Online Supplementary Material to Accompany the Paper

"Are UK Regional Productivity Disparities Really Narrowing? An Investigation into Recent Productivity Data Revisions"

Fokke Reitze Gouma, Philip McCann and Raquel Ortega-Argilés

Appendix A: Additional Material and Evidence on Regional Growth

In terms of other ONS economic and productivity data which appears somewhat inconsistent with the ONS (2024a) data discussed in section 3, the *Regional Economic Activity by Gross Domestic Product* recently reported that of all the ITL1 regions, London experienced the largest increase in both overall real GDP (4.9%) as well as in real (4.2%) GDP per capita in 2022 (ONS 2024b)[1]. This is largely a result of the fact that while during the lockdown periods of 2020 and 2021 London experienced the largest contraction amongst all UK ITL1 regions, this contraction was followed immediately by the strongest GDP and GDP per capita recovery of all UK regions in 2021 and 2022 (ONS 2024b)[2] and also for 2023 (ONS 2025a)[3]. Indeed, in general, regions which faced greater contractions in 2020 and 2021 responded with greater 'bounceback' growth rates after that (ONS 2025a,b,c). The scale of London's GDP per capita contraction was not noticeably different from many other UK city-regions and urban areas (ONS 2024d). According to the Regional Economic Activity data, the regional GDP per capita rankings remained unchanged from those during the immediate pre-Covid period, while the London region's 2022 GDP per capita levels were almost exactly at 2019 levels (ONS 2024d)[4].

Similarly, in terms of Gross Value Added (GVA), London increased its overall GVA strongly at current prices between 2019 and 2022. ONS (2024c) reports London's GVA at current basic prices increasing between 2019 and 2022 by 12.18% from £472.3bn to £529.8bn while ONS (2024d) reports London's GVA at current basic prices increasing between 2019 and 2022 by 9.61% from £473.7bn to £519.2bn. London exhibited a strong post-lockdown recovery which is till continuing. In other words, these various real GDP and nominal GVA figures move in a similar direction and imply that between 2019 and 2022 the London region economy did not noticeably decrease its output, unless regional price deflators more than offset nominal GVA rises.

Appendix B: London Productivity Hours, Productivity Jobs and Population

The detailed levels and changes in 'productivity hours', 'productivity jobs' and population in the London economy at both the ITL1 large region and ITL2 sub-regional areas are reported below in Tables A1, A2 and A3, respectively, and derived from Tables 12 and 13 of ONS (2024e)

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[1] Table 1 (ONS 2024b)
[2] Figure 1 (ONS 2024b)
[3] Table 1 and Figure 1 (ONS 2025a)
[4] In Table 11 of ONS 2024d, Greater London's GDP per capita at 2019 prices changes from £57,519 in 2019 to £57,417, a fall of 0.18%.

Table A1: London Productivity Hours 2019-2022 (ITL2 and ITL3)

	Mid-2019	Mid-2020	Mid-2021	Mid-2022	Hours Change 2019-2022	% Change 2019-2022	Annual % Change 2019-2022	Annual % Change 2021	Annual % Change 2020
LONDON	189,483,361	168,500,284	181,940,978	192,950,598	3,467,237	1.802	0.61	7.97	-11.07
Inner London West	76,437,852	68,110,209	74,530,838	77,366,584	928,732	1.215	0.41	9.42	-10.89
Inner London East	47,693,375	42,901,313	46,144,750	49,968,055	2,274,680	4.77	1.58	6.96	-10.04
Outer London East & North East	18,829,250	17,201,034	17,893,062	19,384,423	555,173	2.95	0.98	4.02	-8.65
Outer London South	15,645,356	13,687,765	14,539,120	15,652,790	7,434	0.04	0.016	6.22	-12.51
Outer London West & North West	30,877,528	26,599,965	28,833,209	30,578,747	-44,319	-0.14	-0.048	8.40	-13.85

Table A2: London Productivity Jobs 2019-2022 (ITL2 and ITL3)

	Mid-2019	Mid-2020	Mid-2021	Mid-2022	Jobs Change 2019-2022	% Change 2019-2022	Annual % Change 2019-2020	Annual % Change 2020-2021	Annual % Change 2019-2022
LONDON	5,748,843	5,672,525	5,715,107	5,949,919	201,076	3.49	-1.33	0.75	1.16
Inner London West	2,173,947	2,113,909	2,187,683	2,251,265	77,318	3.56	-2.76	3.48	1.19
Inner London East	1,450,175	1,441,988	1,447,381	1,541,669	91,494	6.31	-0.56	0.37	2.10
Outer London East & North East	632,578	619,963	615,813	647,405	14,827	2.34	-1.99	-0.67	0.78
Outer London South	510,553	513,457	504,080	532,091	21,538	4.22	+0.57	-1.82	1.41
Outer London West & North West	981,591	983,209	960,150	977,489	-4,102	-0.42	+0.16	-2.35	-0.14

Table A3. London Population Estimates Mid-Year 2019-2022 (ITL2 and ITL3)

	Mid-2019	Mid-2020	Mid-2021	Mid-2022	Pop Change 2019-22	% Change 2019-22	Annual % Change 2019-22	Annual % Change 2020-21
LONDON	**8,961,989**	**9,002,488**	**8,796,628**	**8,866,180**	**-95,809**	**-1.07**	**-0.36**	**-2.29**
Inner London West	**1,212,016**	**1,230,445**	**1,079,697**	**1,100,688**	**-111,328**	**-9.19**	**-3.06**	**-12.25**
Camden	270,029	279,516	210,390	218,049				
City of London	9,721	10,938	8,618	10,847				
Hammersmith & Fulham	185,143	183,544	183,295	185,238				
Kensington & Chelsea	156,129	156,864	143,940	146,154				
Wandsworth	329,677	329,735	328,367	329,035				
Westminster	261,317	269,848	205,087	211,365				
Inner London East	**2,420,819**	**2,429,787**	**2,327,434**	**2,355,487**	**-65,332**	**-2.69**	**-0.89**	**-4.21**
Hackney	281,120	280,941	259,956	261,491				
Haringey	268,647	266,357	264,130	261,811				
Islington	242,467	248,115	216,767	220,373				
Lambeth	326,034	321,813	317,498	316,812				
Lewisham	305,842	305,309	299,810	298,653				
Newham	353,134	355,266	350,626	358,645				
Southwark	318,830	320,017	306,374	311,913				
Tower Hamlets	324,745	331,969	312,273	325,789				
Outer London East & North East	**1,924,686**	**1,929,278**	**1,933,840**	**1,937,632**	**+12,946**	**+0.67**	**+0.22**	**0.24**
Barking & Dagenham	212,906	214,107	218,534	219,992				
Bexley	248,287	249,301	246,543	247,835				
Enfield	333,794	333,587	329,601	327,224				
Greenwich	287,942	289,034	289,254	291,080				
Havering	259,552	260,651	262,022	264,703				
Redbridge	305,222	305,658	309,836	310,911				
Waltham Forest	276,983	276,940	278,050	275,887				
Outer London South	**1,309,450**	**1,314,617**	**1,313,022**	**1,314,866**	**+5,416**	**+0.41**	**+0.14**	**-0.12**
Bromley	332,336	332,752	329,830	329,578				
Croydon	386,710	388,563	390,506	392,224				
Kingston Upon Thames	177,507	179,142	167,845	168,302				
Merton	206,548	206,453	215,324	214,709				
Sutton	206,349	207,707	209,517	210,053				
Outer London West & North West	**2,095,018**	**2,098,361**	**2,142,635**	**2,157,507**	**+62,489**	**+2.98**	**+0.99**	**2.11**
Barnet	395,869	399,007	388,639	389,101				
Brent	329,771	327,753	338,918	341,221				
Ealing	341,806	340,341	366,127	369,937				
Harrow	251,160	252,338	260,987	261,185				
Hillingdon	306,870	309,014	304,792	310,681				
Hounslow	271,523	271,767	287,940	290,488				
Richmond Upon Thames	198,019	198,141	195,232	194,894				

If instead we use the revised population estimates (ONS 2024g), this gives the London 2019 population as 8,889,743, the 2020 population as 8,867,008, the 2021 population as 8,804,769, the 2022 population as 8,869,043, and the 2023 population as 8,945,309. These figures imply that the fall in London's population in 2021 is 62,239, or -0.7% relative to 2020 (ONS 2024g). London is the only ITL1 which exhibits a population fall between 2020 and 2021.

In terms of demographic data, for each of the years between 2012 and 2020, the regional population data are based on mid-year population estimates. These are based on the 2011 Census and then adjusted annually using other information and surveys of local and regional population growth (ONS 2023b, 2024g). Following the 2021 Census rebased population estimations are also constructed (ONS 2023b, 2024g). As we see, there were very big swings in UK population trends between 2020 and 2022. In terms of changes to the UK mid-year populations, net in-migration fell dramatically from 224,000 to 111,000 between the year ending June 2019 to June 2020 and then rose (following the post-Census 2021 revised estimates) to 254,000 for the year ending in June 2021 to 634,000 in June 2022, and then to 906,000 for the year ending June 2023 (ONS 2024i), representing the largest annual population surge in 75 years (ONS 2024h). Many in-migrants first move to London, and although London's population fell between 2019 and 2022 it recovered quickly from 2023 onwards.

Appendix C: Scatterplots Comparing ONS 2023 Regional Productivity Data and the Revised 2024 Regional Productivity Data

In the following figures, we depict different checks in order to help us to better understand the sources of the differences between the previous regional output per hour data reported by the ONS in their publications up to and including 2023 and those arising from the revised 2024 published data.

The analysis is carried for ITL2 regions spanning the years 2006 to 2002 inclusive and we compare different aspects of the old and revalued data in order to identify areas of agreement and areas of difference.

In terms of the nomenclature that we use in the following figures:

GVA/H = Gross Value Added per Hour Worked
GVA/H_v = Gross Value Added per Hour Worked Volumes (i.e. corrected for price deflators)
GVA_p_calc = Calculation of deflators = log % change in GVA – log % change in GVA-v
GDP_v = Gross Domestic Product Volumes
GDP/C_v = Gross Domestic Product per Capita Volumes

When comparing the revalued data from 2024 to previous 2023 data, what we observe in the following figures, is that in Figures A1, A2, A3 and A5, where data points diverge significantly from a simple linear relationship, these data points are almost entirely related to the years 2020-2022 (green dots).

In Figures A4, A7 and A8, there is a high level of correspondence in the relationships between the published data of 2023 and 2024, although again, even in these cases, it is the revalued data for the years 2019-2022 which are slight outliers.

In Figure A6 we observe a rather unusual pattern of regional price deflators, with two separate clusters emerging more than 5 percentage points apart from each other on both axes' dimensions, and with an average clustering distance of some 8 percentage points from each other on both axes. Both clusters are populated by ITL2 regions from all parts of the UK.

In Figures A9 and A10, the growth in GVA per hour (volume measure) bears little relationship with the growth in GDP per capita (volume measure), and this is true for both the 2023 and 2024 data releases. Again, the outliers are almost entirely related to the years 2019 to 2022.

In Figures A11 and A12 se wee that the change in hours worked at the regional level bears no relationship with population change at the regional level, and this is true for both the 2023 and 2024 data releases. Again, it is the years 2019-2022 which show the greatest (upper and lower) dispersion from the regional averages.

In Figures A13 and A14 we also see no relationship between total regional hours worked and regional population change, but we do see, in manner reminiscent of Figure 6, that the regions are grouped into two very distinct clusters, separated by more than 5 percentage points, with an average cluster distance of some 20 percentage points apart. These clusters are populated by ITL2 regions from across the country.

As with the price deflators in Figure A6, given that the UK regional economic system has such a clear core-periphery structure we might have expected clearer pattern to be observed in terms of the economic geography of price deflators, but this appears not to be the case.

Finally, as we see in Figure A15 for the ITL2 regional population growth data, there is a high degree of correspondence between the 2023 and 2024 ONS releases for approximately half of the ITL2 regions, while for half of the ITL2 regions the population change is more than 2 percentage points. By far the largest deviations are for London regions with population growth differences of between 3 and 12 percentage points.

Combining all of these data points suggests that the GVA data and the GDP data are broadly consistent between the 2023 and 2024 data revaluations. However, the GVA per hour and the GDP per capita bear little or no correspondence with each other, as might have been expected from numerous economic studies. Moreover, given the fact that the total hours worked and the population data also bear little or no resemblance to each other, with unusual separated clusters of regions and price deflators, suggests that there are likely to be problems with the data regarding the number of hours worked. In particular, the major differences occur in the links between population data and the numbers of hours worked for the ITL1 London region and its ITL2 sub-regions.

Finally, Figures A16-A19 depict the smoothed productivity (output per hour) growth rates since 2008 according to the 2023 and 2024 data releases by the Office for National Statistics.

Figures A16 and A17 we compare the output per hour growth rates 2008-2019 from the 2023 and 2024 data releases, respectively. As we see, the overall adjustments appear to be rather small. In contrast, Figures A18 and A19 compare the output per hour growth rates 2008-2021 from the 2023 and 2024 data releases, respectively. As is clear from a comparison of these two figures, the differences are very significant indeed, with the overall slope reflecting these relationships becoming much steeper and the positioning of London and Wales decline markedly while that of the South East improves markedly.

Figures A1 (above) and A2 (below)

Change in GVA/H_v ONS 2023 vs ONS 2024, for ITL2 geographies
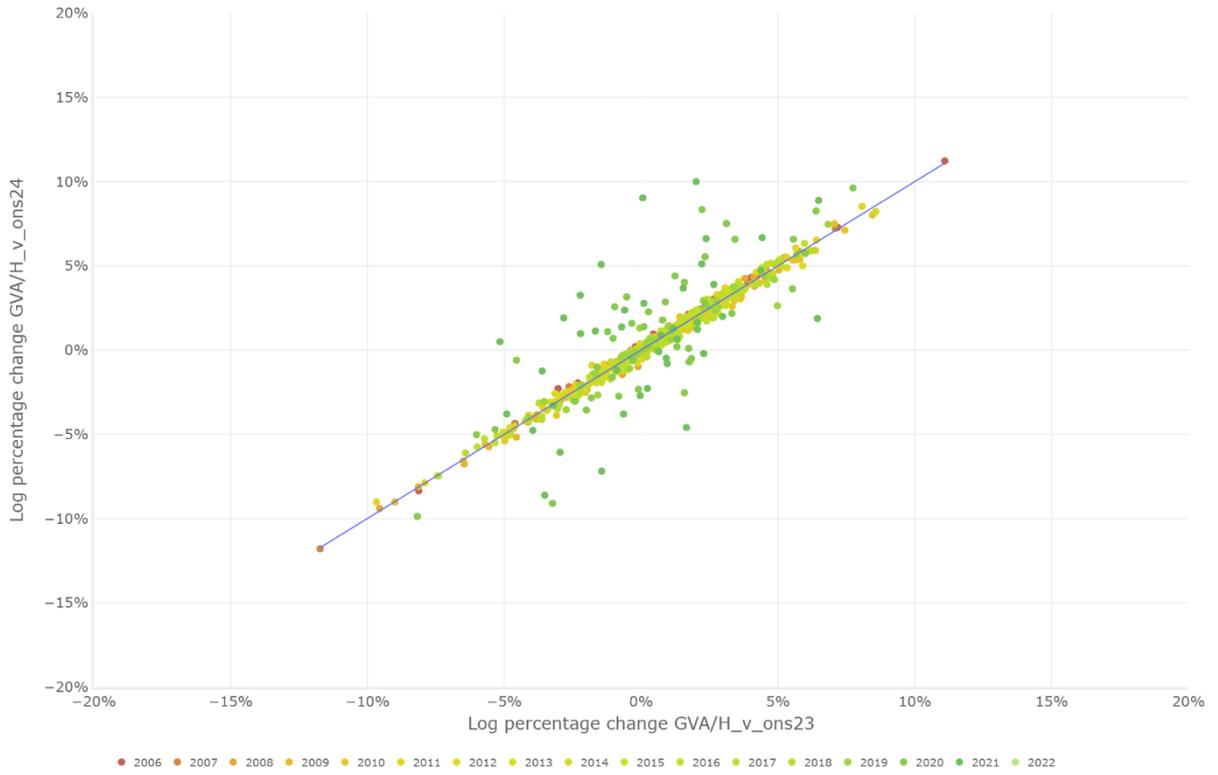
Change in GVA/H ONS 2023 vs ONS 2024, for ITL2 geographies
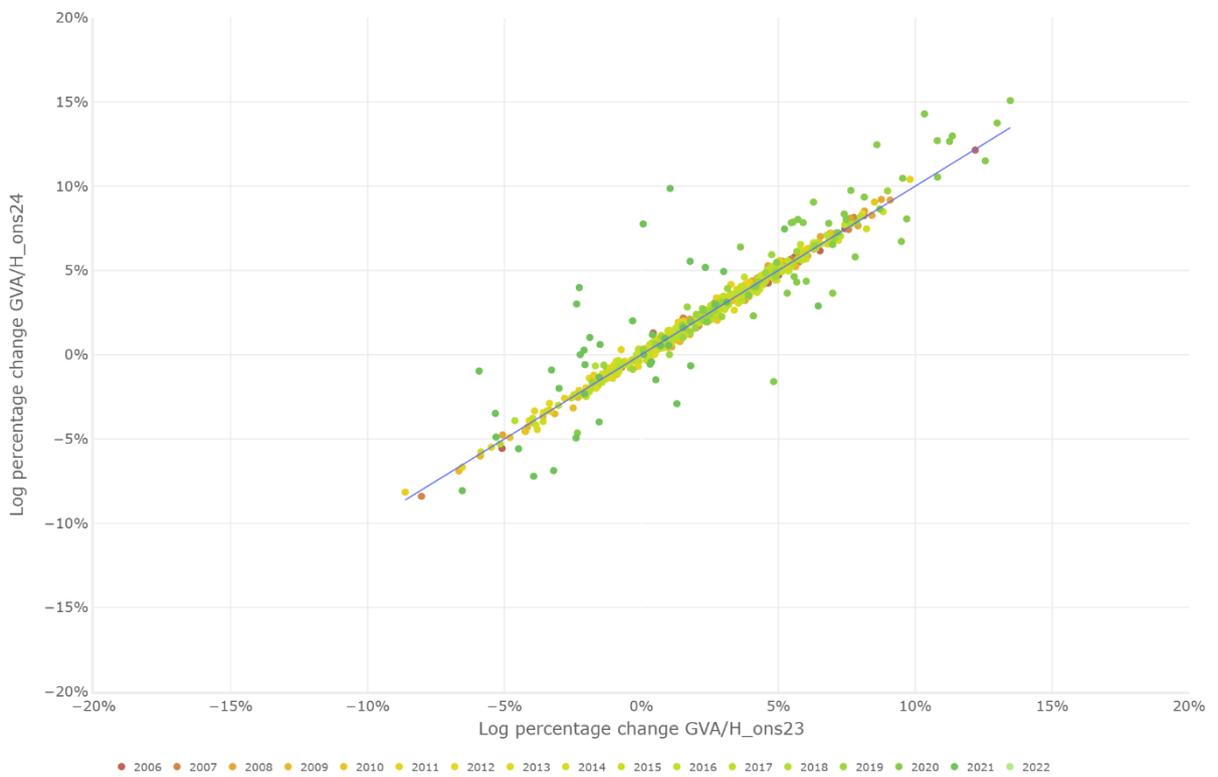
Figures A3 (above) and A4 (below)

Change in GVA/H_v ONS 2023 vs ONS 2024, for ITL2 geographies
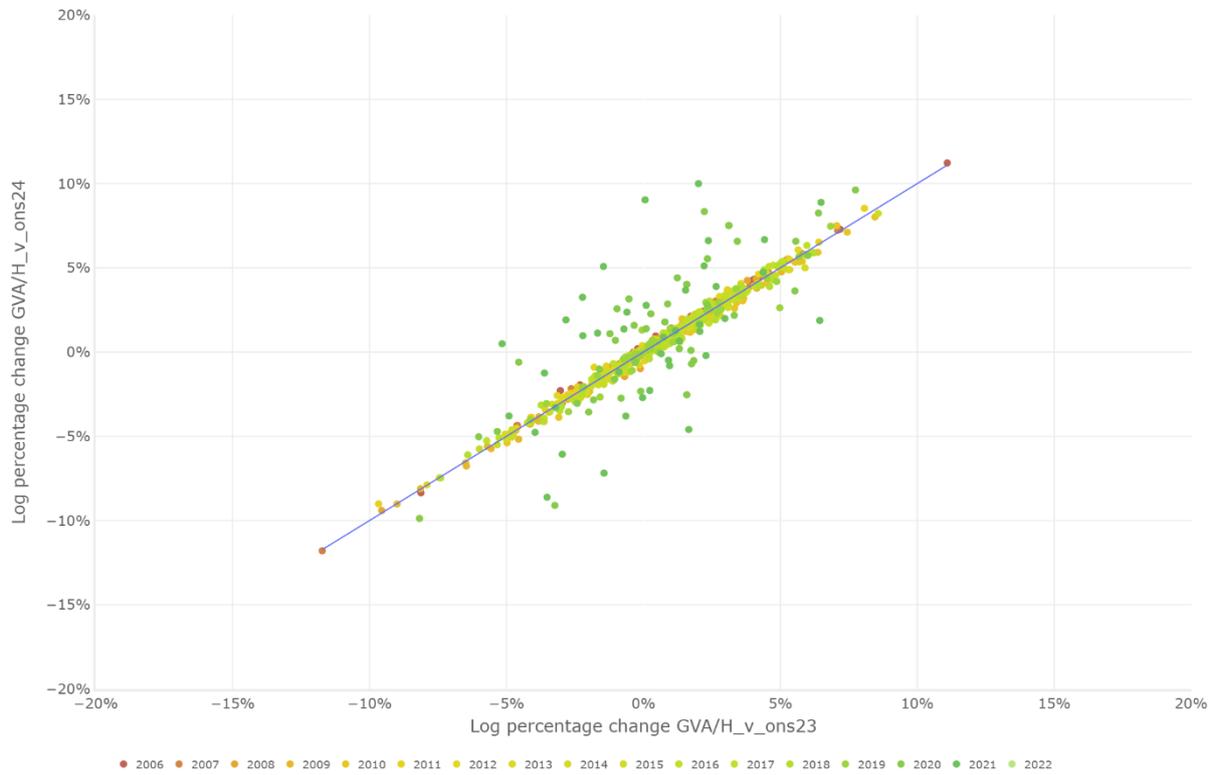
Change in Hours ONS 2023 vs ONS 2024, for ITL2 geographies
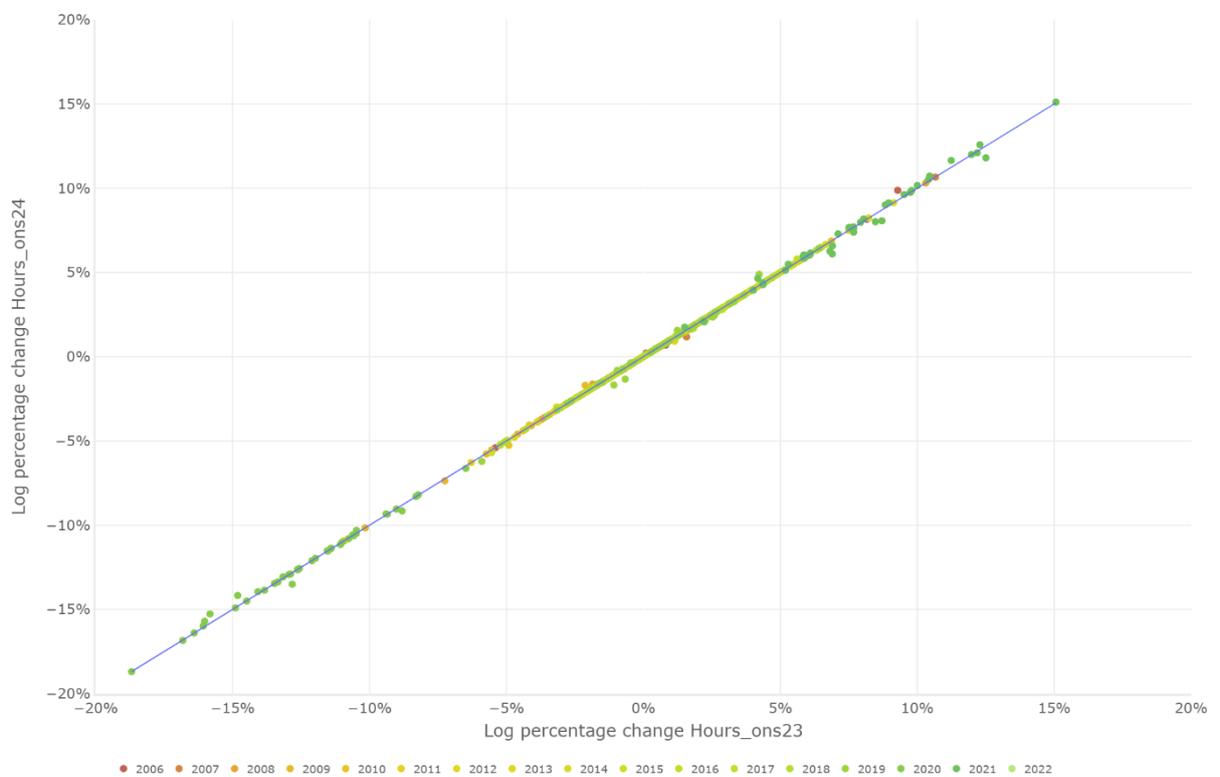
Figures A5 (above) and A6 (below)

Change in GVA_p_calc ONS 2023 vs ONS 2024, for ITL2 geographies
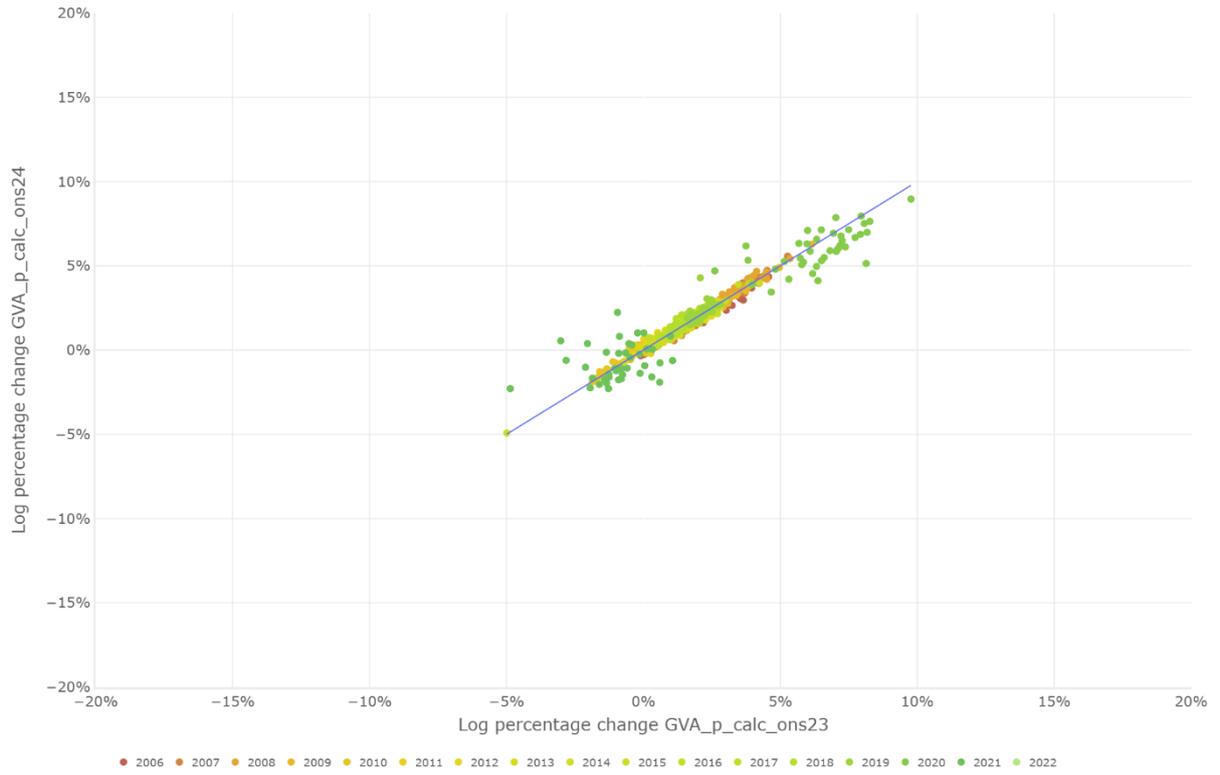
Change in GVA_p_calc ONS 2023 vs ONS 2024, for ITL2 geographies
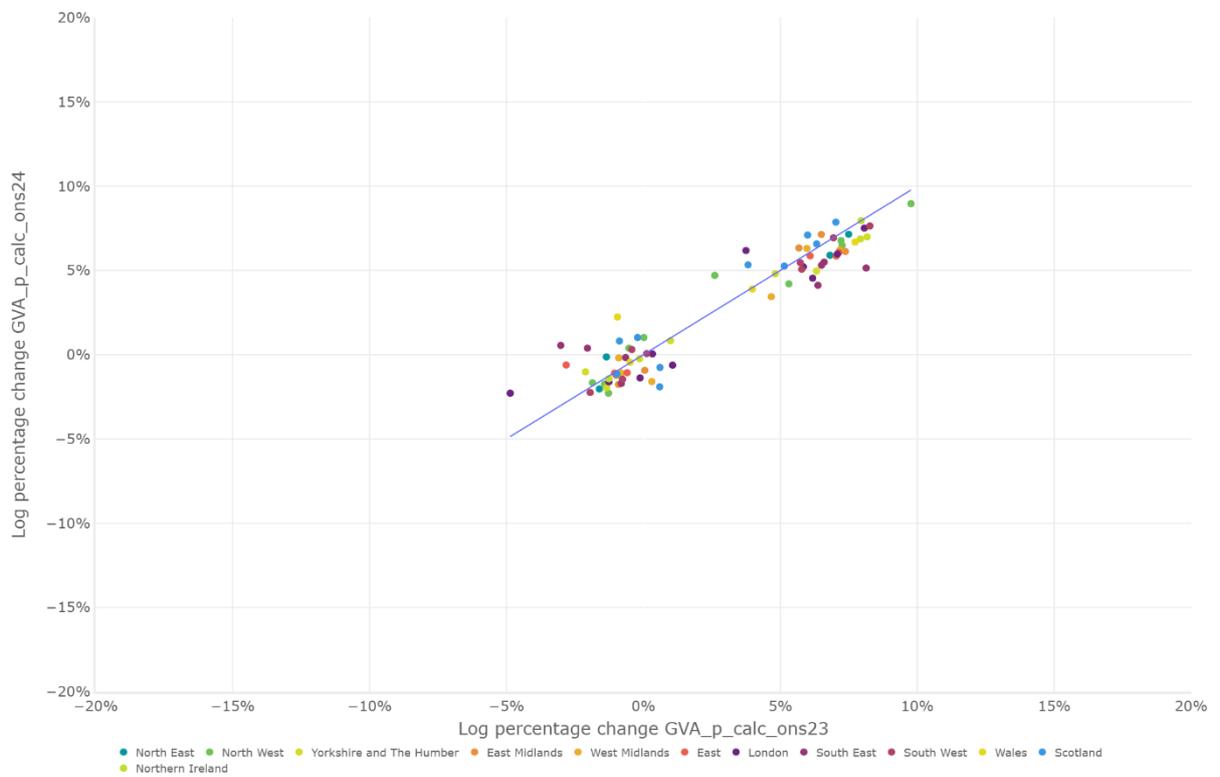
Figures A7 (above) and A8 (below)

Change in GVA_vs_GDP_v ONS 2023 release, for ITL2 geographies
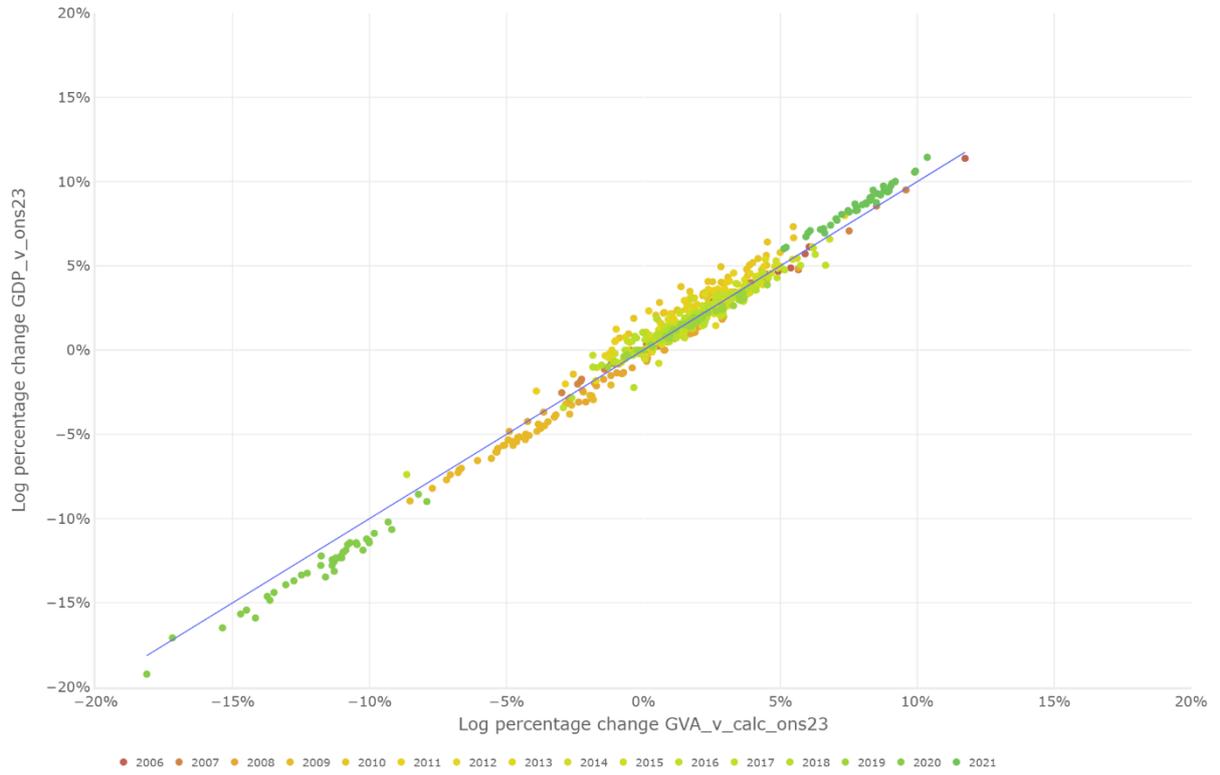
Change in GVA_vs_GDP_v ONS 2024 release, for ITL2 geographies
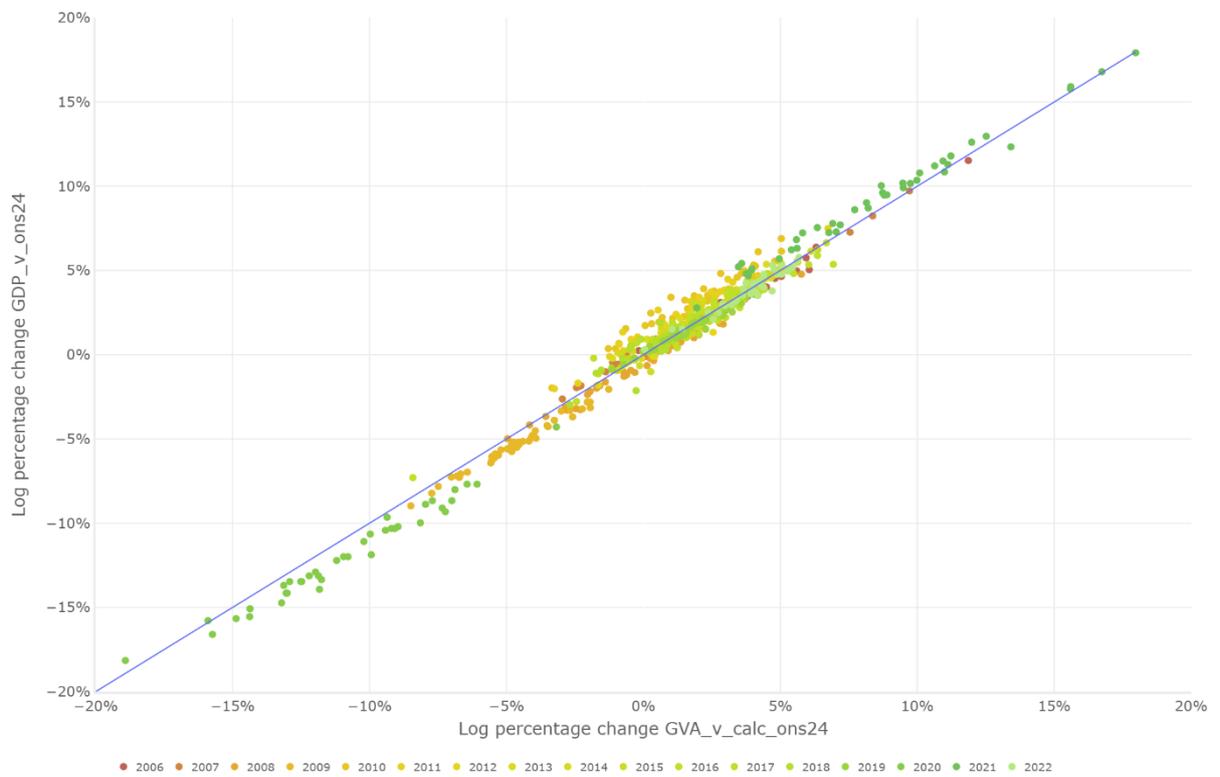
Figures A9 (above) and A10 (below)

Change in GVA per hour vs GDP per capita 2023 release, for ITL2 geographies
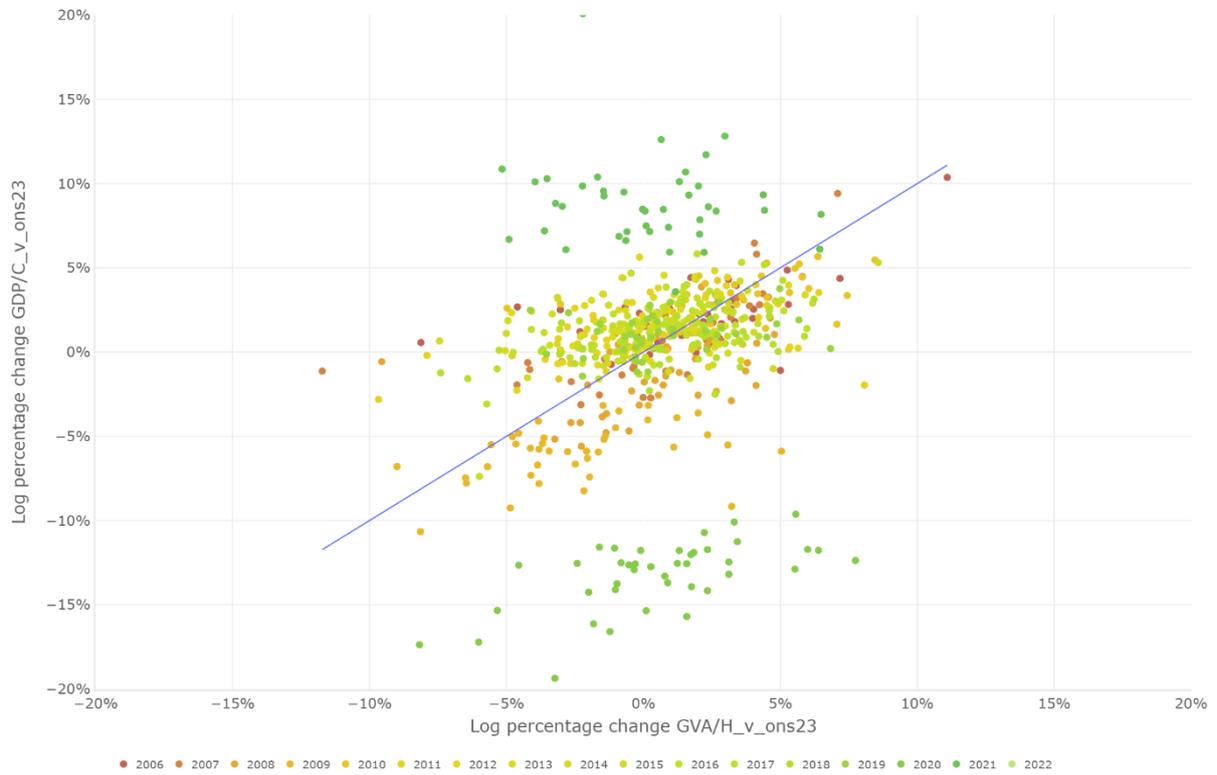
Change in GVA per hour vs GDP per capita 2024 release, for ITL2 geographies
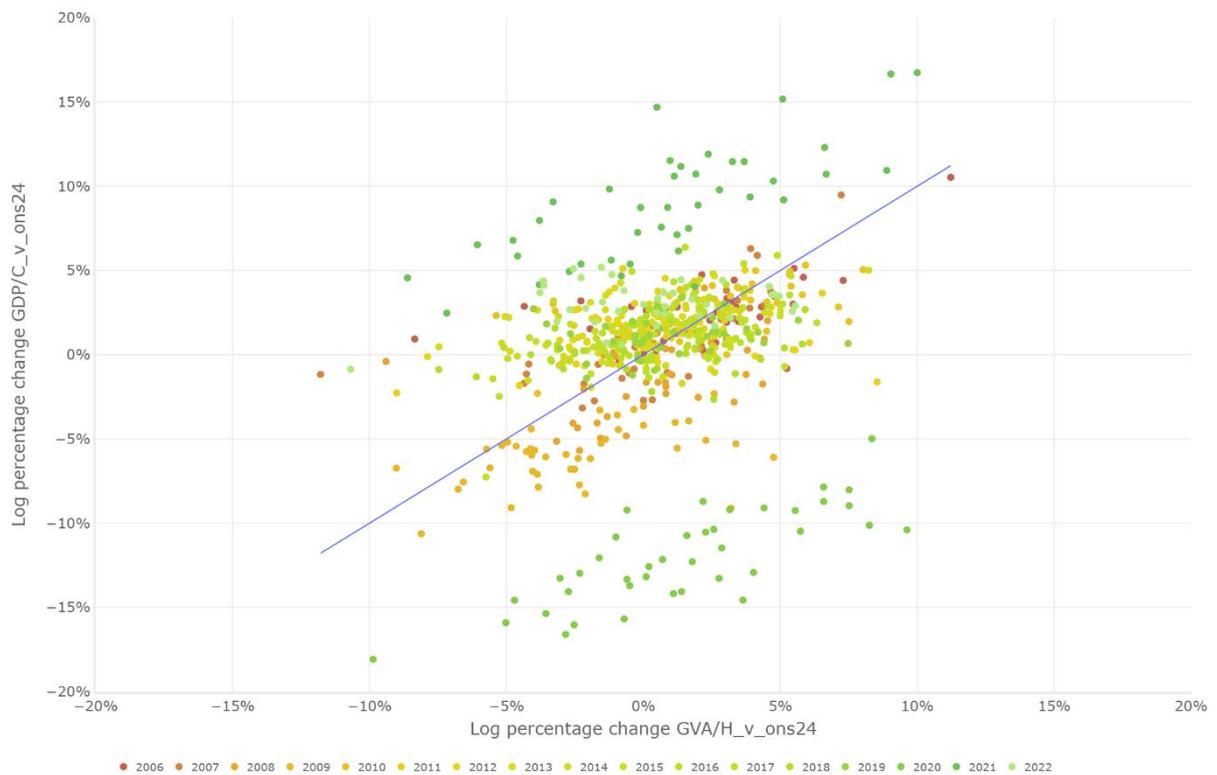
Figures A11 (above) and A12 (below)

Change in Hours vs Population 2023 release, for ITL2 geographies
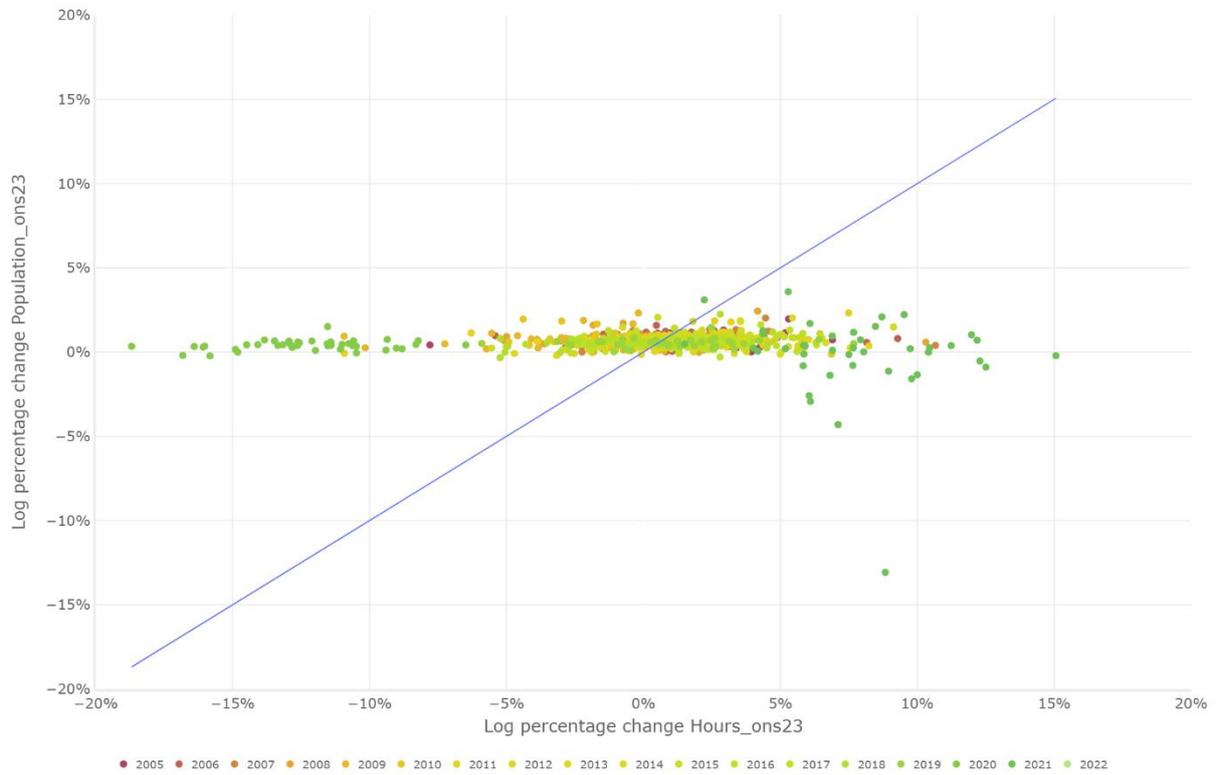
Change in Hours vs Population 2024 release, for ITL2 geographies
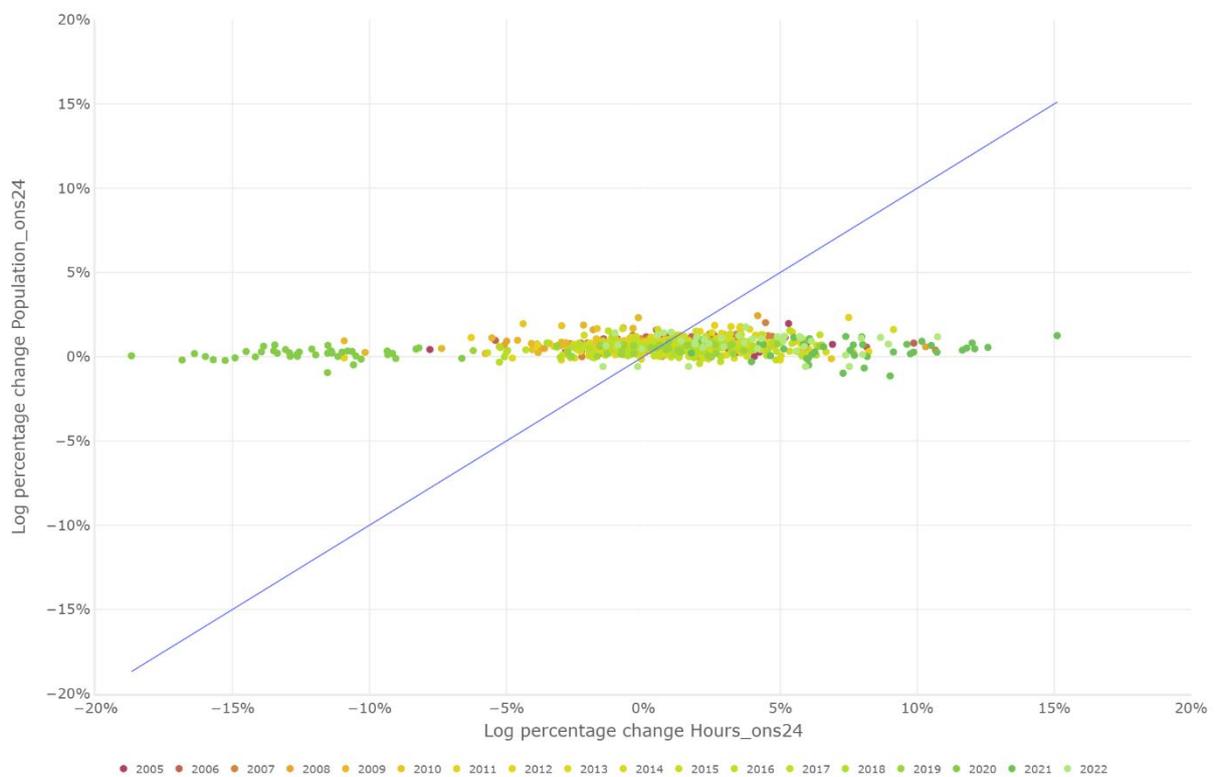
Figure A13 (above) and A14 (below)

Change in Hours vs Population 2023 release, for ITL2 geographies

Change in Hours vs Population 2024 release, for ITL2 geographies
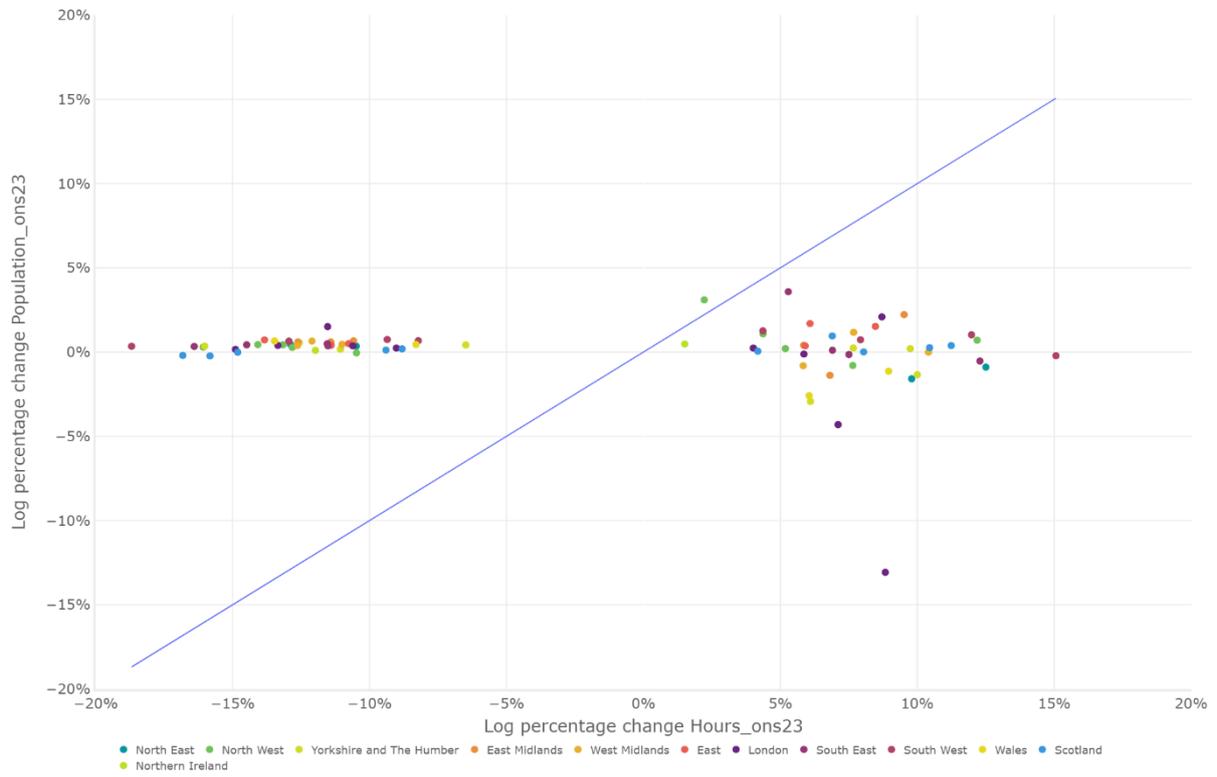
Figure A15

Change in Population ONS 2023 vs ONS 2024, for ITL2 geographies
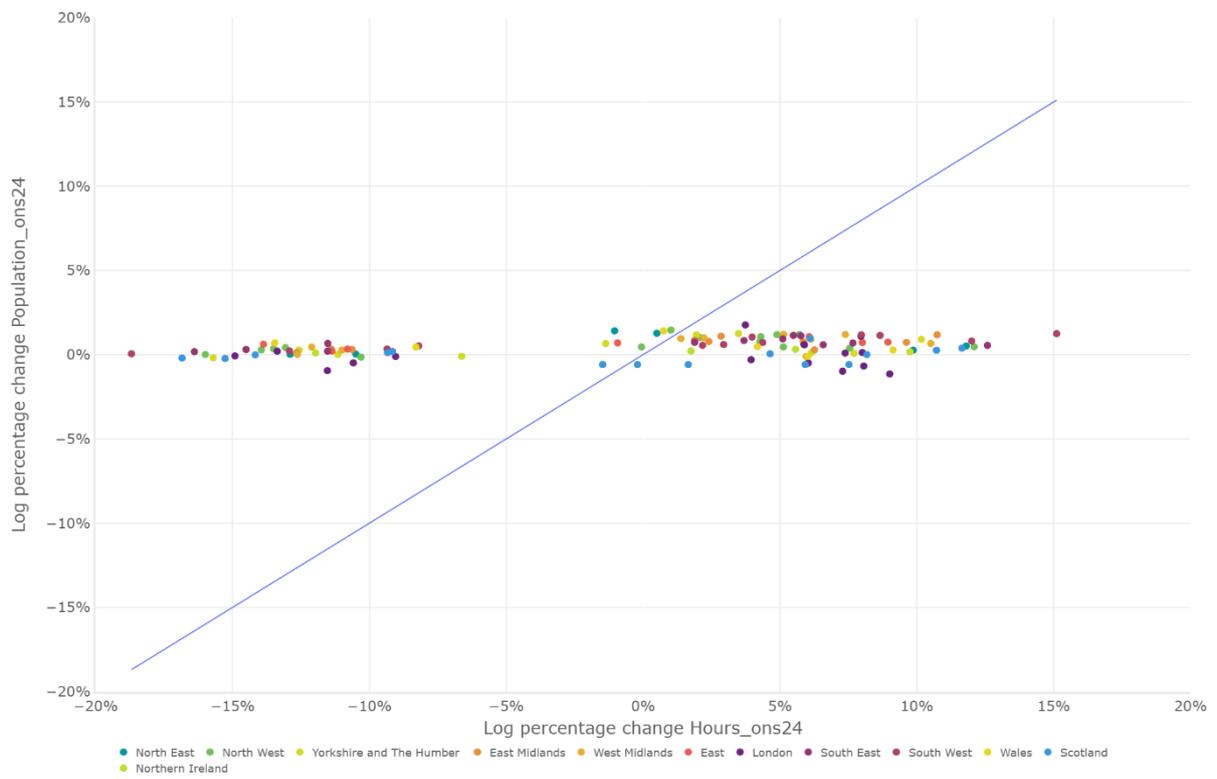
Figure A16

UK ITL 1 regions
2019 Nominal smoothed GVA per hour, vs. 2008-2019 productivity change
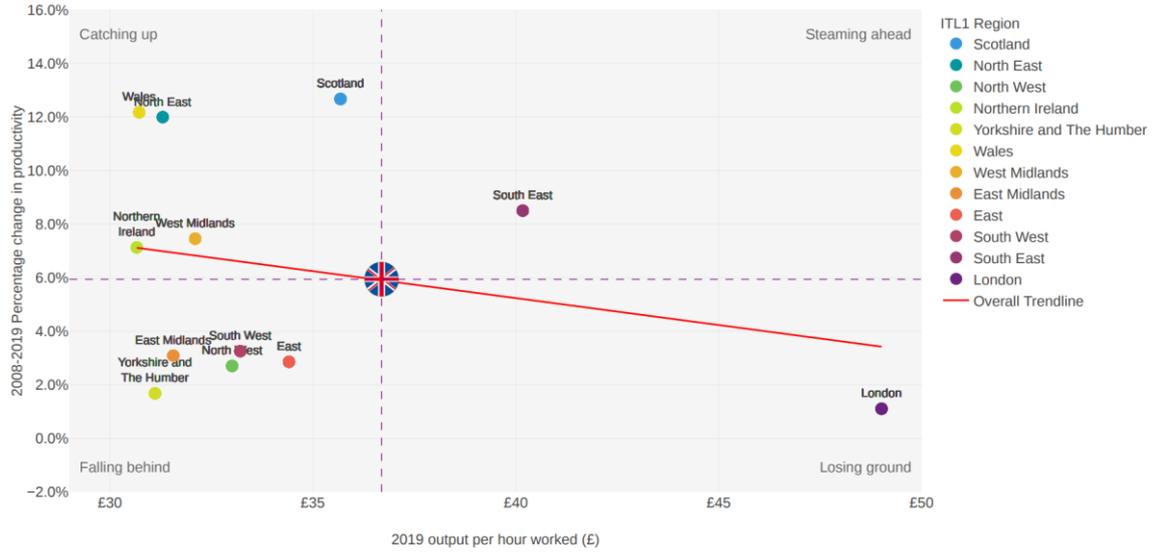
TPI visualisation, based on ONS Subregional Productivity June 2023 release

Figure A17

UK ITL 1 regions
2019 Nominal smoothed GVA per hour, vs. 2008-2019 productivity change
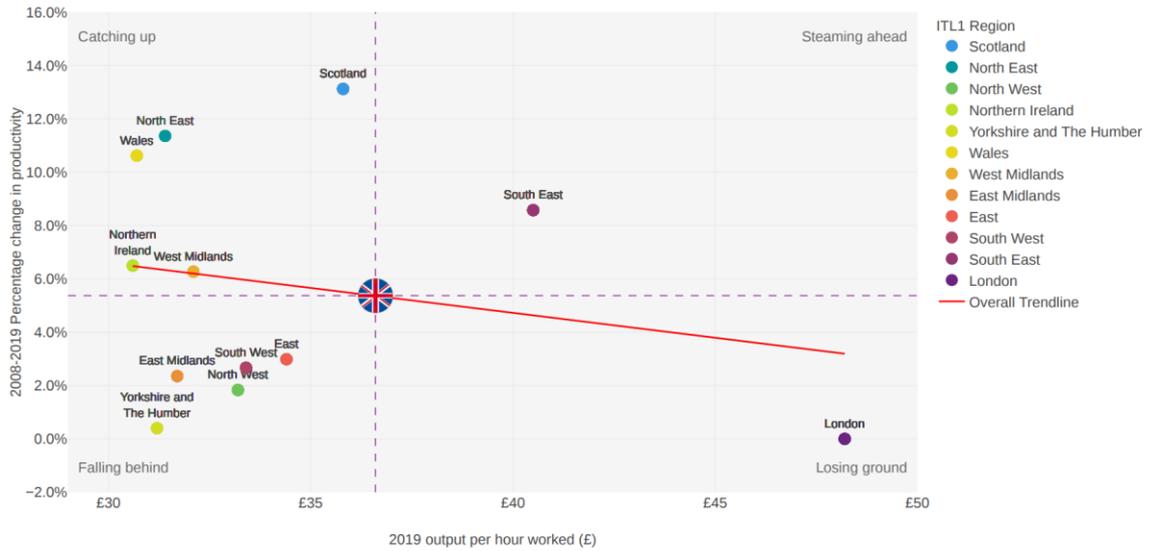
TPI visualisation, based on ONS Subregional Productivity June 2024 release

Figure A18

UK ITL 1 regions
2021 Nominal smoothed GVA per hour, vs. 2008-2021 productivity change
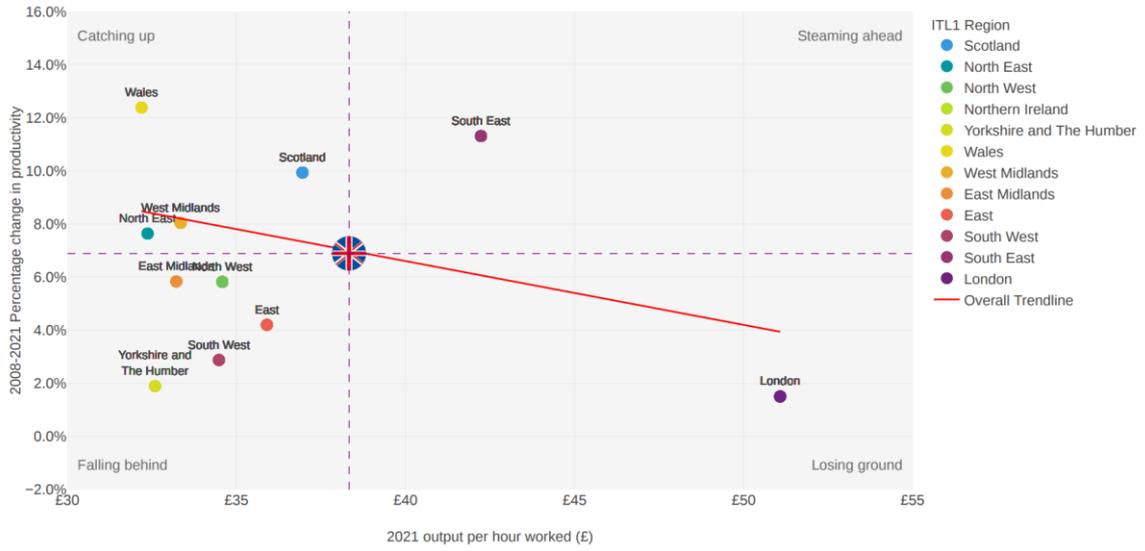
TPI visualisation, based on ONS Subregional Productivity June 2023 release

Figure A19

UK ITL 1 regions
2021 Nominal smoothed GVA per hour, vs. 2008-2021 productivity change

TPI visualisation, based on ONS Subregional Productivity June 2024 release

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