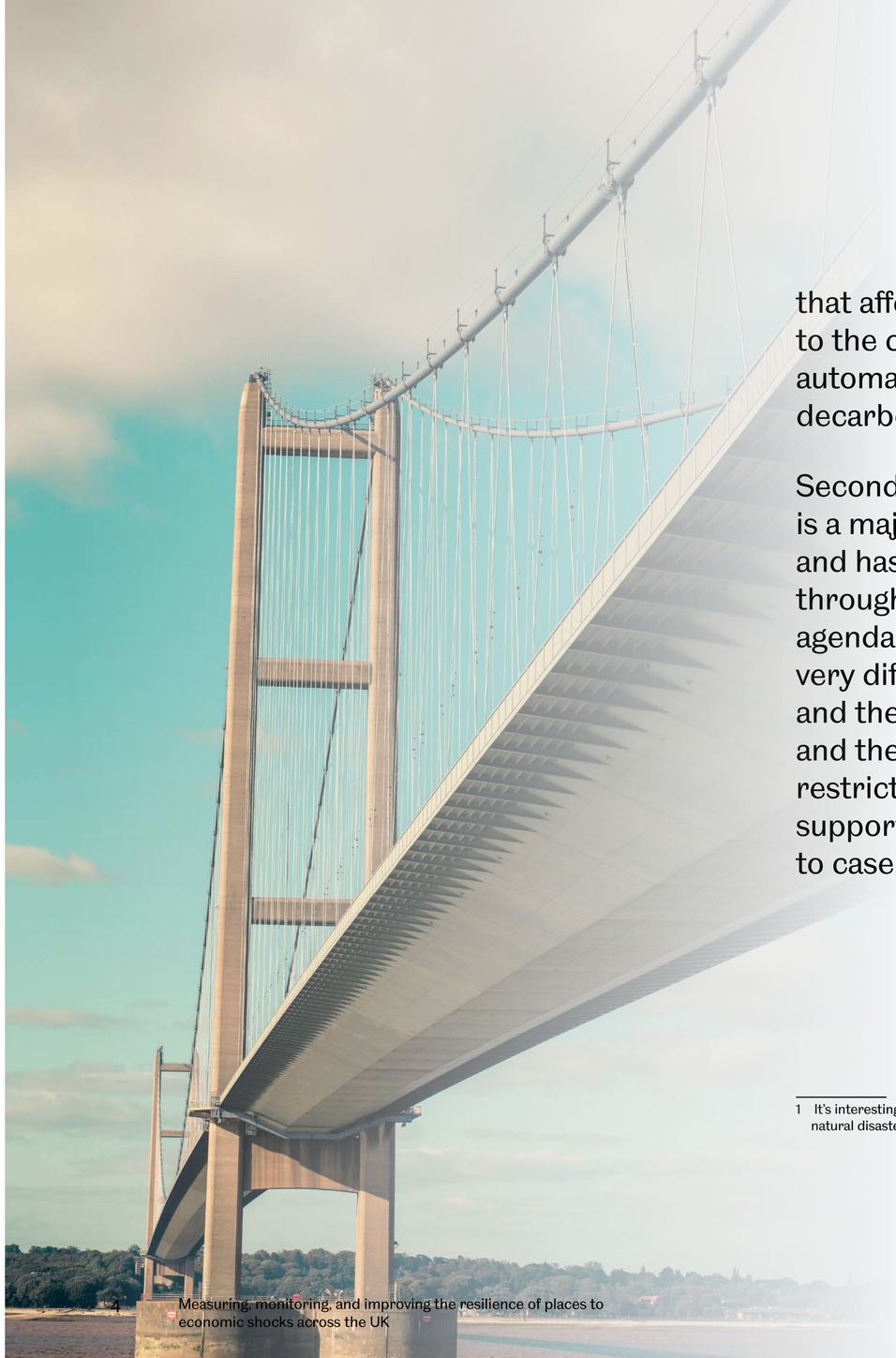
In May 2008, the United Nations University World Institute for Development Economics Research published a paper entitled “Economic Vulnerability and Resilience: Concepts and Measurements” (Briguglio et al., 2008). Against a backdrop of a worsening financial crisis, the Institute introduced a resilience index measure to understand the vulnerability of countries to an economic shock. It was comprised of four domains: macroeconomic stability, microeconomic efficiency, quality of governance, and social development.

Iceland topped the index, as the world’s most resilient country, performing well across all metrics. Ireland also performed well – ranked second in the world for macroeconomic stability. Yet five months later Iceland was plunged into economic chaos as its major banks collapsed and were taken into public ownership. The crisis in Ireland was of such severity that the country was compelled to apply to the International Monetary Fund for support.

How could a respected institution with a good grasp of the data get it so wrong such a short time before large crashes in both countries? The methodology was valid, but the index didn’t include the quantum or type of debt held by financial institutions – which, given the nature of the crisis, turned out to be a major omission. Similarly, we could easily imagine that, had a resilience index of nations been composed at the end of 2019, it would have been unlikely to include a category for pandemic readiness. This is a cautionary tale, warning us how hard it is to gauge the resilience of places to economic shocks before they happen.

Nonetheless, there are good reasons to want to understand, and quantify, resilience – particularly, for the Commission 2070’s purposes, the resilience of places *within* the UK.

Firstly, at time of writing, the UK is in the midst of a major global economic shock, brought about by the Covid-19 pandemic. In the UK there is the further economic shock caused by the adjustment of trading relations with the European Union. It is natural to question the ability of local economies to react and respond to these events, and to wonder which places in the UK have been, or will be, most affected. Moreover, COVID-19 and Brexit have brought to the fore a range of longer term structural adjustments



that affect local economies in relation to the challenges and opportunities of automation, the decline of retail and decarbonisation.

Secondly, in the UK, regional inequality is a major concern for policymakers and has been given political prominence through the government's "levelling up" agenda. The pandemic has already had very different impacts – on both health and the economy – in different places, and the Government has applied varying restrictions and levels of economic support across the country in response to case rates.

Thirdly, there is a view that economic shocks are becoming, or are likely to become, more regular events. We don't yet have the evidence to show this conclusively – in fact, the current recession was preceded by a long (albeit slow) period of growth. But the scale of the shock – the biggest recession in centuries – has shown the potential for quickly escalating crises which inflict major economic trauma. Environmental devastation – itself a possible causal factor in this crisis – may be in a future a major source of economic shocks[1]. A step-change in the pace of automation has the potential to displace large amounts of labour.

1 It's interesting to note that, at the start of 2020, all five of the World Economics Forum's top 5 global risks in terms of likelihood were environmental: extreme weather, climate action failure, natural disasters, biodiversity loss, and human-made environmental disasters (World Economic Forum, 2020).

Why does resilience matter for spatial inequality?

A look at the evidence from UK history shows that the impact of economic shocks is not uniform. Recessions in the 1980s resulted in much higher increases in unemployment in regions with large manufacturing clusters (which in England tended to be in the North and the Midlands). The South was hit particularly hard in the early 1990s recession. And recovery from the 2008 financial crisis has also been very uneven.

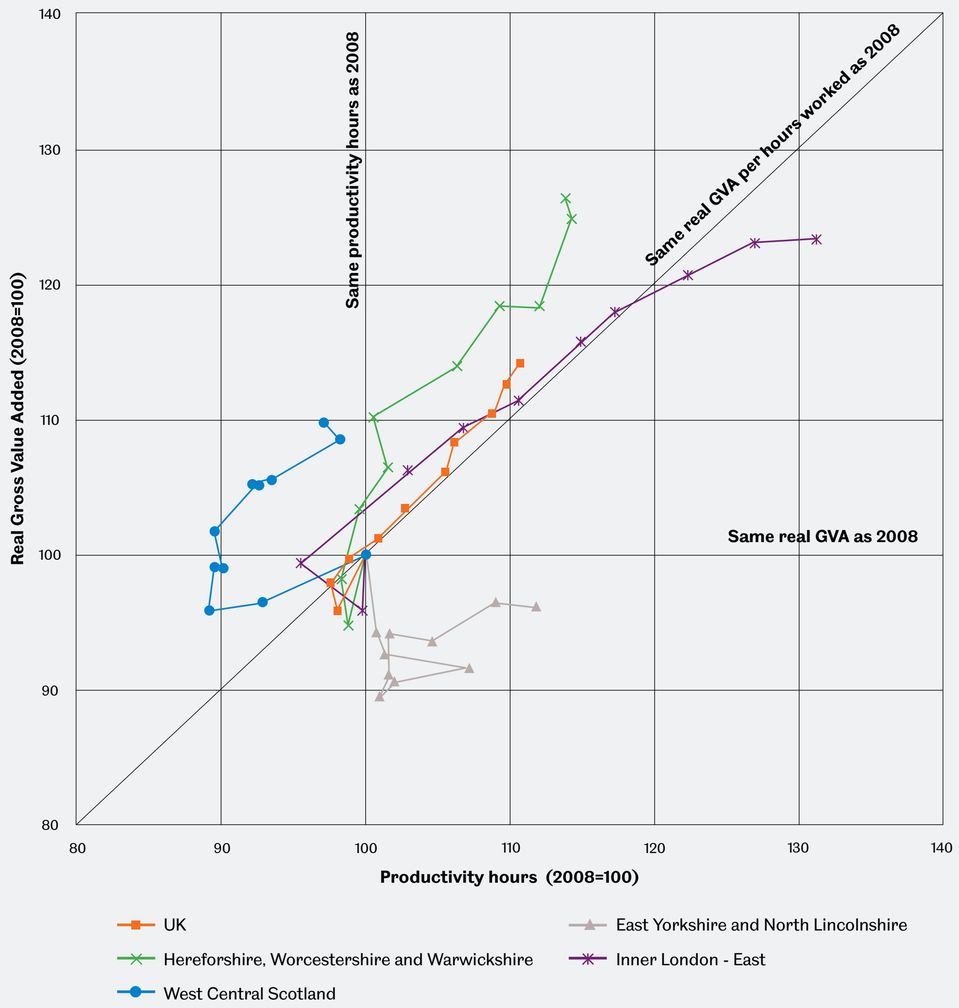
Figure 1 shows the path that the UK, and selected (NUTS2) regions have taken since 2008. The output of places (expressed by real Gross Value Added, GVA) and the amount of productive hours worked have been rebased to 100 in 2008 for all places. The chart then has every year marked, connected by a line, up until 2018 (the last point on each area's "path" from 2008).

The national picture is that output fell in 2009, then grew consistently, passing 2008 levels in 2012. By 2018, output was 14.2% higher than in 2008, while the amount of hours worked was 10.7% higher – indicating a small productivity improvement (shown by the final position being above the diagonal line).

This national story, however, conceals a large degree of regional variation. For instance, Herefordshire, Worcestershire and Warwickshire have experienced strong output growth of 26.4%. Both the hours of work done, and the productivity of those hours have increased. Inner London East has also grown its output by over 20% – but the number of hours worked has grown even more. However, other areas have faced much more of a challenge in their recovery. West Central Scotland (an area centred on Glasgow) still has fewer hours worked than in

2008 – suggesting a legacy effect of unemployment or underemployment. Meanwhile the East Yorkshire and North Lincolnshire area has performed badly – though the number of hours worked never fell, and in fact grew by 11.8% over the period, output fell by 3.8%, a picture which is consistent with a shift towards low-value "gig economy" work.

Figure 1. Real GVA output and hours worked in selected NUTS2 regions between 2008 and 2018



Source: Analysis of ONS Business Register and Employment Survey and ONS Regional Accounts

This finding aligns with comments from Ron Martin, who has developed much of the literature around regional economic resilience: “Not only may regional variations in the depth of recessionary contraction create spatial inequalities in the negative consequences for employment, household incomes and welfare, there is the possibility that *such effects may not be merely transitory, to be eliminated during the subsequent recovery phase, but prove to have longer-lasting repercussions*... the ‘memory of recession’ may linger much longer in some regions than in others.” (Martin et al., 2016)

What are the mechanisms by which these effects may linger longer in some places? Most notably, unemployment can cause scarring effects, as people lose skills, and may be unable to transition into new jobs and sectors in the absence of training. The underlying strength of some local economies may allow them to quickly generate new jobs, after a recession while others may find that if major local employers collapse, there is no-one else looking to take their place.

If the recovery from previous shocks has been so variable, then we shouldn’t be surprised if the present shock has asymmetric outcomes over the coming years. As Overman puts it: “The economic crisis caused by COVID-19 will play out unequally across areas.” (Overman, 2020). Already high levels of spatial inequality could be exacerbated if less prosperous areas are more negatively affected, with a longer hangover from the shock. Having an understanding *now* of how resilient places are, and therefore how much and what type of support they need, will be vital to guarding against growing spatial inequality. To summarise: if a place is not resilient *now* to the current economic shock, it may suffer the after-effects long after the shock is past.

How should we define resilience?

We might first ask, how helpful is the term “resilience” in this context? Its major advantage is its common usage, helping people quickly grasp the broad economic concept described. It is almost always used in reference to a negative change or event, with the implication that the resilient entity (typically a person) performs well in the circumstances.

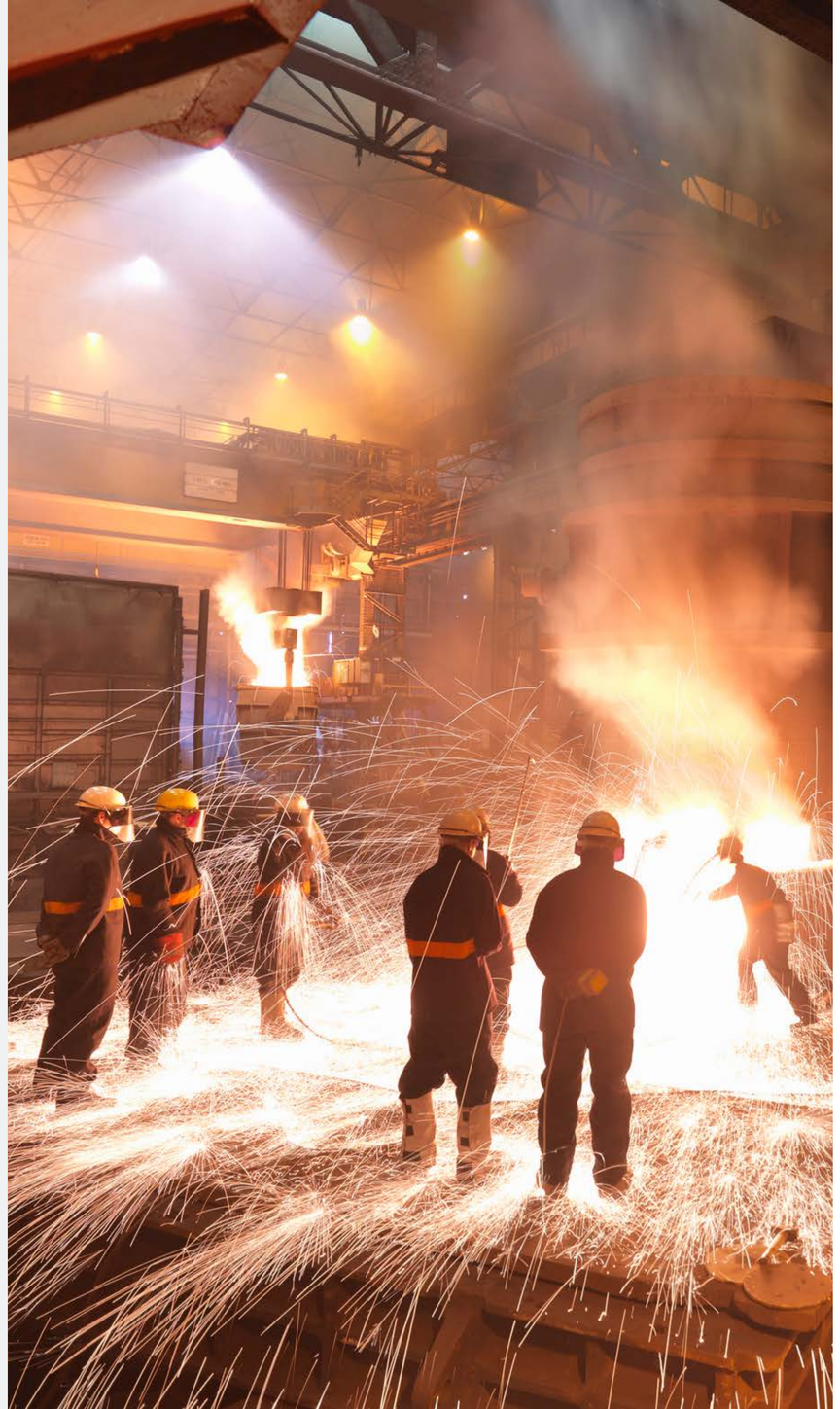
However, what “resilience” provides in terms of accessibility, it lacks in terms of specificity. For example, the Oxford English Dictionary defines resilience as: “The quality or fact of being able to recover quickly or easily from, or resist being affected by, a misfortune, shock, illness, etc.; robustness; adaptability.” This suggests “resilience” can mean:

1. That a negative impact is not felt, or not greatly felt, in the first place (“resist being affected by”, “robustness”); or,

2. That despite the impact being felt, it is moved on from quickly (“being able to recover quickly or easily”); or,

3. That the resilient entity is able to change appropriately in response to the impact (“adaptability”)[2].

Applying these three definitions to an economy undergoing a demand-side shock, this could mean in the first sense that the economy doesn’t see a big rise in unemployment; in the second that though there may be additional unemployment it is quickly reabsorbed; or in the third that the sector mix of the economy can adapt to a new equilibrium in response.



2 These three approaches broadly correspond to the three interpretations highlighted in Martin (2012) – engineering, ecological, and adaptive

In summary, “resilience” is probably a necessary, but on its own insufficient, term to capture how a place is likely to respond to a shock. The corresponding idea of **vulnerability** may be helpful to pinpoint more precisely the ways in which a place is *not* resilient, or the similar, but perhaps more specific, concept of **exposure**. For example, an economy could be resilient in one sense by having a broad range of sectors, meaning that there is little prospect of a sector-specific shock hitting output and employment particularly hard. But on the other hand, the majority of its exports are to one particular trading partner, making it vulnerable. A decline in the economy of the trading partner will have a significant impact. Therefore, it is exposed in one way, but not another. The broad concept of resilience does not capture this nuance.

It is also important to develop a language to describe how economies may change for the better or worse in response to a shock. At a sector level, the distinction between **adaptation** and **adaptability** has been proposed (Xiao, Boschma, Andersson, 2018), where adaptation means change within current sector specialisms, and adaptability means an ability to move between sectors. More resilient regions are those which are able to successfully navigate the trade-off between these two. We might propose an additional concept of **agility**, which summarises the ability of an economy to move as appropriate, be that within sectors, or between them.

Can we measure resilience, and if so, how?

Much of the analysis around resilience takes **sectors** as the starting point. Economic shocks often affect certain sectors more than others, and simplistic analyses focus on the size of relevant sectors within places. Sector data can also be used to develop more advanced concepts, such as **related variety**, which looks at the presence of closely associated sectors, and has been shown to be associated with resilience by Frenken K., Van Oort F. and Verburg T. (2007). They also find that **unrelated variety**, which captures the diversity of sectors, has similarly been shown to prevent increases in unemployment during a shock.

There are other reasons for building sector considerations into our understanding at the present time. With Covid-19, the impact of lockdown has been very sector specific. Those which depend on more human contact have been shut down. We can see that from widely differing rates of furloughing – 61% in the Arts, Entertainment, and Recreation sector vs. 30% in the Information and Communications sector at the end of July 2020 (HMRC, 2020). Government policy on restrictions throughout 2020 has also been sector-based, with hospitality one of the first to close, then in-person retail, and lastly education. Similarly, with the exit from the European Union, the impact again is likely to be different across sectors – some sectors, notably manufacturing, are much more dependent on imports and exports, and therefore will be more impacted by changes in trading conditions.

The other, practical, benefit of measuring resilience through sectors is that we have relatively good sector data for places. The ONS Business Register and Employment Survey (BRES) shows sector employment at a very low level (Lower super output area – LSOA – which contain between 1,000 and 3,000 residents). Business counts data is similarly granular. Gross Value Added (GVA) data is published for broad sectors at a local authority level, allowing approaches which take national sector projections and apply to local places using employment share analysis. For example, in the first lockdown of Spring 2020, the Centre for Progressive Policy took Office for Budget Responsibility sector projections and multiplied the impact by the local sector shares of GVA to get overall impact (Norman, 2020).

There are, however, some key drawbacks in using sectors – and we should be wary of leaning too much on sector analysis to understand present levels of resilience:

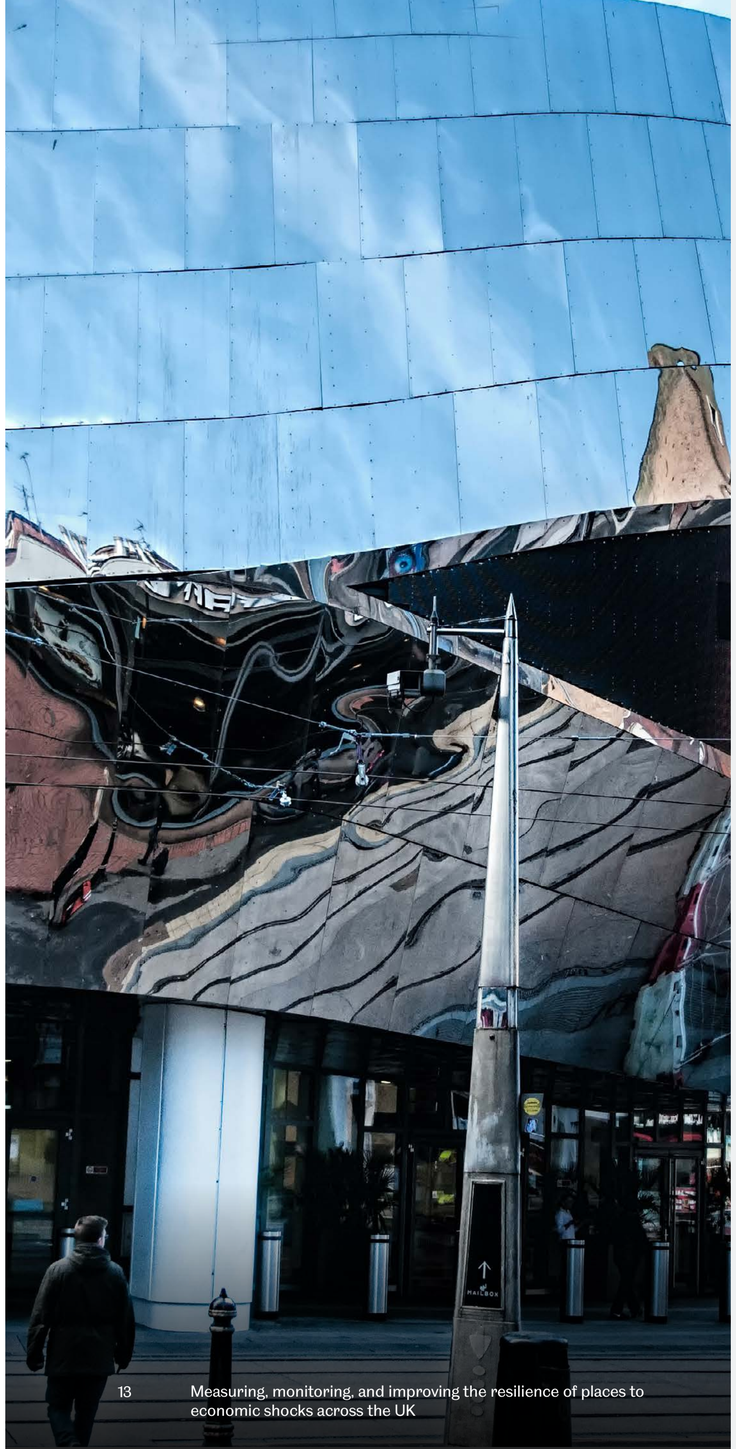
1. **In general, places in the UK are becoming more homogenous in terms of sector mix.** Martin et al (2017) find that, with the one exception of Slough, every city in the UK has become less specialised relative to the UK between 1971 and 2014[3], and that this effect has been stronger in places which were more specialised to begin with. Nonetheless, this has happened despite high and rising levels of regional inequality. Sector mixes have become more generic; economic outcomes haven't. This suggests that sectors alone may not be good predictors of what will happen in places.
2. **It's hard to know which sectors matter most.** At the start of the financial crisis worse outcomes might have been predicted for areas where that sector was concentrated. However, 43.6% of the UK's financial and insurance sector by value was concentrated in the Inner London NUTS2 area in 2008, and in terms of output those areas have recovered strongly (see the Inner London East line on Figure 1 – this area contains the Docklands financial district). Similarly, at the start of a Covid crisis we might focus on "locked down" sectors – such as retail, hospitality etc. But longer-term impacts might be felt in different sectors, perhaps those with longer supply chains which will find it harder to scale up activity again.

3 As measured by a change in the Krugman index. See Figure 8.

3. **Larger companies have offices in multiple places, and within those there is evidence of functional specialisation.** Roles within different sectors may be becoming more location-specific, suggesting that the nationwide impact on a sector as a whole will not translate straightforwardly into an impact on a place. Markusen and Venables find that "Lower fragmentation costs cause cities to move from sectoral specialization to functional specialization" (Markusen and Venables, 2013). Furthermore, the impact on firms may be very variable even within sectors. Lastly, the Standard Industrial Classification (SIC) sectors do not necessarily capture relatedness very well, as sectors with closely related skills are often far apart in traditional classifications (Neffke and Henning, 2013).

Additional characteristics which seem to be important are the structure of networks within the area, and institutions (Boschma, 2014). Networks are undoubtedly important to places – for example the success of Cambridge has rested in large part on the embeddedness of financial and academic actors within the system, allowing the city to capitalise on successive waves of technological development. Democratic institutions have broadly similar setups across the country – though note the emergence of local mayors in areas of England, who have the ability to exercise hard and soft power in creating a consensus for action among key actors in times of crisis. Measures of funding for institutions may be helpful – but on their own do not tell us enough about how able local institutions are to contribute to local resilience.

To summarise, sectors and other measures may give an indication of resilience, but prior to a crisis we are unlikely to ever have a comprehensive view of the resilience of places. That does not mean, however, that there aren't actions we can take.



How can we build local resilience into policymaking?

To bring this material together and develop policy proposals, we adopt a focus on three time horizons: pre-shock, during shock, and post-shock.

Before the shock: Develop a stress-testing culture to prioritise resilience over efficiency

Following the financial crisis of 2008, the Bank of England introduced annual stress testing to gauge how well financial institutions could cope with large economic shocks. The test for 2019 included a "global recession, with world GDP growth falling by more than in the financial crisis."[4] The findings give the Bank power to increase capital requirements of financial institutions. This approach is a conscious decision to prioritise resilience over efficiency – banks could be more profitable in the short term if they were able to lend more relative to their capital stock. It appears to have paid off: in the current crisis banks have been a stabilising element in the system, offering mortgage holidays to millions of customers and large loans to business, without themselves becoming compromised.

To build the resilience of places, a local-level stress-testing model should be adopted once the current crisis has passed. This would be carried out by local authorities (or Combined Authorities) working with major local institutions (hospital trusts, universities, LEPs), using a common template, alongside officials from central government departments.

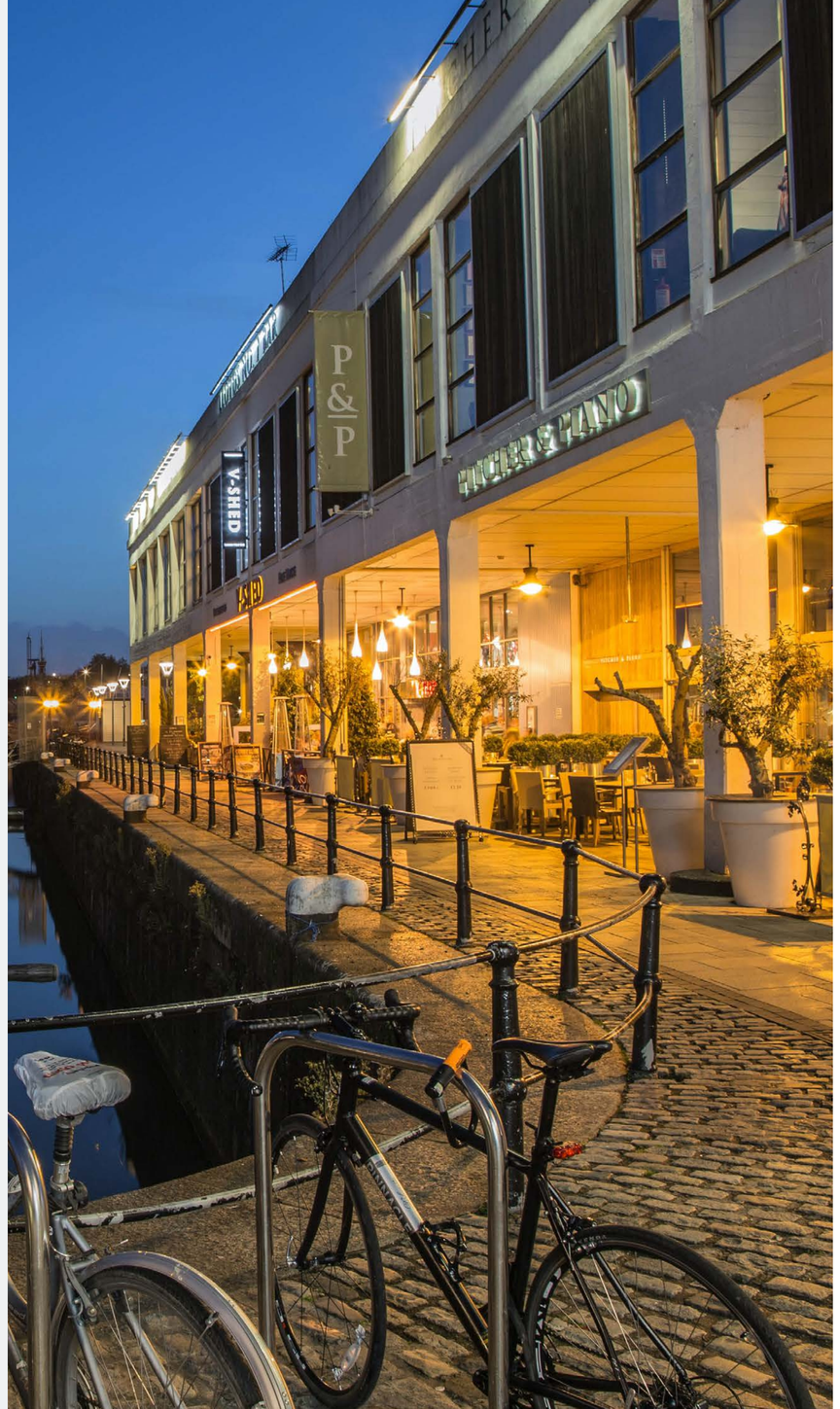
4 https://www.bankofengland.co.uk/-/media/boe/files/stress-testing/2019/stress-testing-the-uk-banking-system-key-elements-of-the-2019-stress-test.pdf?la=en&hash=9F5CF1B969F5987CE2D-BE1F1EA50D7ED5786AB4F

While we can never know the exact nature of future economic shocks, and there are some “unknown unknowns” it would be wrong to suggest that we can’t prepare. While the current pandemic has been described as unprecedented, there was a high level of awareness that such a scenario might occur[5]. Informed predictions being made now about the future impacts of climate change on environments and economies must be heeded. And the very process of planning for scenarios will trigger responses that will be appropriate for a range of situations.

The scenarios this stress-testing should encompass include:

- Another global pandemic
- Large-scale flooding and other dramatic weather events
- Co-ordinated cyber-attacks affecting financial or governmental institutions
- Sharp changes in the price of housing
- Sharp changes in prices of key commodities
- Insurrections at home or in countries with important trading relationships

As well as any other scenarios places believe important to respond to. Central Government would provide detailed descriptions of the scenarios, and a template for filling out a response.



5 As highlighted by press coverage around the pandemic preparation exercise, Exercise Cygnus, carried out in 2016

As part of the process, councils would have the opportunity to call attention to ways in which they would likely be particularly exposed were these events to take place. This could include the implications for:

- The sustainability of local government finances
- Disadvantaged groups within the local population which might be especially affected
- Housing of displaced populations
- Continued provision of transportation
- The ability to provide alternative employment, to prevent long-term unemployment setting in
- The resilience of local transportation networks

Local and central government would then be obliged to respond to the findings, with a central resilience fund providing monies for activities which go beyond the standard legal obligations of councils.

Finally, while some of the details would undoubtedly be kept in confidence, a summary report would be put into the public domain, for accountability purposes, ensuring that ignorance of the risk would not be an excuse later down the line. If it was clear that officials were aware of a significant risk in an area but hadn't taken remedial action, this would understandably be a cause for criticism – incentivising decision makers to act ahead of time.

Taking these actions at the different stages of the cycle will build resilience across places. In turn, this will reduce the tendency of economic shocks to widen spatial inequalities. There will no doubt be more economic crises between now and 2070, and unless considerations of resilience are built into policymaking, the chances of eliminating spatial inequality are slim.

During the shock: Monitor and publish real-time local level data

As a shock unfolds, much policymaking has to be done “on the hoof” – with no better example than the many furlough-type schemes rolled out around the world at very short notice with little or no precedent. To do so effectively – especially at a local level – requires that the best, most up-to-date, data is available. The main need is to quickly see where is suffering and deliver assistance.

We have seen this in the UK with the publication of local-level cases and deaths data for Covid-19. The publication of data has improved over time – for instance, early in the pandemic, deaths data was not available for local authorities, but this has come to be included in the Government’s coronavirus dashboard. Similarly, data on the number of tests being taken, test positivity, and vaccine administration has been added (UK Government, 2021).

However, where health data has led, economic data has lagged (at least, at the local level). Publishing business closures and redundancies data (from HR1 forms) at a local level would be a really good start, as would working to localise the ONS’ faster economic indicators, on areas such as VAT returns and traffic volumes. Taking an open data approach wherever possible will allow the research community (academic institutions, thinktanks, etc) to feed analysis back to policymakers quickly. Generating dashboards, visuals, and other formats which help users easily engage with the data will ensure that economic monitoring is effective and widely used in briefings to policymakers.

After the shock: Target support effectively, based on local need

In order to prevent recession "lingering in the memory" longer in specific places, it is appropriate that in the after-shock phase measures are targeted to those places which the data (above) demonstrate to have been worst affected. It will always be tempting for policymakers to want to move on from the past and stop talking about a crisis now over – particularly when aggregate data for the national economy is looking positive. But those places still feeling the effects don't have this luxury.

Applied to the current shock, once the Covid-19 crisis is fading from view, the Treasury should move from the nationwide furlough scheme to a temporary wage subsidy that varies across places. This would ensure employment is created/retained where it is most needed, and support should only be eased once it is clear this has been done. This should be seen as investment now to prevent larger, long-term costs associated with spatially concentrated deprivation and poor labour market outcomes further down the line. Adopting a transparent approach which shows how areas receiving more support are doing so on the basis of economic data (not political preference) will make this acceptable to the public.

Similarly, skills programmes designed to support people into the labour market should not just focus on demographics (such as the Government's Kickstarter Fund, which is targeted at young adults) but have a spatial dimension – putting additional funds where the evidence shows that job losses have been greatest. Local authorities can again take a leading role in allocating funding according to where job opportunities are locally.

Conclusion

The economic resilience of places determines how well they respond to shocks; this in turn shapes spatial inequality. A plan to “level up” the UK, particularly at a time of a major economic shock, requires building resilience thinking into policy making. By empowering local places to plan for plausible scenarios, and tracking economic shocks across areas as they evolve, we can reduce the UK’s spatial inequality even in the face of shocks.

References

Briguglio, L., Cordina, G., Farrugia, N., Vella, S. (2008). *Economic Vulnerability and Resilience: Concepts and Measurements.* United Nations University Research Paper No. 2008/55

103930

Martin, Ron. (2012). Regional Economic Resilience, Hysteresis and Recessionary Shocks. Journal of Economic Geography. 12. 1-32. 10.1093/jeg/lbr019.

Martin, R., Sunley, P., Gardiner, B., Tyler, P. (2016). *How Regions React to Recessions: Resilience and the Role of Economic Structure.* Regional Studies, 50:4, 561-585, DOI: 10.1080/00343404.2015.1136410

Martin, R., Sunley, P., Gardiner, B., Evenhuis, E., Tyler, P. (2017). *Structural Change and Productivity Growth in Cities*. Structural Transformation, Adaptability and City Economic Evolutions, Working Paper 3. Available from https://www.cityevolutions.org.uk/wp-content/uploads/Structural-Dynamics-and-City-Growth-WP-3-2017-2.pdf

Overman, H. (2020). *How the UK government should respond to the unequal local economic impacts of COVID-19* [accessed online]. VoxEU & CEPR. Available from: https://voxeu.org/article/how-uk-government-should-respond-unequal-local-economic-impacts-covid-19

World Economic Forum (2020). *The Global Risks Report 2020. 15th Edition.* Available from: http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf

Xiao, J., Boschma, R., Andersson, M., *Resilience in the European Union: the effect of the 2008 crisis on the ability of regions in Europe to develop new industrial specializations*, Industrial and Corporate Change, Volume 27, Issue 1, February 2018, Pages 15–47, https://doi.org/10.1093/icc/dtx023

Frenken, K., Van Oort, F., & Verburg, T. (2007) *Related Variety, Unrelated Variety and Regional Economic Growth*, Regional Studies, 41:5, 685-697, DOI: 10.1080/00343400601120296

Markusen, J. and Venables, A. (2013). *Functional specialization, sectoral specialization, and inter-city trade.*

HM Revenue & Customs. Coronavirus Job Retention Scheme (CJRS) Statistics: December 2020. Available at: https://www.gov.uk/government/statistics/coronavirus-job-retention-scheme-statistics-december-2020

Norman, A. *Which local authorities face the biggest immediate economic hit?* [Accessed online]. Centre for Progressive Policy. Available from: https://www.progressive-policy.net/publications/which-local-authorities-face-biggest-immediate-economic-hit

Neffke. F., and Henning, M. *Skill-relatedness and firm diversification*. Strategic Management Journal. 34. 10.2307/23362658.

Boschma, R. (2015) Towards an Evolutionary Perspective on Regional Resilience, Regional Studies, 49:5, 733-751, DOI: 10.1080/00343404.2014.959481

UK Government (2021). *Coronavirus (Covid-19) in the UK*. [Accessed online]. Available from: https://coronavirus.data.gov.uk/

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Professor ADH Crook, who has funded these Fellowships, is anEmeritus Professor at the University of Sheffield. He served as Pro-Vice Chancellor for a decade until 2008 and was appointed CBE in 2014 for his services to housing. Professor Crook has been Chair of Shelter and Sheffield Homes and has also held senior roles with Orbit Housing Group and the Coalfields Regeneration Trust. He currently chairs The Conservation Volunteers and serves on the Architects Registration Board, the Royal Town Planning Institute Board and on the Council of the National Academy of Social Sciences.