

A comparison of TUNDRA and POLAR4

As a result of the underlying methodological differences, TUNDRA and POLAR4 will, on occasion, produce different quintiles for each middle-layer super output area (MSOA). The majority of MSOAs do not change quintiles between the two measures, but those that do are more likely to increase by one quintile in the TUNDRA classification compared to under POLAR4. This may be because TUNDRA only includes England, which has a high proportion of POLAR quintile 1 areas compared to other devolved nations.

Background

1. TUNDRA (tracking underrepresentation by area) is an alternative measure to POLAR4 because it focuses on the participation rate of state-funded mainstream school pupils and only applies to England (Table 1). It is important to investigate their similarities and differences in order to identify the strengths of TUNDRA and explore how it might be used alongside POLAR4 when evaluating the young participation rates of an area.
2. For comparison purposes, the Key Stage 4 (KS4) population used in TUNDRA within this investigation uses cohorts of students from 2006-07¹ to 2010-11 to align with the same cohorts used in POLAR4. This differs from the cohort of students used in the experimental TUNDRA classification 2009-10 to 2013-14 in the area-based measures mapping tool and postcode look-up. Comparing TUNDRA and POLAR4 using the same cohorts means we are able to identify local areas where changes in the young participation rate are due to differences in methodology between the two classifications.

Table 1. Differences in methodology between TUNDRA and POLAR4

	TUNDRA	POLAR4
Applicable areas	Restricted to only MSOAs in England	All MSOAs in England and its equivalent in the devolved nations
Suppression of areas	Only MSOAs which have a population of 50 or higher are included in the calculations	No restrictions when calculating young participation rates for each MSOA and equivalent, but do not display rates if population is below 50 (All MSOAs will have a quintile)
Population	State-funded mainstream school pupils from the National Pupil Database (NPD)	Population estimates from the Office for National Statistics (ONS)

¹ 2006-07 refers to the cohort of pupils who undertook their KS4 examinations in the summer of 2007.

Changes in quintiles

- Table 2, 3 and 4 show the proportion of MSOAs which have changed quintiles between the two methods².
- Table 2 shows that 71.3 per cent of the TUNDRA MSOAs³ belong in the same quintile as POLAR4. Approximately the same proportion increased and decreased quintiles under the TUNDRA classification compared to POLAR4: 15.2 and 13.5 per cent, respectively.

Table 2. Proportion of MSOAs which have increased or decreased quintiles

Change in quintile from POLAR4	Number of MSOAs	Proportion of MSOAs	Proportion of MSOAs (weighted by population)
no change	4,822	71.3%	72.8%
increased quintile	1,028	15.2%	16.6%
decreased quintile	913	13.5%	10.6%

- Table 3 displays how these increases or decreases vary in magnitude with only 2.0 per cent of the MSOAs changing by two or more quintiles. A change in one quintile is considered a small amount of change because of the methodology differences and random variation. This means that 98 per cent of the population experience a change of one or less quintiles.

Table 3. Proportion of MSOAs with a certain number of quintile changes

Change in quintile from POLAR4	Number of MSOAs	Proportion of MSOAs	Proportion of MSOAs (weighted by population)
1 or less	6,625	98.0%	98.8%
2 or more	138	2.0%	1.2%

- Table 4 breaks down these changes into the exact number of quintiles.

² The MSOA examined are limited to those included in TUNDRA. Population weighted MSOA figures are also provided and are based on the TUNDRA population.

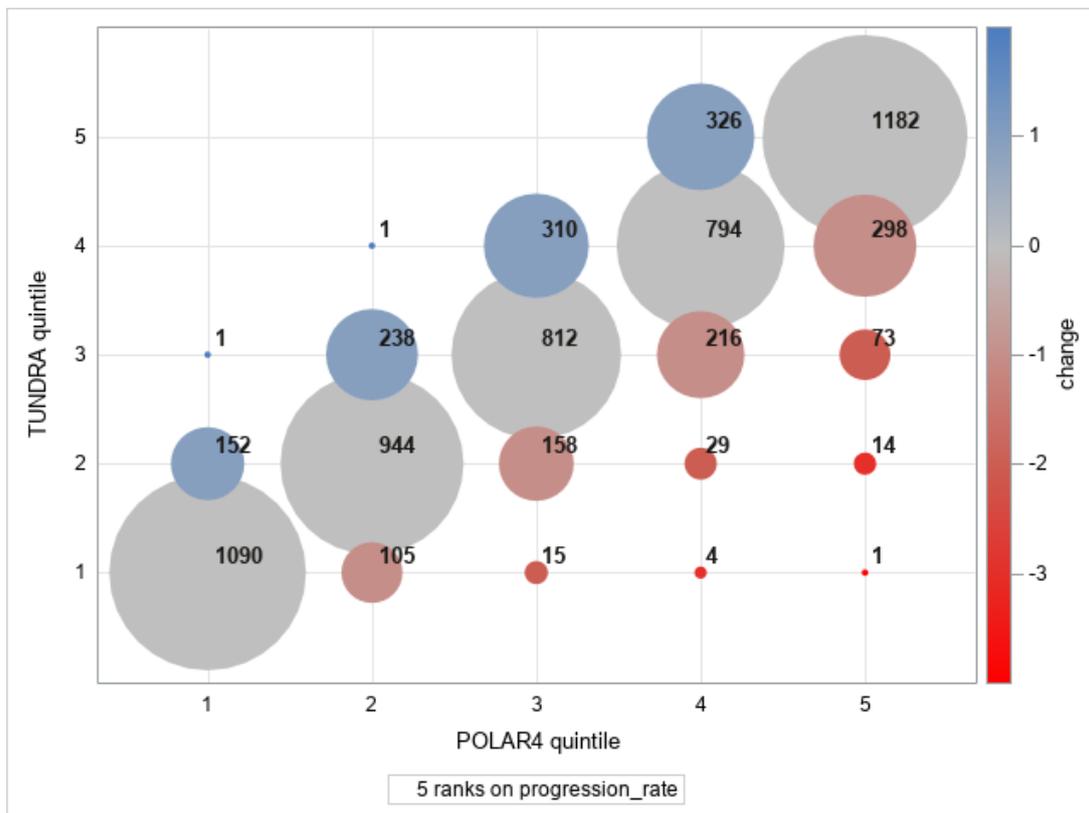
³ Using the TUNDRA methodology but applying it to 2006-07 to 2010-11 cohorts.

Table 4. Proportion of MSOAs by the number of changes in quintile from POLAR4

Change in quintile from POLAR4	Number of MSOAs	Proportion of MSOAs	Proportion of MSOAs (weighted by population)
-4	1	0.0%	0.0%
-3	18	0.3%	0.1%
-2	117	1.7%	1.1%
-1	777	11.5%	9.4%
0	4,822	71.3%	72.8%
1	1,026	15.2%	16.6%
2	2	0.0%	0.0%

7. These quintile changes are also displayed by the bubble plot in Figure 1, which shows the movement in quintiles between TUNDRA and POLAR4 for the 2006-07 to 2010-11 cohorts. The size of the bubble indicates how many MSOAs are in each category. There are more MSOAs that have higher TUNDRA quintiles than lower quintiles from POLAR4 quintiles (more MSOAs in blue than red), but MSOAs that have lower TUNDRA quintiles may change by a higher number of quintiles (red MSOAs are more spread out).

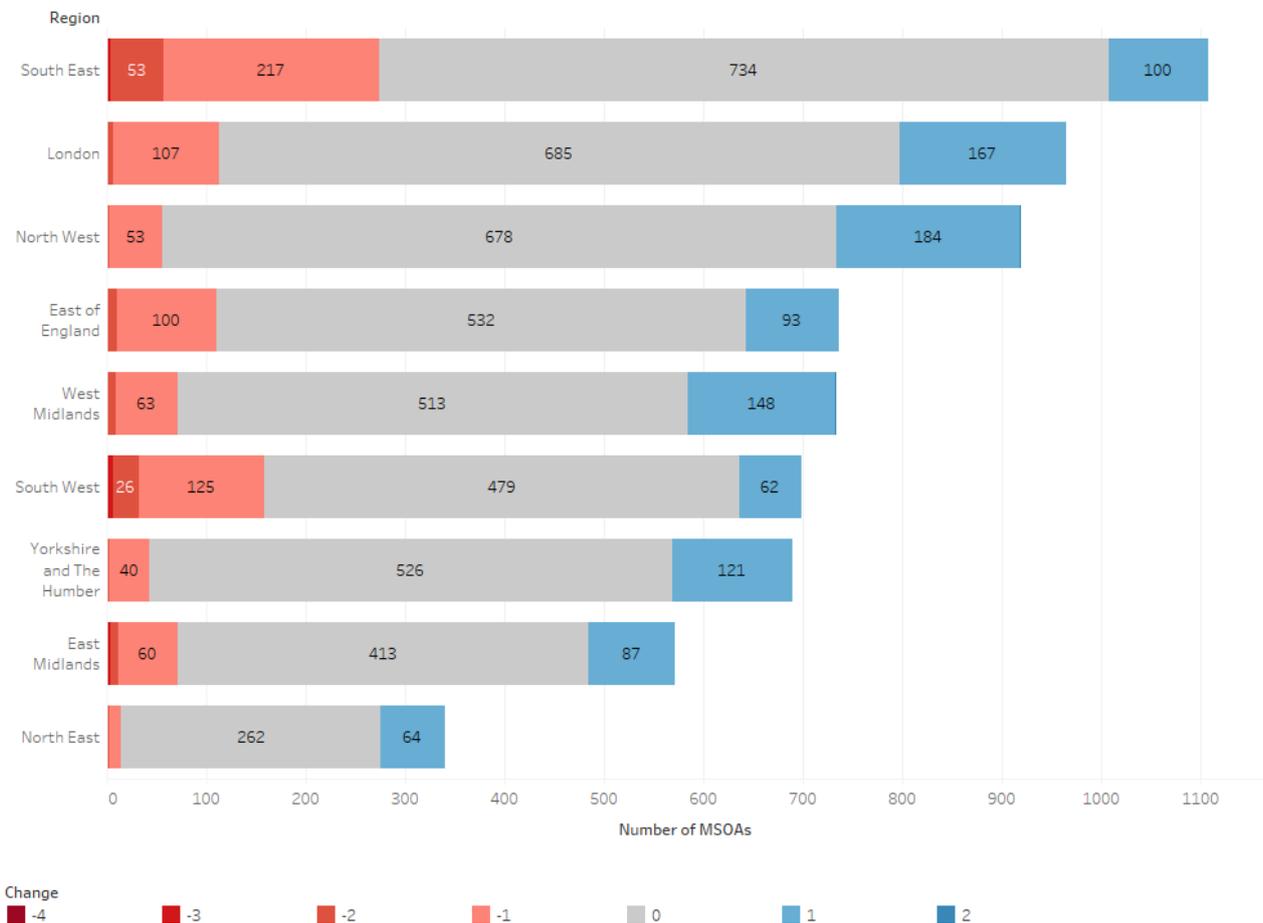
Figure 1. Number of MSOAs under TUNDRA and POLAR4 quintiles



8. Figure 2 show how these changes in quintile are distributed by region of MSOA. The South East and South West contain more MSOAs that have lower TUNDRA quintiles compared to its POLAR4 quintiles.

Figure 2. Number of MSOAs in each region that changes quintiles

Differences in TUNDRA quintiles from POLAR4



9. In addition, Table 5 shows how large these changes are for each region. It shows that the South West is the only region to have an MSOA that shifts four quintiles downwards under TUNDRA. They are also the two regions where more MSOAs shift down under TUNDRA compared to the number of MSOAs in the same region that shift up. Annex A provides a list of the MSOAs by region that have changed by more than 1 quintile (either up or down).

Table 5. Number of MSOAs in each region that changes quintiles

Region	Change in TUNDRA quintile from POLAR4							Total
	-4	-3	-2	-1	0	1	2	
South East	0	4	53	217	734	100	0	1108
London	0	1	5	107	685	167	0	965
North West	0	1	2	53	678	184	1	919
East of England	0	0	11	100	532	93	0	736
West Midlands	0	1	8	63	513	148	1	734
South West	1	6	26	125	479	62	0	699
Yorkshire and The Humber	0	1	2	40	526	121	0	690
East Midlands	0	4	8	60	413	87	0	572
North East	0	0	2	12	262	64	0	340
Total	1	18	117	777	4822	1026	2	6763⁴

10. In conclusion, the investigation on the differences between TUNDRA and POLAR4 reveal that for the same years (2006-07 to 2010-11), there are different quintiles for the area they have in common (England). A portion of these differences is due to the methodology, such as the fact that only England is included in TUNDRA, which means quintile allocation would be different. The other methodological difference is that TUNDRA excludes pupils from independent schools, special schools, and pupil referral units, which means participation rates will vary for certain MSOAs resulting in different quintiles. More MSOAs increase quintiles than decrease quintiles under TUNDRA, but those which experience a decrease in quintiles often experience more drastic changes, such as a decrease of three or four quintiles. This effect varies slightly between regions.

⁴ A total of 28 MSOAs are not included in the table, because 28 MSOAs are suppressed for the 2006-07 to 2010-11 cohort of TUNDRA because they have less than 50 pupils in the area (compared to 27 MSOAs suppressed for the 2009-10 to 2013-14 cohort).

Annex A: List of MSOAs that have moved more than one quintile under TUNDRA compared to POLAR4

MSOA	Region	Name of Area	Change in TUNDRA quintile from POLAR4
E02000390	London	Hammersmith and Fulham 019	-2
E02000393	London	Hammersmith and Fulham 022	-2
E02000573	London	Islington 020	-3
E02000643	London	Lambeth 026	-2
E02000938	London	Wandsworth 016	-2
E02001166	North West	Salford 010	-2
E02001321	North West	Wigan 035	2
E02001803	North East	Sunderland 013	-2
E02001922	West Midlands	Birmingham 096	2
E02001988	West Midlands	Coventry 031	-3
E02002392	Yorkshire and the Humber	Leeds 063	-2
E02002784	Yorkshire and the Humber	York 013	-3
E02002803	East Midlands	Derby 008	-3
E02002808	East Midlands	Derby 013	-2
E02002863	East Midlands	Rutland 001	-3
E02002882	East Midlands	Nottingham 015	-2
E02002889	East Midlands	Nottingham 022	-2
E02002890	East Midlands	Nottingham 023	-2
E02002895	East Midlands	Nottingham 028	-2
E02002989	South West	Bath and North East Somerset 005	-2
E02002991	South West	Bath and North East Somerset 007	-2
E02003002	South West	Bath and North East Somerset 018	-2
E02003043	South West	Bristol 032	-3
E02003068	South West	North Somerset 004	-3
E02003106	South West	South Gloucestershire 017	-2
E02003184	South West	Bournemouth 013	-2
E02003192	South West	Bournemouth 021	-2
E02003509	South East	Brighton and Hove 019	-2
E02003517	South East	Brighton and Hove 027	-2
E02003521	South East	Brighton and Hove 031	-2
E02003522	South East	Brighton and Hove 032	-2
E02003523	South East	Brighton and Hove 033	-2
E02003545	South East	Portsmouth 022	-2
E02003546	South East	Portsmouth 023	-2
E02003547	South East	Portsmouth 024	-3
E02003548	South East	Portsmouth 025	-2
E02003571	South East	Southampton 023	-2
E02003585	South East	Isle of Wight 005	-2

E02003619	East of England	Bedford 004	-2
E02003735	East of England	East Cambridgeshire 004	-2
E02004134	South West	East Devon 006	-2
E02004156	South West	Exeter 008	-4
E02004171	South West	Mid Devon 008	-2
E02004221	South West	Torrige 002	-3
E02004231	South West	West Devon 003	-2
E02004259	South West	North Dorset 005	-2
E02004260	South West	North Dorset 006	-2
E02004270	South West	West Dorset 002	-2
E02004366	South East	Eastbourne 011	-2
E02004379	South East	Lewes 001	-2
E02004382	South East	Lewes 004	-2
E02004394	South East	Rother 003	-2
E02004420	South East	Wealden 018	-2
E02004535	East of England	Epping Forest 009	-2
E02004536	East of England	Epping Forest 010	-2
E02004540	East of England	Epping Forest 014	-2
E02004625	South West	Cotswold 011	-2
E02004631	South West	Forest of Dean 006	-2
E02004776	South East	Havant 015	-2
E02004828	South East	Test Valley 015	-2
E02004841	South East	Winchester 013	-2
E02005008	South East	Ashford 013	-2
E02005019	South East	Canterbury 010	-2
E02005084	South East	Maidstone 017	-2
E02005204	North West	Fylde 002	-2
E02005393	East Midlands	Melton 003	-2
E02005490	East Midlands	South Kesteven 015	-2
E02005491	East Midlands	South Kesteven 016	-3
E02005552	East of England	King's Lynn and West Norfolk 002	-2
E02005568	East of England	King's Lynn and West Norfolk 018	-2
E02005573	East of England	North Norfolk 004	-2
E02005590	East of England	Norwich 007	-2
E02005707	North East	Northumberland 002	-2
E02005804	Yorkshire and the Humber	Scarborough 010	-2
E02005919	East Midlands	Rushcliffe 014	-2
E02005930	South East	Cherwell 010	-2
E02005931	South East	Cherwell 011	-2
E02005936	South East	Cherwell 016	-2
E02005939	South East	Cherwell 019	-2
E02005949	South East	Oxford 010	-2
E02005959	South East	South Oxfordshire 002	-2
E02005963	South East	South Oxfordshire 006	-2

E02005964	South East	South Oxfordshire 007	-2
E02005965	South East	South Oxfordshire 008	-2
E02005968	South East	South Oxfordshire 011	-2
E02005973	South East	South Oxfordshire 016	-3
E02005980	South East	Vale of White Horse 003	-2
E02005982	South East	Vale of White Horse 005	-2
E02005983	South East	Vale of White Horse 006	-2
E02005996	South East	West Oxfordshire 004	-2
E02006027	West Midlands	Shropshire 012	-2
E02006047	South West	Mendip 001	-2
E02006056	South West	Mendip 010	-2
E02006059	South West	Mendip 013	-2
E02006080	South West	South Somerset 006	-2
E02006100	South West	Taunton Deane 002	-2
E02006111	South West	Taunton Deane 013	-3
E02006329	South East	Elmbridge 013	-2
E02006333	South East	Elmbridge 017	-2
E02006345	South East	Guildford 002	-2
E02006360	South East	Guildford 017	-2
E02006364	South East	Mole Valley 003	-2
E02006374	South East	Mole Valley 013	-2
E02006381	South East	Reigate and Banstead 007	-2
E02006394	South East	Runnymede 002	-3
E02006396	South East	Runnymede 004	-2
E02006415	South East	Spelthorne 013	-2
E02006429	South East	Tandridge 002	-2
E02006435	South East	Tandridge 008	-2
E02006436	South East	Tandridge 009	-2
E02006437	South East	Tandridge 010	-2
E02006505	West Midlands	Stratford-on-Avon 002	-2
E02006516	West Midlands	Stratford-on-Avon 013	-2
E02006523	West Midlands	Warwick 005	-2
E02006543	South East	Arun 002	-2
E02006563	South East	Chichester 003	-2
E02006565	South East	Chichester 005	-3
E02006569	South East	Chichester 009	-2
E02006619	South East	Mid Sussex 016	-2
E02006640	South West	Wiltshire 029	-2
E02006642	South West	Wiltshire 038	-2
E02006665	South West	Wiltshire 050	-2
E02006669	South West	Wiltshire 054	-2
E02006676	South West	Wiltshire 061	-2
E02006740	West Midlands	Worcester 007	-2
E02006753	West Midlands	Wychavon 006	-2
E02006838	South East	East Hampshire 017	-2
E02006848	South West	Swindon 027	-3

E02006854	London	Tower Hamlets 033	-2
E02006883	South West	Bournemouth 023	-2
E02006885	South West	Bournemouth 024	-3
E02006887	South West	Bristol 054	-2
E02006895	West Midlands	Birmingham 134	-2
E02006896	West Midlands	Birmingham 135	-2
E02006902	North West	Manchester 054	-3
E02006904	East Midlands	Nottingham 039	-3
E02006907	East of England	Norwich 014	-2
E02006908	East of England	Norwich 015	-2