

# Online Appendix for the Article, “Fuller Measures of Output, Input and Productivity in the Non-Profit Sector: A Proof of Concept for the United Kingdom”

## Appendix A - Data Sources

### ONS Data

GDP(o) low-level aggregates [industry GVA] - GDP output approach-low-level aggregates

NPISH GVA proportions - Non-profit institutions serving households (NPISH) gross value added (GVA) proportions

NPISH compensation of employees - AS:NP:D.1:Compensation of Employees

NPISH gross operating surplus - NPISH (S.15): Operating Surplus, gross (B.2g): Resources: Current price: £m: NSA

NPISH wages and salaries - AS:NP:D.11:Wages and Salaries

NPISH consumption of fixed capital Capital Consumption (£m): S.15: TOTAL: Ind TOTAL: CP

NPISH final consumption expenditure - NPISH (S.15): Individual consumption expenditure (P.31): Uses: Current price: £m: NSA

Industry output deflators - Experimen-

tal industry deflators, UK, non-seasonally adjusted

Household satellite account dataset - Household satellite account, UK

Mid-year population estimates by age group, via nomis - Population estimates - local authority based by single year of age

Hours worked by industry (productivity) - Output per hour worked, UK

ASHE wage data by occupation - Annual Survey of Hours and Earnings time series of selected estimates

### Volunteering Data

Community Life Survey 2020-21 - Available here

Community Life Survey 2019-20 - Available here

Community Life Survey 2016-17 - Available here

Ad hoc estimates from the Community Life Survey: Further estimates on volunteering trends in England - Available here (data download starts automatically)

## Volunteering Extension Methodology

### Notes:

- All calculations by age group, based on participation rates by age group.
- For years before age breakdown in participation are available, the trend in the overall participation rate is used as the trend for the participation rates of all age groups.
- For most years without overall participation rate (2002, 2004, 2006), midpoints between adjacent years are used. For 2011 (in the absence of a 2011-12 datapoint), the 2010 participation rates are rolled forward, since the 2012 rates (from 2012-13 data) are influenced by the 2012 Olympics, which increased participation, and would therefore be inappropriate for 2011 estimates.
- For years before 2000, participation rates held constant.
- All financial year participation rates are treated as representative of their predominant calendar year (e.g. 2010-11 used for 2010) consistent with approach in ONS Household Satellite account (see ONS, 2013).
- For years with multiple participation rates from survey modes (2013-14, 2014-15, 2015-16), we use the face-to-face estimates for consistency with ONS household satellite account measures. We splice on the estimates from the online/article mode from 2016 onwards to avoid a discontinuity in 2016 driven by a mode effect.
- For average hours of volunteering per volunteer, we use estimates from 2013-14 onwards from the ad-hoc DCMS publication in 2022, adjusting for a mode effect from 2016-17 onwards. We calculate a mode effect on volunteering participation rates by age group, and apply the same effect to the average hours estimates by age group.
- For 2012 we use average hours of volunteering reported in ONS (2013), which is affected by the London 2012 Olympics which led to a large increase in participation.
- For years before 2012 we use a range of modelling by age group, drawing on ONS (2018), participation rates, and other methods. We loosely target total hours of volunteering from ONS (2013), while keeping the approach relatively parsimonious.

**Table A1: Details of Volunteering Participation Rates Use in Modelling**

<b>Year</b>	<b>Mode</b>	<b>Source</b>	<b>Data available</b>	<b>Reported in</b>
2001	Face-to-face	Citizenship Survey	Total participation	Community Life Survey 2016/17 reference tables
2003	Face-to-face	Citizenship Survey	Total participation	Community Life Survey 2016/17 reference tables
2005	Face-to-face	Citizenship Survey	Total participation	Community Life Survey 2016/17 reference tables
2007-08	Face-to-face	Citizenship Survey	Total participation	Community Life Survey 2016/17 reference tables
2008-09	Face-to-face	Citizenship Survey	Total participation	Community Life Survey 2016/17 reference tables
2009-10	Face-to-face	Citizenship Survey	Total participation	Community Life Survey 2016/17 reference tables
2010-11	Face-to-face	Citizenship Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2012-13	Face-to-face	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2013-14	Face-to-face	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2014-15	Face-to-face	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2015-16	Face-to-face	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2013-14	Online/ article	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2014-15	Online/ article	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2015-16	Online/ article	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2016-17	Online/ article	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2016/17 reference tables
2017-18	Online/ article	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2019/20 reference tables
2018-19	Online/ article	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2019/20 reference tables
2019-20	Online/ article	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2019/20 reference tables
2020-21	Online/ article	Community Life Survey	Total participation, and age breakdown	Community Life Survey 2020/21 reference tables

**Table A2: Assumed Proportions of Volunteering Time Relevant to NPISH Sector, and Allocation to Industries**

Field of volunteering	Proportion of volunteering which relates to activity within current GDP boundary (%)	Of which: Proportion relating to activity in NPISH sector (%)	Proportion of volunteering which relates to activity in NPISH sector (%)	Associated SIC 2007 industries divisions (of NPISH-related)
	(a)	(b)	(c)=(a)x(b)	
<b>Children's education/schools</b> (e.g. Parent Teacher Associations, School governor, supporting fairs and fundraising, Helping in school, Running pupils' clubs)	100	15	15	85
<b>Youth/children's activities (outside school)</b> (e.g. Youth clubs, Sports clubs, Hobby or cultural groups for children)	90	90	81	93
<b>Education for adults</b> (e.g. Attending or teaching classes, Mentoring, Cultural groups, Students Union, College governor)	90	90	81	85
<b>Sport/exercise (taking part, coaching or going to watch)</b> (e.g. Sports clubs or groups (e.g. football, swimming, fishing, golf, keep-fit, hiking), Supporter clubs)	75	90	67.5	93
<b>Religion</b> (e.g. Attending a place of worship (church, chapel, mosque, temple, synagogue); Attending faith-based groups, Saturday/Sunday School)	75	100	75	94
<b>Politics</b> (e.g. Membership of, or involvement with, political groups, Serving as local councillor)	100	75	75	94
<b>Older people</b> (e.g. Involved with groups, clubs or organisations for older people e.g. Age UK, Pensioner's clubs, visiting, transporting or representing older people)	75	75	56.25	87, 88
<b>Health, Disability and Social welfare</b> (e.g. Medical research charities, Hospital visiting, Disability groups, Social welfare (e.g. Oxfam, NSPCC, Samaritans, Citizens Advice Bureau), Offering respite care, Self-help groups (e.g. Alcoholics Anonymous))	100	50	50	86, 87, 88
<b>Safety, First Aid</b> (e.g. Red Cross, St. Johns Ambulance, Life Saving, RNLI, Mountain Rescue, Helping after a disaster)	90	90	81	86
<b>The environment, animals</b> (e.g. National organisations (e.g. Greenpeace, National Trust, RSPCA), Local conservation groups, Preservation societies)	90	100	90	75, 91

	(a)	(b)	(c)=(a)x(b)	
<b>Justice and Human Rights</b> (e.g. Special Constable, Magistrate, Legal advice centre, Victim Support, Prison visiting or aftercare, Justice and peace groups, Community or race relations, LGBT groups, National organisations (e.g. Amnesty International))	90	50	45	69.1
<b>Local community or neighbourhood groups</b> (e.g. Tenants' / Residents' Association, Neighbourhood Watch, community group, local pressure group)	25	10	2.5	94
<b>Citizens' Groups</b> (e.g. Rotary Club, Lion's Club, Women's Institute (WI), Freemasons)	90	100	90	94
<b>Hobbies, Recreation/Arts/Social clubs</b> (e.g. Clubs or groups for the Arts (e.g. theatres, museums, amateur dramatics, orchestras), Hobby or cultural groups (e.g. local history club, Social club)	50	90	45	90, 91, 93
<b>Trade union activity</b> (e.g. Membership of, or involvement with, a trade union.)	100	100	100	94
Any other activities	50	25	12.5	Unknown
<b>Total (accounting for share of volunteering in each field)</b>	<b>75.6</b>		<b>58.3</b>	
<b>Total excluding Education (accounting for share of volunteering in each field)</b>	<b>64.5</b>		<b>53.7</b>	

Source: Authors' judgement

Notes: Industries are divisions from the Standard Industrial Classification (SIC) 2007. For National Accounts and NPISH definitions, see section 2.1.

Table A3: Sources and Quality Information about the Relevant Output Deflators

Industry/product (SIC2007 industries/ CPA 2.1 products)	Share of NPISH total (average 1997-2019) (%)	Share of NPISH total excl Education (average 1997-2019) (%)	Deflator sources	Eurostat quality rating	Average annual growth 1997-2019 (%)
85: Education	57.2		72% derived 19% CPI: driving lessons 8% SPPI: adult education	A 19% B 72% C 8%	4.2
94: Activities of membership organisations	10.4	24.1	100% RPI: trade union & prof. orgs subscriptions	C	2.3
93: Sports, amusement and recreation activities	10.1	23.5	60% price index: hire & repair of photographic equipment etc 40% derived	A 60% B 40%	3.7
88: Social work w/out accommodation	6.1	14.4	100% derived	C	2.8
86: Human health activities	3.5	8.2	85% derived; 15% CPI: health	B	2.6
87: Residential care activities	2.6	6.1	100% derived	C	2.8
91: Libraries, archives, museums etc	2.6	6.0	69% price index: hire, maintenance & repair of major durables for recreation; 31% derived	B	2.5
75: Veterinary activities	2.0	4.7	100% CPI: pets, related products & services	B	2.5
90: Creative, arts and entertainment	1.9	4.5	61% AWE with productivity adjustment; 39% CPI: recreational & cultural services	B	2.2
72: Scientific research and development	1.5	3.5	50% AWE with productivity adjustment; 50% CPIY	B	2.1
68.1-2: Real estate (excl imputed rental)	1.1	2.7	53% commercial rental price index; 47% household rental price index	A	2.1
69.1: Legal activities	0.7	1.7	50% AWE with productivity adjustment; 50% CPIY	B	2.0
81: Services to buildings and landscape activities	0.3	0.8	43% SPPI: cleaning services 57% SPPI: various business services	A 43% B 57%	1.5
<b>Total</b>			SPPIs etc. 14.4% CPI/RPI items 25.6% AWE 2.3% Derived 57.7%	A 18.2% B 57.6% C 24.2%	3.50
<b>Total excluding Education</b>			SPPIs etc.21.6% CPI/RPI items 34.4% AWE 5.3% Derived 38.7%	A 17.1% B 38.3% C 44.6%	2.7
<b>Memo: GDP deflator</b>			SPPIs etc. 59.0% CPI/RPI items 15.8% AWE 7.7% Derived 17.5%	A 33.7% B 54.4% C 11.8%	2.0

Source: ONS – GDP(O) sources catalogue; authors' calculations.

Notes: Shares are for total adjusted GVA. Average annual growth is for output deflators.

## Appendix B: Additional Results

Table B1: Proportion of Industry GVA Accounted for by NPISH (%), 1997 to 2019, UK

Industry (SIC 2007 code)	1997	2019	Average 1997 to 2019
Education (85)	28.1	36.4	31
Activities of membership organisations (94)	11.7	18.5	19.2
Social work activities without accommodation (88)	10.9	22.7	16.1
Veterinary activities (75)	13.9	15.5	14.1
Creative, arts and entertainment activities (90)	5	13.8	9.3
Libraries, archives, museums and other cultural activities (91)	5.1	8.6	7
Scientific research and development (72)	6.1	5.7	6.7
Residential care activities (87)	4.3	5.4	4.7
Sports activities and amusement and recreation activities (93)	3.6	3.5	3.2
Services to buildings and landscape activities (81)	2.5	2.1	2.4
Human health activities (86)	1.4	1.6	1.4
Buying and selling, renting and operating of own or leased real estate, excluding imputed rental (68.1-2)	0.4	1.4	1.1
Legal activities (69.1)	0.4	1.9	0.7
<b>Total (whole economy)</b>	<b>1.7</b>	<b>2.9</b>	<b>2.4</b>

Source: ONS, authors' calculations.

Notes: All other industries are 0 in all years. This table shows proportions within each industry irrespective of industry size, whereas Table B2 reflects the relative size of each industry. Figures are before adjustments implemented in this article.

Table B2: Proportion of total NPISH GVA accounted for by industry (%), 1997 to 2019, UK

Industry (SIC 2007 code)	1997	2019	Average 1997 to 2019
Education (85)	80.3	73.5	76.7
Social work activities without accommodation (88)	4.7	10.4	7.2
Activities of membership organisations (94)	2.9	2.7	3.6
Human health activities (86)	3.2	2.8	2.8
Scientific research and development (72)	2.2	1.5	2
Residential care activities (87)	2.1	1.8	2
Creative, arts and entertainment activities (90)	1	2	1.4
Buying and selling, renting and operating of own or leased real estate, excluding imputed rental (68.1-2)	0.6	1.7	1.3
Veterinary activities (75)	0.8	1.1	0.9
Sports activities and amusement and recreation activities (93)	0.9	0.8	0.8
Services to buildings and landscape activities (81)	0.6	0.4	0.5
Libraries, archives, museums and other cultural activities (91)	0.3	0.3	0.4
Legal activities (69.1)	0.2	1	0.4
<b>Total (whole economy)</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: ONS, authors' calculations.

Notes: All other industries are 0 in all years. This table reflects the relative size of each industry, whereas Table B1 shows proportions within each industry irrespective of industry size. Figures are before adjustments implemented in this article. May not sum due to rounding.

**Table B3: Average Annual Growth Rates of Nominal GVA and hours Worked, 1997 to 2019 and Sub-periods, Various Variants and Comparators**

	1997-2007	2007-2019	1997-2019
<b>Nominal GVA</b>			
<b>NPISH including Education</b>			
Adjusted	6.6	4.3	5.3
Unadjusted	8.4	4.8	6.6
<b>NPISH excluding Education</b>			
Adjusted	5.8	4.3	4.8
Unadjusted	9.6	6.6	8.1
<b>Memo items</b>			
Whole economy (GDP)	4.9	3.7	4
<b>Hours worked</b>			
<b>NPISH including Education</b>			
Adjusted (paid and unpaid hours)	2.2	1.8	1.8
Unadjusted (paid hours only)	3.5	3.4	3.4
<b>NPISH excluding Education</b>			
Adjusted (paid and unpaid hours)	1.6	1.2	1.1
Unadjusted (paid hours only)	4.3	4.5	4.4
<b>Memo items</b>			
Whole economy	0.7	1.4	0.8

Source: ONS, authors' calculations.

Notes: Data on hours worked correspond with Figures 6 and 7 of the article. Data on nominal GVA correspond with Figures 8 and 9 of the article.

**Table B4: Average Annual Growth Rates of GVA Deflators, 1997 to 2019 and Sub-Periods, Various Variants and Comparators**

	1997-2007	2007-2019	1997-2019
<b>NPISH including Education</b>			
1 – Central case (GVA and Output deflators)	5.7	1.8	4
2 and 5 – GVA deflator	6.9	1.7	4.6
3 – Output deflator	5.4	1.5	3.5
<b>NPISH excluding Education</b>			
1 – Central case (GVA and Output deflators)	3.8	2.7	3.3
2 and 5 – GVA deflator	5.4	3.2	4.3
3 – Output deflator	3.3	2.1	2.7
<b>Memo items</b>			
Whole economy (GDP deflator)	2.2	1.5	2

Source: ONS, authors' calculations

Notes: See Table 4 of the article for description of deflators used in each series. Numbers correspond to the Variants, as described in Table 4 of the article. GVA deflator used in both Variant 2 (All GVA deflator) and Variant 5 (Unadjusted)