Fuller Measures of Output, Input and Productivity in the Non-Profit Sector: A Proof of Concept for the United Kingdom

Josh Martin[1]
Bank of England and Economic Statistics Centre of Excellence (ESCoE)
Jon Franklin
Pro Bono Economics

Abstract

We explore the appropriate conceptual framework for thinking about the output and productivity of the non-profit sector, and sketch a roadmap for measuring the productivity of this sector. Doing so requires us to go beyond the National Accounts, since some inputs to the non-profit sector (such as volunteer time) are outside the GDP boundary. Using a range of publicly available data we estimate new input and output measures for the Non-Profit Institutions Serving Households (NPISH) sector in the UK, and from these estimate labour productivity levels and growth. We find that the NPISH sector in the UK has grown rapidly over the past 20 years, with hours worked and nominal GVA growing faster than for the economy as a whole. Our fuller measures suggest NPISH accounts for about 4.4 percent of GDP in 2019, up from 3.3 percent two decades before, and compared with 2.9 per cent in 2019 before conceptual adjustments. The NPISH sector is less productive than the UK average, although similar to other labour-intensive industries like retail. We estimate little growth in labour productivity between 1997 and 2019, although price measurement in the relevant industries is difficult, so there is considerable uncertainty around our estimates of real GVA and productivity growth.

1 Josh Martin is an economic adviser at the Bank of England and Economic Statistics Centre of Excellence, and Jon Franklin is chief economist at Pro Bono Economics. We are grateful to Rutger Hoekstra for helpful discussion at the 2022 Royal Economic Society (RES) annual conference, in which we presented an early version of this article in an ONS-ESCoE special session on "Beyond GDP in Practice", and to Andrew Sharpe and two anonymous referees for helpful comments. We thank ONS, in particular Iolo Tomlinson and Lauren Gullis, for making available the NPISH GVA proportions for this article, as well as much of the other data we use. Thanks also to Jasmin Keeble and Adam Jenson at the Department for Culture, Media and Sport (DCMS) for help with data from the Community Life Survey. Any views expressed are solely those of the authors and cannot be taken to represent those of their respective employers. This article should therefore not be reported as representing the views of the Bank of England, or members of the Monetary Policy Committee, Financial Policy Committee or Prudential Regulation Committee. All errors are our own. Email: josh.martin@bankofengland.co.uk.

Whether it is through interventions to support the homeless, providing mental health care for children, or funding research into life-threatening diseases, the non-profit sector (also often described as the "third sector" or "social sector") plays an important role in tackling some of the most complex problems that our society faces. And yet, we know relatively little about it compared to many other parts of our society. In the UK, and many other countries, we do not know the scale of its economic contribution, how efficiently it uses the resources provided to it by funders or, importantly, whether it is getting more effective at tackling these problems over time.

In other parts of the economy we use measures of productivity to understand improvements in the efficiency of sectors and industries over time. However, such measures are challenging both conceptually and practically for the non-profit sector. Understanding both the level and the growth of productivity of the non-profit sector, relative to other sectors of the economy, would allow better assessment of the needs for, and effectiveness of, additional investment in the sector.

At present, we cannot readily answer questions about the size, growth or productivity of the non-profit sector in the UK, since reliable measures of the output and inputs of the sector do not exist. This is for many reasons, including definitional and conceptual challenges, data deficiency, and inattention in statistical circles. We aim to address some of these issues in this article, by presenting a new framework for thinking about the output of the non-profit sector in National Accounting terms, assembling publicly-available data for the UK into this framework, and presenting initial results.

The activity of many non-profit bodies falls within the Non-Profit Institutions Serving Households (NPISH) sector of the National Accounts. In the UK, NPISH comprises most higher education establishments (including universities), charities, and a range of other non-profit bodies. As measured, it accounts for about 3 per cent of UK Gross Value Added (GVA) in 2019, although as we demonstrate, this is an underestimate of its true value.

Like the government sector, the output of the NPISH sector cannot be measured by market transactions, since there are not economically significant prices.[2] Thus, productivity cannot easily be measured either. This has been partially overcome for the public sector based on recommendations in the 'Atkinson Review' (Atkinson, 2005), but little attention has been paid to similar challenges measuring the output of the NPISH sector. As such, the measure of the NPISH sector in the National Accounts is, we believe, an incomplete measure of the sector.

2 Non-market producers provide all or most of their output to others free of charge or at prices that are not economically significant. Economically significant prices are prices which have a substantial influence on the amounts of products producers are willing to supply and on the amounts of products that purchasers wish to acquire. It is the criterion that is used to classify output and producers as market or non-market, thus deciding whether an institutional unit in which government has a controlling interest is to be designated as a non-market producer and so classified in the general government sector, or as a market producer and so classified as a public corporation (ESA 2010, 20.19).

Work by the Johns Hopkins Center for Civil Society Studies as part of their Comparative Nonprofit Sector Project helped to develop the conceptual and practical underpinnings for better measurement of the non-profit sector in some countries. Their work, alongside researchers from several countries, led to the development of a UN Handbook on Non-Profit Institutions. The latest version, published in 2018, is entitled the *Handbook of National Accounting: Satellite Account on Non-profit and Related Institutions and Volunteer Work* (United Nations, 2018). Countries as diverse as the United States, New Zealand, and Mozambique have produced satellite accounts following this Handbook, although few countries publish updates routinely. Valuation of unpaid household service work, including informal volunteering, is under discussion as part of the update of the System of National Accounts currently under international discussion, although this explicitly excludes discussion of formal volunteering.[3]

The UK has not, as of 2023, produced such a satellite account, but UK Government has committed that "DCMS [Department for Culture, Media and Sport] will work with the Office for National Statistics (ONS) to bring together economic data on the value of the social economy – a civil society 'satellite account'" (DCMS, 2022). DCMS commissioned a study into the feasibility of a satellite account for "civil society" in late 2022. Sector advocates ThinkNPC conducted research into the use cases for a civil society satellite account for the UK, including interviews with sector participants (French and Davies, 2023). Stakeholders argued that the mere existence of such data would put the sector on equal footing with the rest of the economy, strengthen their bargaining position for resources, inform analysis of the sector, and enable monitoring of the health of the sector. Kenley (2021) makes similar arguments.

This article makes an initial stride towards such a satellite account, but with a focus on productivity. We use a narrower definition of the non-profit sector, using data only for the NPISH sector for practical reasons. We do not attempt to construct a full satellite account, instead limiting our focus to the measurement of GVA (in nominal and real terms) and hours worked in order to describe trends in the level and growth of labour productivity of the sector. We make amendments and additions to standard measures, such that our estimates go 'Beyond GDP' and are inconsistent with current National Accounting rules. Our adjustments also go beyond the recommendations of the aforementioned UN Handbook in a conceptual sense, which we believe better reflects the true value of the non-profit sector. All data and estimates in this article are for the UK, using a range of official data sources, principally from the UK Office for National Statistics (ONS).

The article proceeds as follows: section 1 defines the non-profit sector for the purposes of this article, and sets out the conceptual framework; section 2 describes the

3 Known as "Towards the 2025 SNA". Discussion on unpaid household service work, including informal volunteering, is discussed in guidance note WS.3, part of the Well-being and sustainability theme. More information from: https://unstats.un.org/unsd/nationalaccount/towards2025.asp

data and methods used; section 3 presents the results of a proof of concept set of estimates for inputs, output and labour productivity of the non-profit sector; and section 4 concludes.

Conceptual Framework

In this section we first address definitional issues, then set out the conceptual framework for inputs and output, before providing a summary and describing some unresolved issues.

How Do We Define the Non-profit Sector?

The data, methods and approach in this article are rooted in the National Accounts, which are the internationally recognised way to compile statistics of the economy. While this has its limitations, including many that impinge on the accurate measurement of the non-profit sector, it is nonetheless a useful starting point for this article given its central position in most economic statistics. We will have to go 'beyond the National Accounts' in a number of places through this article.

The National Accounts define five main institutional sectors, which reflect differences in ownership and funding.[4] One of these is the Non-Profit Institutions Serving Households (NPISH) sector, which is for economics units that are non-market operators (earn less than 50 per cent of their revenue from sales of goods and services; or do not charge economically significant prices), but not state-owned. The other sectors are: non-financial corporations (both publicly and privately owned); financial corporations; government (both central and local); and households (reflecting households as consumers, and unincorporated businesses).

While the NPISH sector is the obvious home for non-profit organisations, they can exist in other institutional sectors, especially the Private Non-Financial Corporations (PNFC) sector. A business that is not-for-profit but does still operate in the market (charges economically significant prices, or earns more than 50 per cent of its revenue from sales) would be classified in the PNFCs sector, but might be of relevance to analysis of the productivity of the non-profit sector. Additionally, non-profit institutions that do not "serve households" will not be allocated to NPISH; for instance, non-profit institutions that "serve businesses", such as industry trade bodies, will usually be allocated to the PNFC sector.

It is difficult to quantify the size of the non-profit sector outside of the NPISH sector, but we suspect it would be large and an important target for future research. However, identifying non-profit organizations outside the NPISH sector is impossible from published aggregate data, and would only be possible from microdata analysis, which is beyond the scope of this article. We revisit this topic briefly in section 4.

For this article, we focus on the NPISH

4 Most of these sectors also have more detailed subdivisions, which are not pertinent to this article. Throughout, we use "sector" in the National Accounting sense, referring to the description given in the text here. The way in which many people use "sector" – to describe the type of output, e.g. manufacturing or services – are referred to as "industries" in the National Accounting context, which is again the term we use throughout.

sector. This encompasses much of what we are interested in when considering the non-profit sector, and is the only sector in the National Accounts which is clearly related.

The education industry accounts for around 70-80 per cent of the NPISH sector in the UK as measured. This primarily reflects universities, all of which are classified in the NPISH sector in the UK. Our interest is principally in the non-profit sector, for which we use NPISH as a tractable proxy. However, we are relatively less interested in universities, which are quite unlike the rest of the non-profit sector. Universities also receive considerable attention already from other organisations in the UK such as the Higher Education Statistics Agency. As such, we will present results for the NPISH sector including and excluding education, with the measure excluding education our preferred measure of the non-profit sector.

Conceptualizing and Measuring Inputs in the Non-Profit Sector

Like the rest of the economy, inputs in the non-profit sector can be thought to include labour, capital assets, and intermediate goods and services. However, unlike most of the rest of the economy, not all of those factors of production are paid for in the non-profit sector, notably the labour.

We conceptualize the production function of the non-profit sector as:

$$Y = Af(L_p, L_v, K, I)$$

Where Y is output, equal to a function of paid labour L_p, volunteer labour L_v, capital K, and intermediate inputs I, with a productivity term A. Define $L = L_p + L_v$.

The specific functional form is not important to the subsequent sections, but it is necessary to state that L_p and L_v are positive and non-overlapping: that is, each hour of labour input is either paid or given voluntarily, such that measuring only L_p would underestimate inputs by L_v.[5]

While L_p can be measured through standard household and labour market surveys, as for the rest of the economy, L_v usually cannot. L_v is a relatively large input in the non-profit sector, but a relatively small input outside the non-profit sector. As such, its measurement does not attract much attention when measuring the economy as a whole, or most other sectors. Measuring L_v is thus mostly a challenge unique to the non-profit sector.

Measuring only L_p would clearly lead the estimated level of total labour input (and total inputs) to be too low; that is $L > L_p$. However, also relevant for productivity analysis, the rate of change of L_p might not be a good proxy for the rate of change of L, since there is no reason to assume that $\partial L_p = \partial L_v$. Put another way, if the balance of paid to unpaid labour input changes over time, which it might well, then measuring only paid labour input would be to mis-measure the growth of total labour input. It is therefore crucial to account for volunteer labour input (L_v) as well as paid labour input (L_p).

The preferred measure of labour input

5 L_p and L_v may be seen as either complements or substitutes in production. We see them as mostly substitutes, although they will display some complementarities in some settings.

for productivity statistics is hours actually worked (as opposed to hours paid, or contracted, for instance), although numbers of jobs or workers are also sometimes used. Data on hours worked is usually found in household surveys, such as the Labour Force Survey (LFS).

However, the institutional sector classification of organizations in the National Accounts has no bearing on voluntary activity, so it is quite possible that people volunteer for organizations outside the NPISH sector, and even outside the broader non-profit sector. Thus, if including volunteering time in the measure of inputs in the NPISH sector, in order to maintain alignment between inputs and output, we must ensure that our measure covers only volunteering done for NPISH units. This is difficult, since volunteers will not typically know the institutional sector of the organization they are volunteering for, and could not report it even if asked, which in the UK they are not. We can make an estimate of the fraction of formal volunteering done for NPISH units by aligning the reported 'fields' of volunteering with the industries of NPISH units, and making some informed estimates, which we describe in section 3 and Appendix A.

The alternative is to expand our measures to cover all non-profit organizations, regardless of institutional sector. In some ways this is easier, but in others harder – it avoids additional modelling of volunteering input, but necessitates the identification of non-profit units outside the NPISH sector, which is challenging. We believe this is preferable, and would be more useful to industry and policymakers, but is beyond the scope of the present article.

Conceptualizing and Measuring Output in the Non-Profit Sector

In order to ensure additivity across the economy, the typical numerator in the productivity equation is "gross value added" (GVA). GVA is calculated by deducting "intermediate consumption" (IC) from total output (TO). Total output is equal to the value of all output of the unit, including market output (i.e. sales, or turnover), non-market output (output produced and provided for free or at prices that are not economically significant), and output for own final use (output produced by a unit and retained for its own use, such as the in-house development of software).

Intermediate consumption is the cost of purchased intermediate goods and services produced by other units, which is the output of other units in the economy. It covers all current expenditures, such as raw materials, business services, utilities, rent, and overheads. Expenditures on capital assets are not deducted. Deducting intermediate consumption from total output avoids double counting when adding across the economy.

In the market sector of the economy, total output can be readily measured based on turnover (with adjustments for output for own final use and changes in inventories), and so GVA can be calculated by subtracting intermediate consumption from total output. GVA can equivalently be expressed as the sum of:

- Compensation of employees *(CoE)* – all payments to workers, i.e. wages and salaries, bonus and overtime payments, and non-wage labour remuneration such as employer's pension and

National Insurance contributions.

- Gross operating surplus *(GOS)* – covering both depreciation (consumption of fixed capital) and a return on capital (net operating surplus).
- Taxes less subsidies on production *(T-S)* – taxes and subsidies relating specifically to production, and not to products, hence excluding Value Added Taxes (VAT), fuel duties, and so forth.[6]

Algebraically:

$$TO = CoE + IC + GOS + (T - S)$$

$$GVA = TO - IC = CoE + GOS + (T - S)$$

Gross Operating Surplus *(GOS)* can be decomposed into the costs of using capital through depreciation (consumption of fixed capital, *CFC*) and a return on capital which is broadly equivalent to profit (net operating surplus, *NOS*). Algebraically:

$$GOS = CFC + NOS$$

$$GVA = CoE + CFC + NOS + (T - S)$$

However, this basic model for market sectors does not work for the non-profit sector. Like the public sector, output of the non-profit sector is largely not paid for at the point of use and there are no market prices, and thus cannot be reported as turnover in standard business surveys. While its value can be approximated as the sum of costs of production, this relies on full and accurate estimates of the economic costs of production, which are challenging.

We address the two main components of GVA – compensation of employees, and gross operating surplus – in the next sections, highlighting how National Accounts measures could be adapted to better reflect economic reality of the non-profit sector. In doing so, we go 'Beyond GDP', making adjustments that are inconsistent with current National Accounting rules, but better reflect the economic reality of the non-profit sector.

Gross Operating Surplus in the Non-profit Sector

By its definition, the non-profit sector is unlikely to be aiming to maximize profits, although some third-sector organizations do make profit which is reinvested or distributed. Instead it is more likely to be maximizing its output, delivering as much of its output as it can without making a loss.[7] This means that the amount of Net Operating Surplus (NOS) earned in the sector is likely to be far lower than for a profit-maximizing firm, although we argue that NOS should not be zero in this sector.

The components of Gross Operating Surplus can be hard to measure accurately across the whole economy. Estimates of consumption of fixed capital depend on assumptions and models about depreciation rates. GOS as a whole, and NOS within that, are often calculated by residual in the National Accounts. In the case of

6 Henceforth we ignore this component, since it is small relative to the other components, and would not materially affect the results to factor it in.

7 This is akin to Ramsey-Boiteux pricing (Ramsey, 1927; Boiteux, 1956) – public monopolies (often natural monopolies) which aim to maximize social welfare by maximizing output, may have to price above marginal cost to avoid making a loss and having to rely on subsidies. We are grateful to Hux Dixon for this insight.

the non-profit sector, these components are even harder to measure – conceptually, and practically. The National Accounts, following international guidance, currently measure GOS of the NPISH sector as follows:

- An estimate is made for Consumption of Fixed Capital using models for the capital stock of the sector, based on surveys and administrative data about capital investment, and assumptions about depreciation rates;
- Net Operating Surplus is assumed to be zero for entities in the NPISH sector.

Whilst NOS is likely to be far less important in the non-profit sector than in other sectors, we feel a low "normal" rate of profit is still appropriate conceptually.[8] This follows the Hall and Jorgenson (1967) conceptualization of the user cost of capital as reflecting both economic depreciation and a rate of return on capital, reflective of the opportunity cost of holding the investment in that asset rather than in a financial product or another investment. Such a return on capital can also be motivated by financing costs, for instance the interest rate on a loan, or the social time preference rate. By excluding even a low return on capital, we feel the National Accounts underestimates the true Gross Operating Surplus (and thus the value of the capital input) of the non-profit sector.

That is not to say we want to attribute profits to the non-profit sector. Rather, this is a method to reflect the true value of the capital services used in production in order to value output. This is not necessary in the market sector, since there are economically significant prices. For the non-profit sector, where we cannot rely on prices and have to instead value output by the sum of costs, it is important to reflect the true economic value of those costs. Valuing capital services more fully, by incorporating the opportunity cost component as well as consumption of fixed capital, does that.

Thus, we adapt National Accounts measures by first re-defining GOS:

$$GOS = CFC + \text{`normal'}NOS + \text{`supernormal'}NOS$$

Setting only 'supernormal' NOS = 0 for the non-profit sector (rather than both NOS components as in the National Accounts) gives adjusted GOS of the non-profit sector as:

$$GOS^* = CFC + \text{`normal'}NOS$$

Compensation of Employees in the Non-Profit Sector

Economic theory says that, under certain conditions, the "value" of labour to production (the marginal product of labour) is equal to the total cost of employment. On this basis the total labour cost should be a helpful way of measuring the value of labour where outputs of a sector are not directly observable. However, there are two challenges in the non-profit

8 This argument applies equivalently to the government sector, which also has NOS set to zero in SNA 2008. As for NPISH, we believe this undervalues the contribution of capital in the government sector in the National Accounts. This argument is also made in the OECD Measuring Capital Manual (OECD, 2009, sections 8.3.2 and 16.3).

sectors.

First, many non-profit organizations will use unpaid volunteers to help deliver their outputs. Given volunteers are unpaid by definition, their cost to the organization is zero. However, this does not mean their value is zero. As noted earlier, we are estimating the value of output in the non-profit sector by the true economic costs of the inputs, in the absence of market prices. Volunteer time has an economic cost: the opportunity cost of the time of the volunteer, who could be doing other paid work, or enjoying leisure, instead of volunteering. Valuation of volunteer time could thus depend on the valuation of the opportunity cost, which could reasonably be argued as the legal minimum wage, the volunteer's own market wage (if they are employed), or a market equivalent wage of the work being carried out. In aggregate these are unlikely to be very different, although may be quite different for individuals with high-paying employments.

We use an estimate of the market wage of occupations doing similar work to the volunteers, consistent with ONS Household satellite account (see ONS, 2013). This is also the recommended approach in all the international guidance, including in the UN Handbook of National Accounting: Satellite Account on Non-profit and Related Institutions and Volunteer Work (United Nations, 2018, p.58). The System of National Accounts (SNA) 2008 (United Nations et al., 2009, paragraph 23.34) recommends valuation of volunteer labour in a Non-Profit Institutions satellite account be based on "remuneration rates of employees undertaking similar work". The International Labour Organisation (ILO) Manual on Measuring Volunteer Labour (International Labour Organisation, 2011, pp.36-39) also suggests an approach based on average market wages in the industry and/or occupation of the volunteer.

Recall that valuation of volunteer time is only necessary in order to fully value the output of the non-profit sector. Thus, our objective is to value the labour input of the volunteer to the associated production activities, rather than an estimate of the social value (to the individual or society). Thus, an imputed wage rate that best reflects the type of labour input they are providing (proxied by the wage rate on similar paid labour) seems most appropriate.

Specifically, we use the wage of employees in the private sector in occupations that relate to the type of volunteering being carried out.[9] The validity of the shadow wage will depend on the similarity of the voluntary activity with that done by the wage donor. These shadow wages should be adjusted to represent "total employment costs", paralleling compensation of employees for employees.

Second, the labour costs component is further compromised if the total labour cost does not truly represent the marginal product (value) of labour services. There is evidence that the paid (and unpaid) work-

9 The weighted average of occupational wages used by ONS (2013) to value volunteering, and as adopted in this article, turns out to be around twice the level of the National Minimum Wage in the UK. The difference is falling over time as the National Minimum Wage increases, especially following the introduction of the National Living Wage in 2016. In 2019, the volunteering shadow wage we use is 75 per cent larger than the main National Living Wage.

force in the non-profit sector is motivated by non-pecuniary factors, such as the social value of the work (see e.g. Kamerāde and McKay, 2015). This means they may accept wages below the wage for an equivalently skilled job in the market sector, since they receive a form of non-monetary compensation for their labour, despite the fact that their marginal productivity should be almost identical. How much higher will depend on the value that the workers place on the non-pecuniary benefits. DCMS (2020) and Croner (2017) find that workers in the non-profit sector earn 20-30 per cent less than workers in other sectors. O'Halloran (2022) controls for a range of individual-level factors such as education and experience, and suggests that the differences in wages may be smaller than this but still significant. Thus, the true value of the labour services is likely to be higher than that paid by the non-profit sector.

We do not seek to include the value the non-pecuniary benefit per se. Indeed, many well-paid workers in the market sector might receive non-pecuniary benefits in their jobs too. Rather, we wish to accurately value the labour services provided by the workers in the non-profit sector, in order to more accurately value the output of the sector. The disconnect between pay and the value of the labour services is only a challenge for the non-profit sector as, unlike in the market sector, the value of labour services is used to value the output of the sector. The presence of non-pecuniary benefits is simply the reason that the pecuniary value of labour services would undervalue the output of the sector.

Thus, we adapt National Accounts measures by first expanding the compensation of employees to include the value of volunteer time:

$$CoE^* = W_p L_p + W_p L_v$$

Where W_p is the going hourly labour compensation (including non-wage labour costs, etc.) of paid workers in the market, L_p is hours of paid labour, and L_v is hours of volunteer labour.

We assume that workers in the non-profit sector accept a below-market wage due to non-pecuniary benefits, such that:

$$(1+\alpha)W_p^{NPS} = W_p$$

Where α is a factor reflecting the degree of discount accepted by workers in the non-profit sector due to non-pecuniary benefits. If $\alpha = 0$, then there is no discounting, and wages in the non-profit sector are market wages. If $\alpha > 0$, as we believe, then there is discounting, and wages in the non-profit sector are below market wages, and thus understate the true value of the labour services.

Then our adjusted measure of compensation of employees in the non-profit sector can be written as:

$$CoE^* = (1+\alpha)W_p^{NPS} L_p + W_p L_v = W_p L_p + W_p L_v$$

Appropriate Deflators (Price Indices) and Volume Output Measurement

Measurement of productivity growth requires output be measured in volume terms, that is as an estimate of the volume of output rather than its cost. This is usually achieved by applying suitable price indices, or "deflators", to estimates of the cost of the output. Price indices should

account for changes in observed and unobserved price, including changes in quality. If products improve in quality, but observed price stays the same, effective prices have fallen – this can be thought of as getting 'more' (a higher quality good) for the same price, and thus the effective price falling. Prices of high-tech products like laptops and mobile phones are explicitly adjusted for quality change in the inflation statistics using a variety of techniques, but most services are not adjusted for quality change explicitly (ONS, 2019).

In measurement of public service productivity, the UK ONS makes explicit adjustments for changes in service quality, and applies these to the change in the 'quantity' of output, in their 'public service productivity' statistics (ONS, 2022), but not to output measures in the UK National Accounts. For instance, in estimating the true growth in the volume of public service education services, quality measures of exam attainment are incorporated alongside quantity measures of the number of students. This relies on high-quality and relevant data to proxy for quality changes, which are attributable to the service being provided. Where this can be done, the estimates are likely to be of high quality, and ONS is a world-leader in the measurement of public service output – however, this has high data demands and requires significant research effort.

Ideally, future work would explore direct volume output measures for the non-profit sector, similar to those used for public sector output. For instance, the volume of output of non-profits working to help people back into employment could be measured directly by the number of people supported or the number of coaching sessions delivered. Crucially, these would need to be adjusted for changes in quality, such as the increase in the number of people obtaining sustained employment who would not otherwise have done. This would require significant investment in data collection and methodology.

For the proof of concept in this article, we will use price indices covering relevant activities to deflate the estimates of the cost of GVA in the non-profit sector. This will give estimates of the growth in "real GVA" (GVA in constant prices). However, this is crucially dependent on the relevance and quality of the deflators used.

Summary and Conceptual Framework

To summarize, we make the following modifications to current National Accounts measurement to produce conceptually superior estimates of the level of productivity of the non-profit sector:

- Adjust labour inputs to also capture volunteer time, by estimating the fraction of volunteering time that relates to NPISH units in the National Accounts;
- Adjust the value of GVA to capture:
  - the cost of volunteer time (covering shadow wages and salaries and shadow non-wage labour costs)
  - the non-pecuniary value workers in the non-profit sector receive from working in that sector, so as to put the valuation onto market equivalent rates
  - a 'normal' rate of return on cap-

ital, as well as consumption of fixed capital

For estimates of productivity growth, we use price indices of relevant activities to deflate the (adjusted) GVA of the non-profit sector.

Our adjusted GVA measure can thus be written as:

$$GVA^* = W_p^{NPS} L_p + \alpha W_p^{NPS} L_p + W_p L_v + CFC + \text{`normal'} NOS$$

Data and Methods

Accurate productivity measures require consistency between the input and output measures used – namely that they correspond to the same activity, and cover the same time period. Measures of the input and output of the non-profit sector suffer issues that make good productivity measures challenging.

To make "proof of concept" estimates of our expanded GVA concept for the non-profit sector, and accordingly productivity measures, we use a range of publicly available data and some creative methods and assumptions. The publicly-available data are limited, and the results in this article are accordingly fairly uncertain. With further work, including with microdata sources, we believe considerable improvements would be possible.

The data sources used in this article are set out below. Links to the data used are provided in the Data Appendix.[10]

Current Price GVA of the NPISH Sector (before adjustment)

Data from UK National Accounts publications from ONS give us compensation of employees and gross operating surplus (which is just equal to consumption of the fixed capital in the absence of any net operating surplus) for the NPISH sector, which added together gives GVA (ignoring net taxes on production).

We are grateful to the ONS for publishing the proportion of GVA in each industry that comes from the NPISH sector, annually between 1997 and 2019 (see Data appendix for link, and Appendix B for summary table).[11] We combine these with ONS estimates of GVA in each industry (from the "GDP low-level aggregates" dataset) to estimate NPISH GVA in each industry, and then aggregate for a sector-whole figure, which approximately matches the estimate from aggregate CFC and CoE above.[12]

By doing so, we can explore the industrial make-up of the NPISH sector in the National Accounts for the first time (see Appendix B for a summary).[13] As measured, around three-quarters of the NPISH sector comes from the education industry – primarily reflecting universities, as well as other education institutions that meet

10 See the online appendix at the following link: http://www.csls.ca/ipm/44/IPM_44_MartinFranklinArticle_OnlineAppendix_.pdf

11 See the online appendix at the link provided in footnote 10

12 Not exactly, due to rounding and the omission of net taxes on production.

13 See the online appendix at the link provided in footnote 10

the NPISH inclusion criteria (such as nurseries and private schools). Since universities are not what most people are interested in when considering the non-profit sector, we present estimates with and without the education industry included.[14]

It is worth noting we are not using estimates of NPISH final consumption expenditure (FCE), a component of the expenditure measure of GDP. By convention, the NPISH sector is assumed to consume its own non-market output, in the same was as for the government sector consuming its non-market output (government final consumption expenditure). The UK ONS measures real NPISH FCE by deflating estimates of current price output of the sector, comprised of compensation of employees, intermediate consumption, consumption of fixed capital, and net taxes on production. Deflators are chosen or constructed to accord with the relevant concepts. This is the same method as for estimates of much government output, although some government output is also measured 'directly' using cost-weighted activity indices.

Value of Volunteering

The UK Household satellite account (produced by ONS) provides estimates of the value of formal volunteering, annually from 2005 to 2016 in the latest release (ONS, 2018). These are based on the estimated hours of regular, formal volunteering, sourced from various surveys including most recently the Community Life Survey (run by research agency Kantar Public on behalf of DCMS). These hours are then multiplied by estimated hourly wage rates for appropriate occupations, sourced from the Annual Survey of Hours and Earnings (ASHE). For more details on the ONS methods, see ONS (2013). The valuation is independent of the allocation of volunteering to industries.

We extend these estimates in two ways: over time and accounting for non-wage labour costs. We then establish what fraction of this volunteering should be included in NPISH, and allocate it to industries.

Extension in Time

We extend estimates back to 1997 and forward to 2019, based on a model that approximates as closely as possible the methodology in the ONS Household satellite account, using only publicly available data. Given the scope of this article and without access to microdata, this necessarily requires additional assumptions and modelling.

Specifically, we build a model based on:

- The rate of participation in regular, formal volunteering, by age group, sourced from the Community Life Survey and earlier Citizenship Survey. Since data for earlier periods are not for every year, and the survey mode changes over time, we interpolate, splice between sources, and extrapolate as necessary.

14 See for example the definitions used for the NCVO Almanac: https://www.fc.production.ncvocloud.net/ncvo-publications/uk-civil-society-almanac-2021/about/definitions/general-charities

- The size of the UK adult population by age group, sourced from *nomis*, based on mid-year population estimates from ONS.[15]
- The average hours of volunteering by age group, based on information in ONS (2013), ONS (2017b) and published by DCMS in 2022 (see Data Appendix) with additional modelling and adjustments.[16]
- The average wages of relevant occupations, sourced from ASHE, following the information in ONS (2013).

This model gives a close match for the value of volunteering reported in the household satellite account, and we use this to extrapolate official estimates. Chart 1 shows our modelled estimates come close to the official figures in both magnitude and trend, and we use our model to extend the official estimates.

The first three factors in our model (participation, population, and average hours) provide an equivalent means to extrapolate hours of volunteering, necessary to add to labour inputs. Our estimate of hours worked is a reasonable match for the data in ONS (2013) and ONS (2017b) in most years with available comparisons (Chart 2). New data published by DCMS in 2022 (see Data Appendix) is also similar up to 2015, after which it suffers from a mode effect and is not comparable.[17]

Accounting for Non-Wage Labour Costs

The ONS Household satellite account values volunteering only by a shadow wage (sourced from ASHE), which does not account for the value of non-wage labour costs that an employer would incur if the labour were paid.[18] While these non-wage labour costs are not actually incurred, they are a necessary addition to make the shadow wage for the volunteer input conceptually equivalent to that of paid employees in the sector. We use National Accounts data to calculate the ratio between "wages and salaries" and "compensation of employees" of the NPISH sector between 1997 and 2019, and use this to scale up the (extended) volunteering estimates from the household satellite account, which are based on the value of (shadow) wages only. Chart 3 shows this uplift ratio for the NPISH sector, as well as for non-financial corporations, government and the whole economy. The series for NPISH is mostly between that for the whole economy (lower) and government (higher).[19]

Allocation of Volunteering Time and Value to Industries

To incorporate volunteering into the output and inputs of the non-profit sector, we

15 To access *nomis* look at the following link: https://www.nomisweb.co.uk/

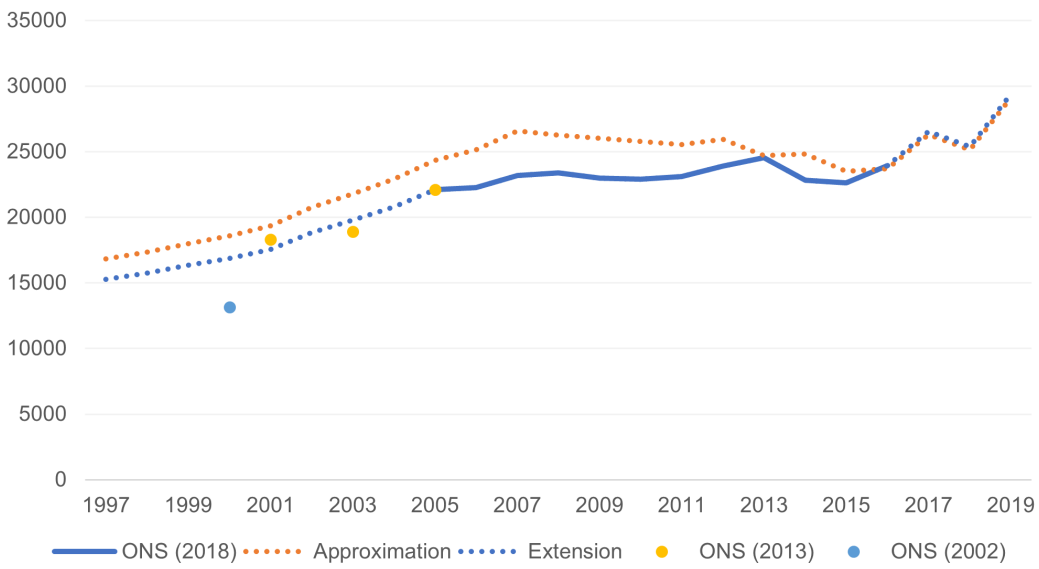
16 See the online appendix at the following link: http://www.csls.ca/ipm/44/IPM_44_MartinFranklinArticle_OnlineAppendix_.pdf

17 See the online appendix at the link provided in footnote 16.

18 This is our reading of ONS (2013) and ONS (2018).

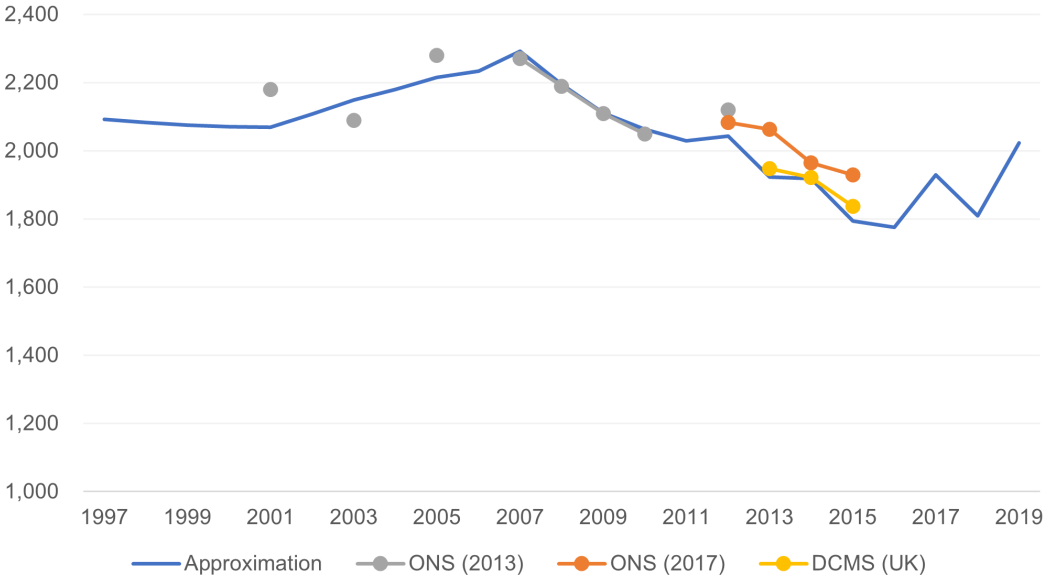
19 There is a spike in the NPISH series in 2018, due to the one-off recording of an increase in lecturers' pension contributions. We are grateful to an anonymous referee for this information.

Chart 1: Value of Volunteering in the United Kingdom, Existing Estimates and Extension, 1997 to 2019, £ million



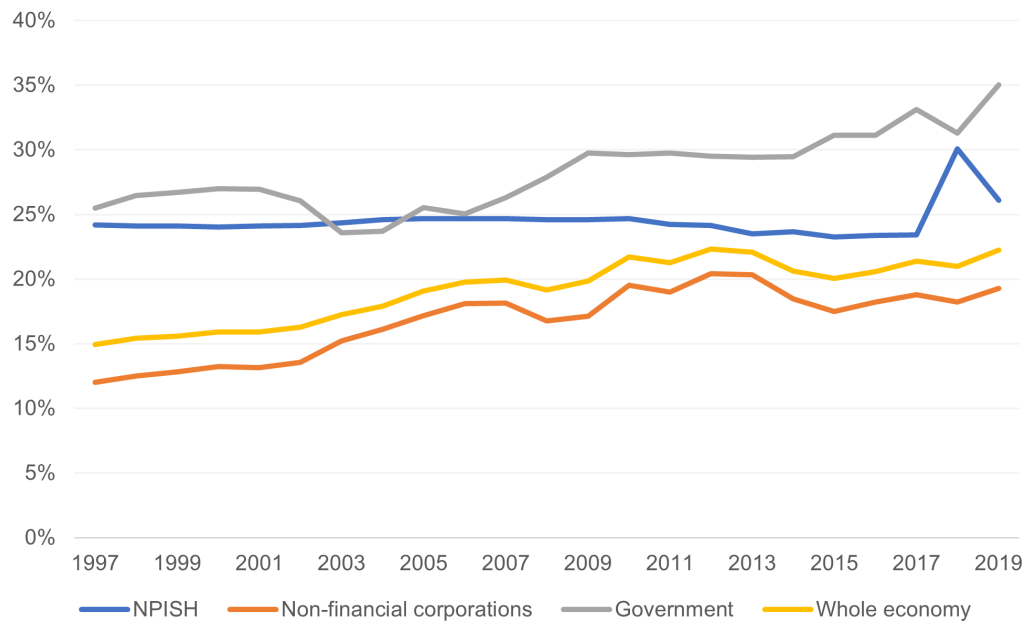
Source: ONS – Household satellite account (various iterations, see Data Appendix); authors' calculations using various sources (see text).

Chart 2: Millions of Hours of Volunteering Per Year, Existing Estimates and Extension, 1997 to 2019



Source: ONS (2013), ONS (2017), DCMS (2022), authors' calculations.

Chart 3: Uplift from Wages and Salaries to Compensation of Employees, Various UK Institutional Sectors, 1997 to 2019



Source: ONS – various Blue Book 2021 data, see data appendix; authors' calculations.

Notes: The NPISH series is much flatter than for other sectors, likely reflecting the use of assumptions or fixed proportions in the calculation by ONS. The spike in the NPISH series in 2018 is due to the one-off recording of an increase in lecturers' pension contributions.

need to ensure that it relates to the same activity as the rest of the input and output measures. For this article, that means that it should relate to activity in the NPISH sector. Not all volunteering will relate to activity in the NPISH sector – for instance, some volunteering could be in government-funded schools or hospitals, which would relate to activity in the government sector. Some volunteering (such as informal community groups) might not relate to any activity in the National Accounts boundary, which is clearly not relevant to the NPISH sector either. We aim to incorporate only the volunteering which relates to the NPISH sector in our estimates.

The source of data on volunteering is not related to the National Accounts or business statistics, which makes strict alignment with industries and sectors difficult. An indication is given by respondents, who report the 'field' of volunteering they participate in, on the Community Life Survey. We make assumptions about the proportion of volunteering which is relevant to the NPISH sector based on the 'field' of volunteering', as shown in Table A2 in the appendix.[20] We also assign 'fields' to industries based on the given descriptions of the fields.

We are grateful to DCMS for publishing a bespoke breakdown of the volunteering data, covering five years from 2016/17 to 2020/21. Given the various issues of in-

20 See the online appendix at the following link: http://www.csls.ca/ipm/44/IPM_44_MartinFranklinArticle_OnlineAppendix_.pdf

terpreting the data for our purposes, and to reduce the effects of sampling error, we take a simple average across years rather than reflecting year-to-year changes. Since respondents can volunteer in more than one 'field', we rescale the proportions to 100 per cent. Where volunteering could plausibly relate to multiple industries, we divide the time equally amongst the possible industries.

Multiplying the proportions of volunteering in each 'field' from the published data, by our assumptions of relevance as detailed in Table A2, yields an estimate of the relevant proportion of total volunteering; this is 58 per cent of volunteering relating to NPISH, or 54 per cent if excluding Education. As such, most of the volunteering we identify is in the non-Education NPISH sector.

Uplift for the Value of the Non-Pecuniary Benefit of Working for Non-Profits

As argued in the previous section, it is conceptually appropriate to inflate the labour payments in the NPISH sector to put them on a "market equivalent" basis, since workers in the non-profit sector likely accept lower wages due to non-pecuniary benefits they receive from working in the sector. DCMS (2020) and Croner (2017) find that workers in the non-profit sector earn 20-30 per cent less than workers in other sectors. O'Halloran (2022) controls for individual level factors such as education and experience, and suggests that the true gap is closer to 5 per cent, but this is based on a narrower concept of the non-profit sector than NPISH. We apply a 10 per cent increase, constant over time. This could be refined with microdata work that would enable analysis that controls for education and experience, amongst other factors, and allow this to vary over time.

Uplift for Gross Operating Surplus

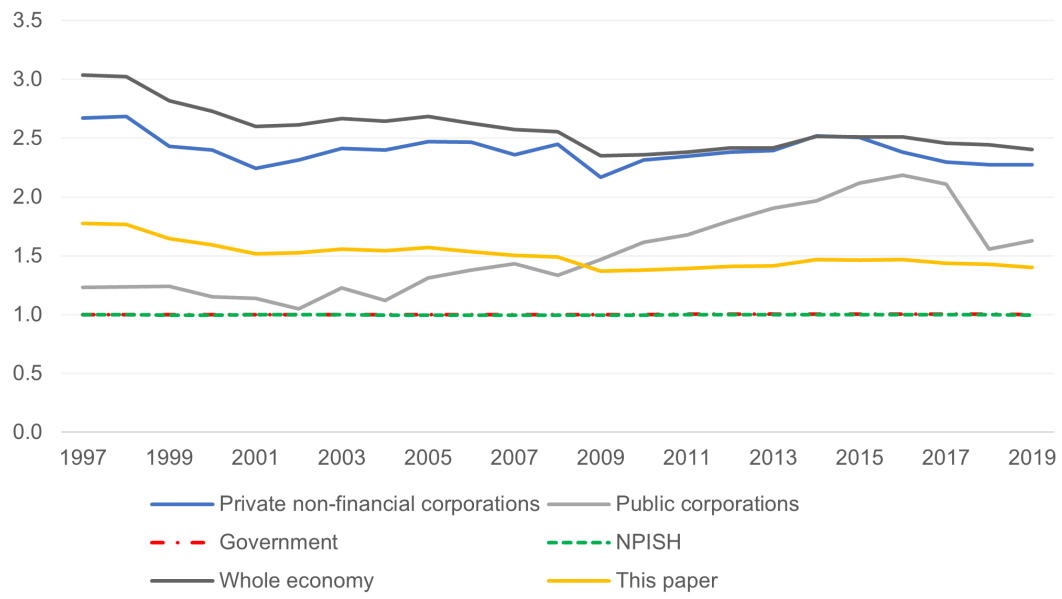
Using data from the National Accounts, we estimate the ratio between consumption of fixed capital and gross operating surplus by institutional sector (Chart 4). For NPISH and government, this ratio is 1, since gross operating surplus is only consumption of fixed capital. For the private sector, and the economy as a whole, the ratio varies between about 3 and 2.5, declining non-uniformly over time.

For the NPISH sector, we use an average uplift of 1.5, which is close to the average for the public non-financial corporations sector. Public corporations share some similarities to NPISH, in that they have a somewhat unusual mix of market and non-market characteristics and objectives. The public corporations sector is dominated by a small number of large bodies, which makes the data somewhat volatile. For our uplift ratio for the NPISH sector, we fit the trend of the ratio for the whole economy to the level from the public corporations sector. Multiplying this ratio by the known total for consumption of fixed capital gives a good first approximation to account for 'normal' NOS for the NPISH sector.

Deflators and Real GVA

In order to explore the growth of the volume of output, and hence of productiv-

Chart 4: Ratio of Gross Operating Surplus (GOS) to Consumption of Fixed Capital (CFC) for Selected UK Institutional Sectors, Used in this Article



Source: ONS – various Blue Book 2021 data, see data appendix; authors' calculations.

Notes: NPISH and government ratios can vary very slightly from 1 due to rounding differences across ONS publications.

ity, we must adjust for inflation over time using price indices, also known as "deflators". The appropriate deflators for NPISH GVA are those that reflect the activities of NPISH, and are conceptually well matched to the implied industry GVA deflators of the relevant industries.

We construct implied industry GVA deflators from the ONS industry GVA data (the "GDP low-level aggregates" dataset), by dividing current price GVA by the chained volume measure of GVA. This gives a GVA deflator for each industry which makes up NPISH GVA. We assume that the price growth of the aggregate industry is a good match for price growth of the NPISH component of that industry. This will be a better assumption when NPISH accounts for a large fraction of the industry.

We then construct a composite deflator for NPISH GVA using the relevant industry deflators in the right combination. Specifically, we construct a chained Paasche price index, using the industry shares of total NPISH GVA as weights.[21] The industry shares of NPISH GVA come from the industry GVA data described earlier (see Appendix B for a summary of these shares).[22] We do this with and without the education industry, adjusting weights accordingly, since we exclude education in various

21 A Paasche index uses weights in the current period, as opposed to a Laspeyres index which uses weights from the base period. A chained index means the weights are updated, in our case each year. It is typical to use Paasche indices for prices, and Laspeyres indices for volumes.

22 See the online appendix at the following link: http://www.csls.ca/ipm/44/IPM_44_MartinFranklinArticle_OnlineAppendix_.pdf

results in section 4. Applying these composite deflators to the NPISH current price GVA estimates gives real GVA estimates.

The industry GVA CVM data in the GDP low-level aggregates dataset are double-deflated estimates, meaning that different deflators have been applied to each output by product, and intermediate consumption by product. Double deflation calculates volume estimates of output and intermediate consumption separately, and then deducts the real estimates of intermediate consumption from the real estimates of total output.[23] As such, the deflators implied by the CVM data reflect the balance of output and intermediate consumption.

In our framework, we increase the estimate of output by adding the value of volunteering, increasing paid compensation of employees, and adding 'normal' net operating surplus. However, we do not change the estimate of intermediate consumption, which means that the balance of output and intermediate consumption in GVA changes.[24] As such, the implied deflators from the unadjusted GVA data might not be appropriate for the new output estimates, but will continue to be appropriate for the unadjusted GVA component of our new total.

To construct a suitable output deflator, we use the ONS "experimental industry output deflators", which are a mix of industry output and product deflators, reflecting the mix of products produced by each industry. We create a chained Paasche price index from these industry output deflators, using the sum of the GVA adjustment components by industry (volunteering value, non-pecuniary wage uplift, and 'normal' net operating surplus) as weights. Chart 5 shows our constructed deflators, alongside the unadjusted versions.

The quality of the composite deflators, and thus the real GVA estimates, is clearly dependent on the quality of the underlying industry output deflators. Table A3 in the appendix shows details of the make-up and quality of these industry output deflators, using information published in ONS' GDP(O) sources catalogue.[25] Table A3 includes the proportion of total adjusted GVA that each industry accounts for (with and without the education industry), the data source/method for the deflator, the associated quality rating given in the Eurostat Prices and Volumes handbook, and the average annual growth rate in the deflator between 1997 and 2019.[26]

Many deflators are sub-optimal, with only 16 per cent of the total receiving an A rating. Large fractions are "derived"

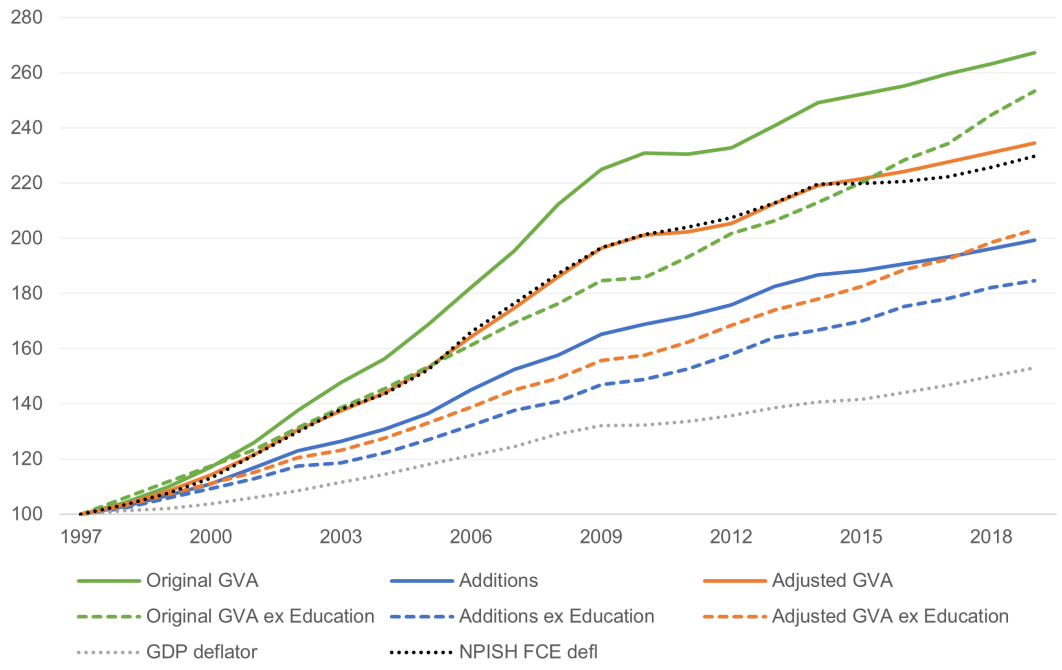
23 See more on double deflation in ONS (2017a).

24 For example, imagine that unadjusted total output was £20m, and intermediate consumption was £10m, such that unadjusted GVA was £10m. Our additions add £5m to output, making adjusted total output £25m and adjusted GVA £15m. But the industry GVA deflators are on the basis of output being £20m and intermediate consumption being £10m, so they might not be appropriate for the additional £5m of output – there is now more output relative to intermediate consumption than there was before.

25 See the online appendix at the following link: http://www.csls.ca/ipm/44/IPM_44_MartinFranklinArticle_OnlineAppendix_.pdf

26 The quality ratings are given in the ONS GDP(O) sources catalogue (ONS, 2021); we have not checked this information with the Eurostat Prices and Volumes handbook.

Chart 5: Various Deflators for the NPISH Sector and GDP, Index 1997 = 100



Source: ONS – various; authors' calculations

Notes: FCE = Final consumption expenditure; GVA = Gross Value Added. Solid lines are for total NPISH (including Education industry); dashed lines are for NPISH excluding Education. "Original GVA" series use implied GVA deflators; "Additions" series use industry output deflators; "Adjusted GVA" series are the aggregate of "Original GVA" and "Additions". Summaries of growth rates can be found in Table B4 of Appendix B.

deflators, meaning the deflator is not directly estimated, but derived from independent volume and current price output estimates. This is common when measuring public sector output since most such output does not have an associated price. For instance, the implied deflator for Education output is partly the difference between the growth rate in the cost of delivering education (current price output), and the growth rate in the cost-weighted number of students receiving education (volume output). While direct volume output estimates are often high quality, without adjustment for changes in quality, these derived deflators will tend to overstate price changes (though quality will not always be increasing).[27] Indeed, the average annual growth rate of the deflators in Table A3 tends to be higher than that of the implied GDP deflator, and especially so for those that are partly or fully "derived" deflators. This faster rate of growth in the deflator will depress the growth in real output, and may thus lead us to understate growth in real (adjusted) NPISH GVA and productivity.

The GDP deflator grows far slower than the various other deflators in Chart 5, since

27 Adjustment of non-market output for changes in quality is prohibited under the European System of Accounts 2010, currently followed by the UK ONS, although is permitted under the System of National Accounts 2008, which is followed by other countries.

its composition is quite different. In covering the whole economy, the GDP deflator will reflect trends in the prices of manufactured goods and technology products, as well labour-intensive services. The manufacturing industry has seen faster productivity growth than the rest of the economy over the past two decades, and thus slower price inflation. The prices of technology products have largely fallen over this period, once accounting for quality change. These make up part of the GDP deflator, thus reducing the measure of aggregate price changes. The relevant deflators for the NPISH sector consist principally of labour-intensive services, and so do not reflect such trends.

Labour Inputs

ONS does not publish estimates of workers, jobs or hours worked by institutional sector, making estimates of even the paid hours of work in the NPISH sector difficult. We use the GVA proportions, and apply them to industry-level hours worked estimates from the ONS productivity data. This implicitly assumes that the level of labour productivity per paid hour worked (i.e. ignoring the contribution of volunteering, and before making the other adjustments described in earlier sections) in an industry is the same in the NPISH sector and non-NPISH sector for that industry, since the same proportion of GVA and labour inputs would be allocated to NPISH from the industry. While this is less than optimal, it seems the only viable option for now.

Results

The results in this section reflect considerable uncertainty in the data and assumptions, described in section 3. While we believe these are useful first estimates, they would benefit from further work, and should be interpreted accordingly. As such, we present a range of estimates in places, reflecting our uncertainty particularly relating to deflators.

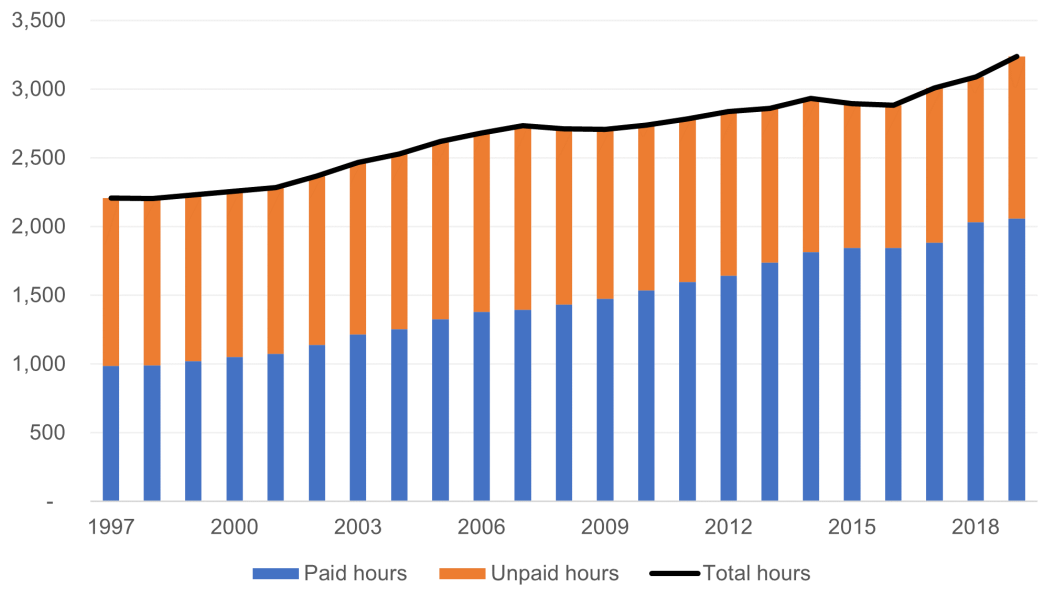
Recall that the education industry makes up a very large share of currently-measured NPISH GVA (around 70-80per cent), which primarily represents universities, which are not what most people are interested in when thinking about the non-profit sector. The output deflator for this activity (which relates to the whole education industry, including government-owned schools) is also unusual: it is derived from measures of spending, and volume output measures of cost-weighted activity indicators (number of pupils in schools, etc.), not adjusted for quality change. As such, we present estimates of NPISH including and excluding education, with our preferred measure being the variants without education.

Labour Inputs

Labour inputs are measured by hours worked, which are the sum of paid hours worked and volunteering hours worked.

For NPISH including education (Chart 6), paid hours worked represent about two-thirds of the total in recent years, up from about half in early years. These shares (the ratio of volunteer to paid labour) are fairly consistent with past work from the Johns Hopkins Centre for Civil Society Studies

Chart 6: Hours Worked, NPISH Sector Including Education, 1997 to 2019, Millions of Hours per year



Source: ONS, DCMS, authors' calculations.

(e.g. Johns Hopkins Centre for Civil Society Studies, 2017). Total hours worked increases quickly over time, at 1.8 per cent per year on average between 1997 and 2019, compared with average annual growth of 0.8 per cent in the economy as a whole. Volunteering hours increase slowly between 1997 and 2007, before falling, and finish in 2019 down slightly on 1997 levels, consistent with Chart 2.

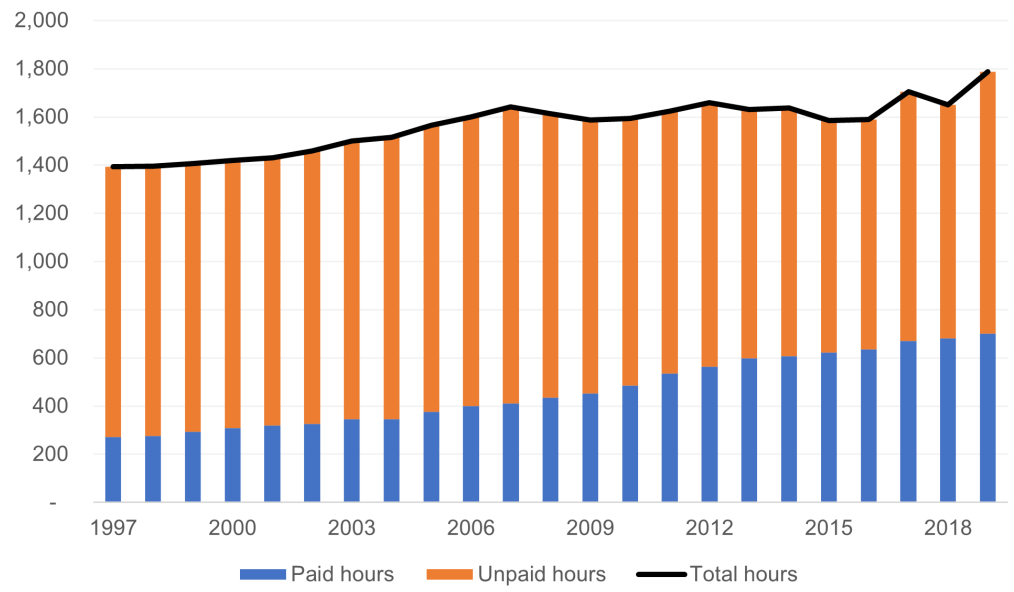
For NPISH excluding education (Chart 7), volunteering hours represent a much larger share of the total – about 80 per cent in the early years, falling to about 60 per cent in more recent years, as paid hours worked have grown more quickly. Total hours worked grow at an average annual rate of 1.1 per cent between 1997 and 2019, faster than for the economy as a whole, despite the large slow-growing volunteering component.

Current Price GVA

Current price GVA comprises the components in the National Accounts of compensation of employees and consumption of fixed capital, and our additions of the value of volunteering (including a shadow non-wage labour cost, not included in ONS household satellite account estimates), a 'normal' return on capital, and an uplift for the non-pecuniary benefit received by employees in the sector (to convert wages to true economic costs of labour inputs).

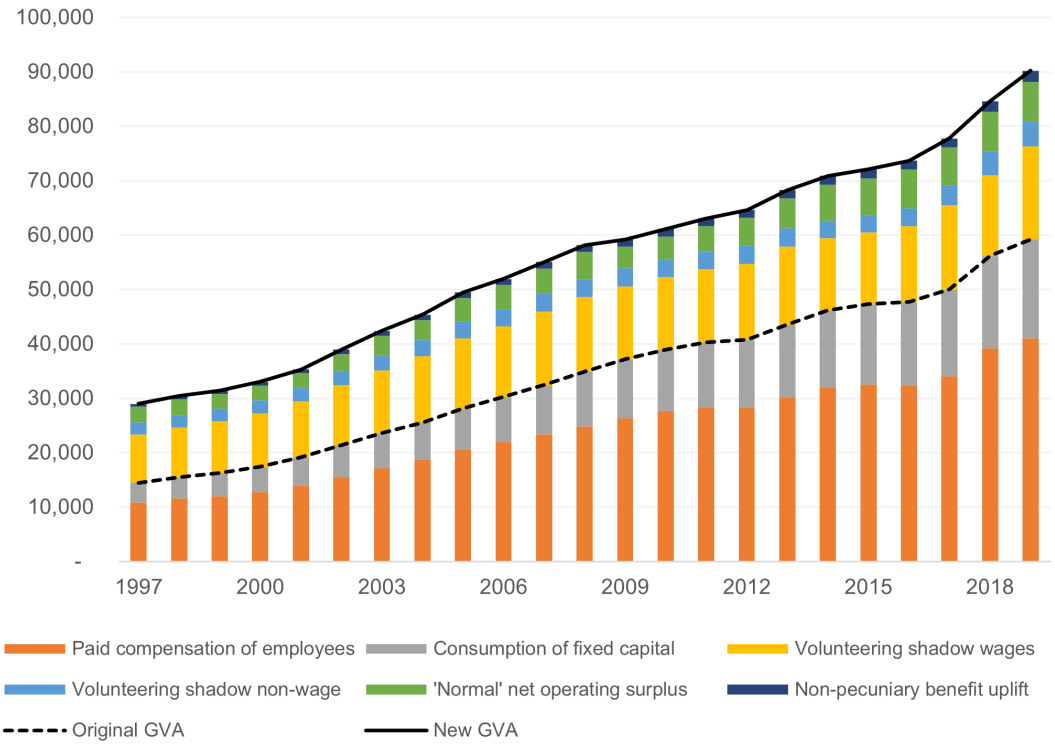
For NPISH including education (Chart 8), these adjustments account for about 35-50 per cent of the total in most years, with their relative contribution falling over time due to more rapid growth of the national accounts components. NPISH GVA goes from accounting for about 2.9 per cent of total GVA in 2019 before adjustments, to

Chart 7: Hours Worked, NPISH Sector Excluding Education, 1997 to 2019, Millions of Hours per year



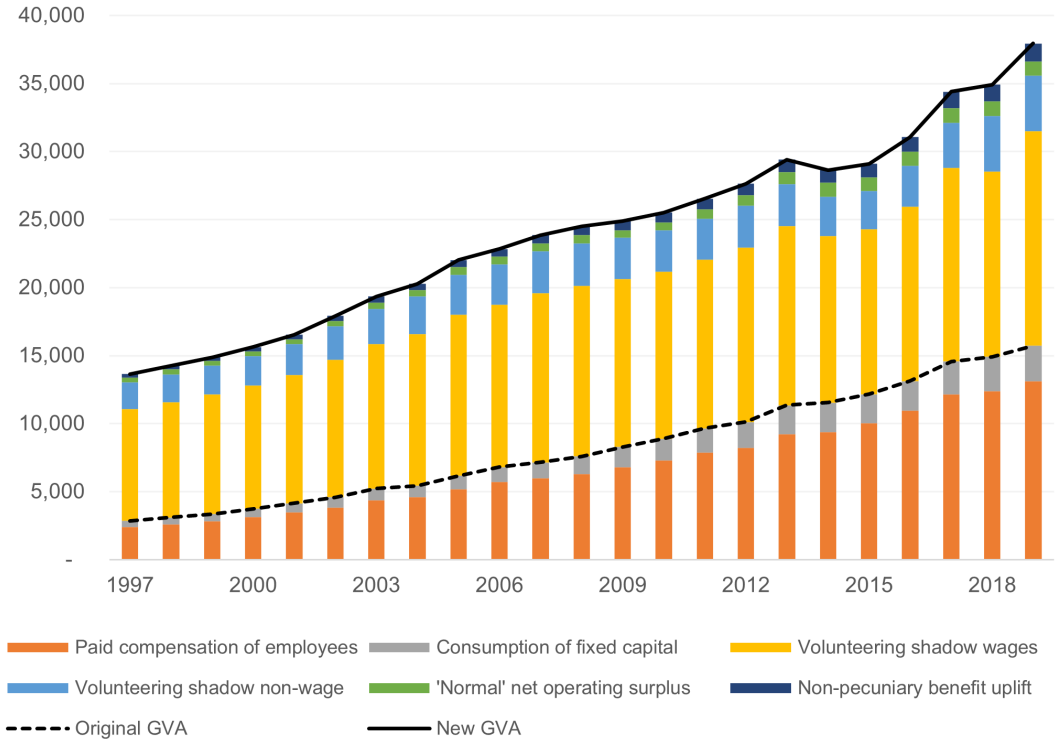
Source: ONS, DCMS, authors' calculations.

Chart 8: Components of Current Price GVA, NPISH Sector Including Education, 1997 to 2019, £ million



Source: Authors' calculations from various sources (see text).

Chart 9: Components of Current Price GVA, NPISH Sector Excluding Education, 1997 to 2019, £ million



Source: Authors' calculations from various sources (see text).

4.4 per cent after adjustments.[28]

For NPISH excluding education (Chart 9), the adjustments make a far larger difference, contributing about 60-80 per cent of the total. Volunteering is the primary contribution, although this is a relatively slow-growing component. This subset of NPISH accounts for about 0.8 per cent of GDP in 2019 before adjustments, rising to 1.9 per cent after. Table 1 summarizes the contribution of each component of GVA, for NPISH including and excluding Education, in 1997 and 2019.

Real GVA

Our central estimates of real GVA (inflation-adjusted GVA) uses a composite GVA deflator (from the implied industry GVA deflators) for the national accounts components of GVA, and a composite output deflator for the additional components of GVA. However, there are considerable uncertainties around both components, so in this section we present three sensitivities using different deflators. The full list of series are summarised in Table 2. See section 3 for description of methods and terms.

For NPISH including education (Chart 10), our central estimate [orange solid line] grows at an average annual rate of 1.3 per cent between 1997 and 2019, with much faster growth coming between 2017 and 2019. This is slower than the growth in real

28 Since we are increasing NPISH GVA with these conceptual adjustments, we have also increased whole economy GVA by an equivalent amount when calculating the share that NPISH accounts for in the economy.

Table 1: Components of Current Price GVA, NPISH Including and Excluding Education, 1997 and 2019, £ billion

Component	NPISH including Education		NPISH excluding Education	
	1997	**2019**	**1997**	**2019**
Paid compensation of employees	10.8	41.0	2.4	13.1
Consumption of fixed capital	3.7	18.2	0.5	2.6
Sub-total: Original GVA	*14.5*	*59.2*	*2.9*	*15.7*
Volunteering shadow wages	8.9	17.1	8.2	15.8
Volunteering shadow non-wage labour costs	2.2	4.5	2.0	4.1
'Normal' net operating surplus	2.9	7.3	0.4	1.0
Non-pecuniary benefit uplift	0.5	2.1	0.2	1.3
Total: New GVA	*29*	*90.2*	*13.6*	*38*

Source: ONS, authors' calculations.
Notes: Components may not sum to sub-total and total due to rounding.

Table 2: Variants of Real GVA Used in the Article

Variant	Deflator for unadjusted GVA component	Deflator for adjustments to GVA (additional output)
1 – Adjusted (Central case)	NPISH GVA deflator	NPISH Output deflator
2 – Adjusted (All GVA deflator)	NPISH GVA deflator	NPISH GVA deflator
3 – Adjusted (All Output deflator)	NPISH Output deflator	NPISH Output deflator
4 – Adjusted (GDP deflator)	GDP deflator	GDP deflator
5 – Unadjusted	NPISH GVA deflator	-

GDP [black dotted line], which grew at an average annual rate of 2.0 per cent between 1997 and 2019. Before adjustments [blue solid line], our estimate of NPISH GVA volume growth was higher, at 2.0 per cent on average per year.

However, using different deflators gives quite different results, as shown in Chart 10. Variant 2 [yellow dashed line], which uses the implied GVA deflators for both the existing and additional components of our GVA measure (Table 2) yields slower growth, and Variant 3 [grey dashed line], which uses our constructed output deflator for all components yields faster growth. Variant 4 [light blue dashed line], which uses the GDP deflator, results in yet faster growth, in line with the far slower price inflation seen in Chart 5.

For NPISH excluding education (Chart 11), our central estimate [orange solid line] grows at an average annual rate of 1.4 per cent between 1997 and 2019, which is again slower than for the economy as a whole. The unadjusted series [blue solid line] grows much faster, at an average rate of 2.6 per cent per year between 1997 and 2019. The adjusted series grows much slower due to the addition of the slow-growing volunteering component.

Using different deflators again gives quite varied results, as shown in Chart 11. Variant 2 [yellow dashed line], which uses the implied GVA deflators for both the ex-

isting and additional components of our GVA measure, again yields slower growth. Variant 3 [grey dashed line], which uses our constructed output deflator for the total measure, and Variant 4 [light blue dashed line], which uses the GDP deflator, both yield markedly faster growth.

Labour Productivity

Labour productivity is calculated as GVA divided by hours worked. Levels of productivity are based on current price GVA, and growth rates of productivity are based on real GVA.

The level of labour productivity in the NPISH sector is lower than the UK average before and after adjustments (Chart 12). While the adjustments increase the level of current price GVA substantially, it also increases hours worked by a larger margin, such that the level of labour productivity falls a little.

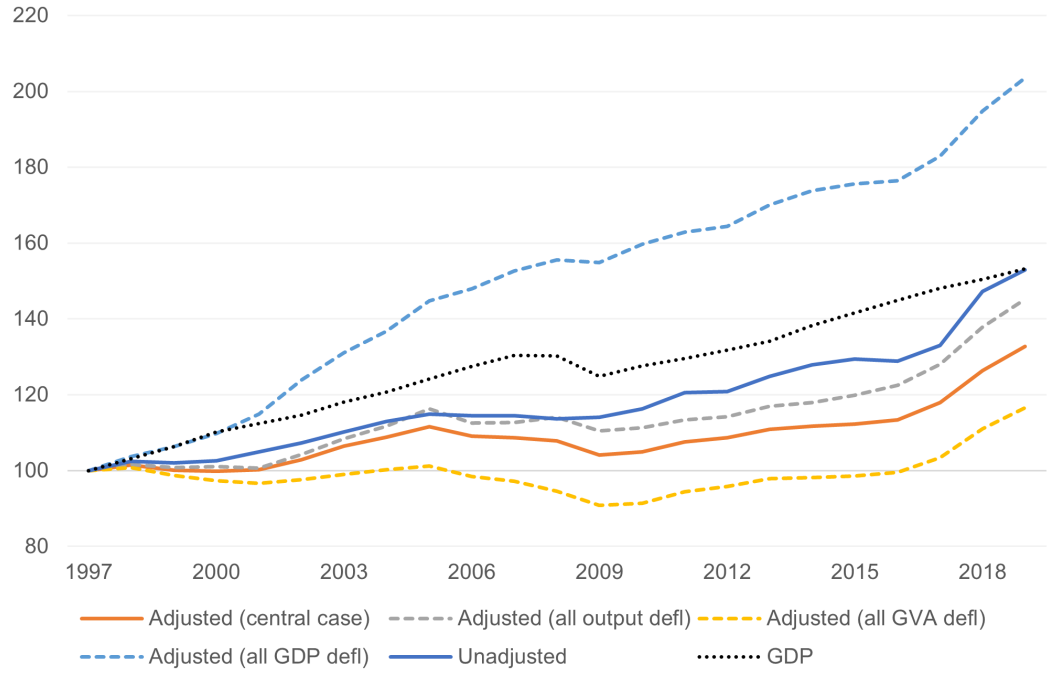
NPISH including education is consistently more productive in levels terms than NPISH excluding education. The former includes universities which are reasonably productive as measured. Both variants are similar to the level of productivity in other labour-intensive industries like retail, and accommodation and food services. The UK average level includes highly productive, often capital-intensive industries such as mining and quarrying, and real estate.

In our central measures, real labour productivity in the NPISH sector including Education falls between 1997 and 2019, both before and after our adjustments (Chart 13). The adjustments reduce the extent of the fall in productivity substantially. Between 1997 and 2019, output per hour worked falls at an average annual rate of 0.5 per cent, compared with 1.1 per cent growth for the economy as a whole. The variants using alternative deflators, as per Chart 10, give commensurately faster productivity growth. This is especially true when using the GDP deflator, which follow the trends in real GVA (Chart 10) and deflators (Chart 5).

However, a large fraction of this measure is education, for which the volume of output is measured without adjusting for quality changes, and grows slowly. ONS public service productivity (PSP) statistics, following the framework in the Atkinson Review, includes explicit quality adjustments on the volume of output for some service areas, including education. While this relates to government-provided education, these quality adjustments might nonetheless give a truer measure of the volume growth of the rest of the industry, including universities. We can apply the ONS PSP education quality adjustment growth rate to the education component of the NPISH sector, to produce an alternative measure of real GVA and thus productivity. This measure (green dashed line) grows faster than our central measure, since the measured quality of public education services is generally improving over the time series (reflecting more output being produced, for the same inputs), and this leaves productivity marginally higher in 2019 than in 1997.

For NPISH excluding education (Chart 14), our central measure sees labour productivity rising by an average of 0.3 per cent per year between 1997 and 2019, faster than the unadjusted measure. Once again, the results are quite sensitive to the choice of deflator (and hence real GVA mea-

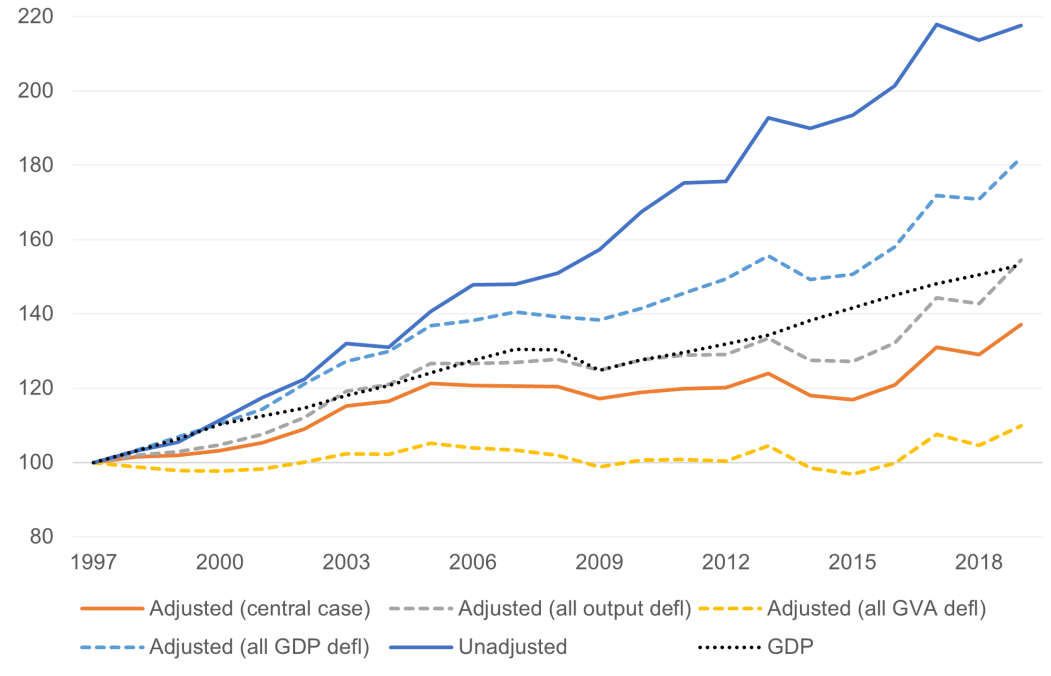
Chart 10: Real GVA, NPISH Sector Including Education, Multiple Variants, 1997 to 2019, Chained Volume Measures(CVM), Index 1997 = 100



Source: ONS; authors' calculations from various sources (see text).

Notes: See Table 4 for description of deflators used in each series.

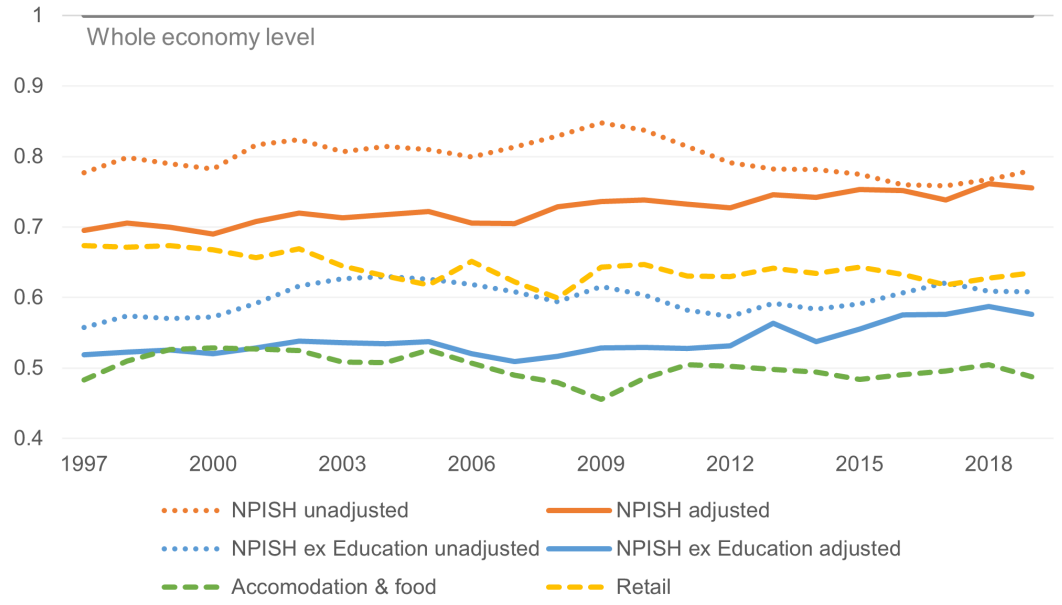
Chart 11: Real GVA, NPISH Sector Excluding Education, Multiple Variants, 1997 to 2019, Chained Volume Measures(CVM), Index 1997 = 100



Source: ONS; authors' calculations from various sources (see text).

Notes: See Table 4 for description of deflators used in each series.

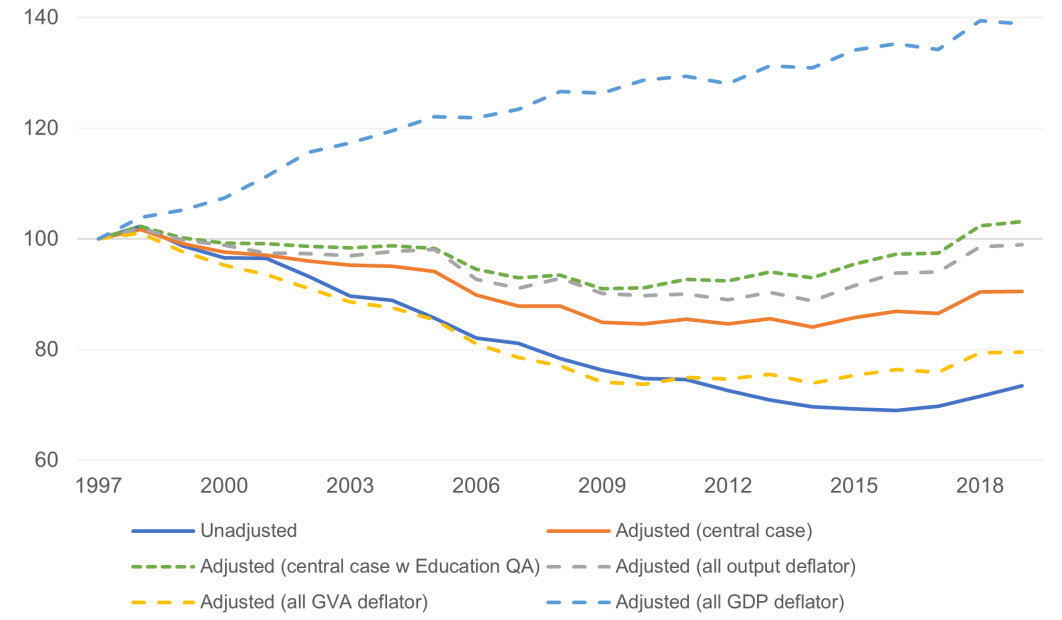
Chart 12: Level of Labour Productivity (Nominal GVA per hour Worked), NPISH Sector Including and Excluding Education, 1997 to 2019, Relative to the UK Average



Source: ONS – output per hour worked; authors' calculations from various sources (see text).

Notes: All series expressed relative to the UK average (UK whole economy) = 1.

Chart 13: Labour Productivity (Real GVA per hour Worked), NPISH Sector Including Education, Multiple Variants, 1997 to 2019, Index 1997 = 100



Source: Authors' calculations from various sources (see text).

Notes: See Table 4 for description of deflators used in each series.

sure, as in Chart 11). The variants using the GDP deflator, or the output deflator across all components, see faster productivity growth than our central case.

Labour productivity in other labour-intensive industries, like accommodation and food services and retail, have been close to flat between 1997 and 2019 (Table 3), so our central case is quite in-keeping with these similarly labour-intensive sectors. Unlike much of the rest of the economy, there is no evidence of a slowdown in productivity growth in the non-profit sector after the 2008 economic downturn – a phenomenon known as the "productivity puzzle".

Discussion

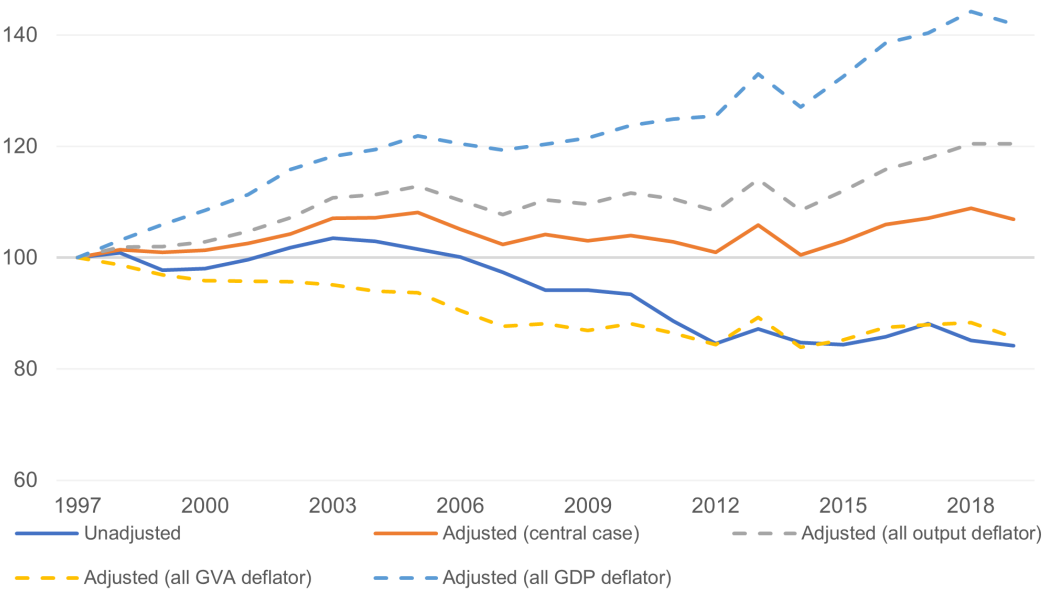
The article introduces conceptual adjustments to National Accounts data to, we believe, better reflect the value and growth of the output, input and productivity of the non-profit sector. For now, this is limited to the coverage of the National Accounts NPISH sector, although we hope that future work will expand to cover non-profit bodies regardless of their institutional sector in the National Accounts.

While the data and estimates in this article are tractable, and move in the right direction, they come with considerable uncertainties. In many areas, assumptions have been necessitated by lack of data or the scope of this article. This article has relied only on publicly available sources (and data made publicly available from ONS and DCMS, for which we are grateful) and use of microdata sources would enable refinement of the estimates and assumptions.

The results are particularly sensitive to the choice of price deflators, as showcased in Charts 13 and 14. Deflators for relevant industries tend to grow faster than for the economy as a whole, and in some cases very fast indeed. This (by identity) supresses the growth of real (inflation-adjusted) output, and thus the growth of productivity. The quality of the deflators is typically low, as seen from Table A2, which might explain the rapid increase in measured prices. The low quality and fast price growth are likely due to the use of deflators based mostly on costs, without adjustment for changes in service quality over time. Factoring in changes in quality, as in ONS public service productivity statistics, would tend to yield slower growth of the deflators, and commensurately faster growth of real output and productivity, since quality is generally measured to be increasing over time (though that need not be true in all cases).

Indeed, we believe the best approach for productivity measurement of the non-profit sector would mirror that of public services, following the Atkinson Review (Atkinson, 2005). This involves the identification of direct measures of the volume of output, and adjustment for changes in service quality over time. For instance, in the case of public education, output is measured based on the number of pupils in schools adjusted for attendance (a direct quantity measure, employed in the National Accounts), adjusted for changes in education quality which are proxied by changes in exam attainment, post-school outcomes, and student well-being (a quality measure, used only in ONS public service productivity statistics). An equivalent approach for the non-profit sector, while methodologically and practically difficult, would be op-

Chart 14: Labour Productivity (Real GVA per hour Worked), NPISH Sector Excluding Education, Multiple Variants, 1997 to 2019, Index 1997 = 100



Source: Authors' calculations from various sources (see text).

Notes: See Table 4 for description of deflators used in each series.

Table 3: Average Annual Growth Rates of Labour Productivity (Real GVA per hour Worked), 1997 to 2019 and Sub-Periods, Various Variants and Comparators

	1997-2007	2007-2019	1997-2019
NPISH including Education			
1 – Adjusted (Central case)	-1.3	0.2	-0.5
1a – Adjusted (Central case with Education quality adjustment)	-0.7	0.9	0.1
2 – Adjusted (All GVA deflator)	-2.4	0.1	-1.0
3 – Adjusted (All Output deflator)	-0.9	0.7	0.0
4 – Adjusted (All GDP deflator)	2.1	1.0	1.5
5 – Unadjusted	-2.1	-0.8	-1.4
NPISH excluding Education			
1 – Adjusted (Central case)	0.2	0.4	0.3
2 – Adjusted (All GVA deflator)	-1.3	-0.2	-0.7
3 – Adjusted (All Output deflator)	0.8	0.9	0.9
4 – Adjusted (All GDP deflator)	1.8	1.5	1.6
5 – Unadjusted	-0.3	-1.2	-0.8
Memo items			
Whole economy	2.0	0.4	1.1
Non-financial services*	1.5	0.8	1.1
Retail trades, except of motor vehicles	0.6	0.2	0.3
Accommodation and food services	-0.4	-0.7	-0.5
Government services*	-0.5	0.0	-0.2

Source: ONS – output per hour worked; authors' calculations from various sources (see text).

Notes: See Table 4 for description of deflators used in each series. "Non-financial services" excludes imputed rental from the real estate industry;"government services" is SIC 2007 sections O, P and Q, comprising Public administration and defence, Education, and Health and social care, these measures are consistent with the National Accounts and not adjusted for quality change. See Appendix B for equivalent figures of nominal GVA, hours worked, and deflators.

timal.

This article only partially addresses the important issue of "value" vs "cost". When output is not sold, as for the non-profit sector, the value of the output is very difficult to determine. We produce fuller estimates of the true economic cost of production, reflecting the full labour and capital costs, but this relates only precariously to the true social value of the output. As the old maxim says:"something is only worth what someone is willing to pay for it", except in this case, no one is paying (or at least, not paying what it is truly worth, given the purpose of the sector). However, the value of the output is still more appropriately thought of from the perspective of the recipient, than the funder or donor.

One way to put this is that many non-profits generate positive externalities – benefits that fall to those other than the individual deciding to "pay" for the services delivered by non-profits. There are at least two reasons to believe this would be the case.

First, while the person buying a good or service in a market sector is normally the person consuming that good or service, in the non-profit sector it can often be a donor that effectively "buys" the service for an entirely different group of beneficiaries. There is no reason to believe that the value the donor places on the output will be the same as the value that the direct beneficiaries or all other potential donors will place on the non-profit's output.

Second, non-profit interventions can often affect the consumption of publicly provided goods and services or the productive capacity of the wider economy. There are many studies that highlight the relatively high social benefit-cost ratios of charitable interventions, suggesting there are significant positive externalities to their work.[29]

To robustly estimate and incorporate the value of these benefits would require significant additional data to be gathered about the outputs and outcomes delivered by the non-profit sector. It would also require us to go 'Beyond GDP', since externalities (positive or negative) are not included in the National Accounts.

This article is a proof of concept of the measurement of the non-profit sector, and a first step in the right direction, leaving many avenues for further work. First, there would be considerable benefit for understanding the sector as a whole from extending the current approach to non-profit organizations outside the NPISH sector. These organizations are an important part of the "third sector", and the delineation based on institutional sector classification will be meaningless to most operating in this area. However, the non-profits operating outside the NPISH sector will be much harder to capture, and cannot be identified from aggregate data. It will therefore be necessary to use microdata analysis and data linkage to identify the relevant organizations and estimate their value added. One option would be to link the Charities Register (maintained by the Charity Commission for England and Wales) to the Inter-Departmental Business Register (IDBR) to identify registered charities

29 See for example, Pro Bono Economics (2020, 2021).

across all institutional sectors. However, some third-sector organizations will also not be registered charities. Analysis using the Annual Business Survey might allow identification of non-profit organizations by "revealed activity" – that is, the making of little to no profit for many years without exiting the market. Microdata analysis of the Community Life Survey would also likely improve the volunteering estimates, which are important.

Second, the UK government's announcement that it will work to develop a full non-profit satellite account (DCMS, 2022) should provide a sharper, more regular focus on the data limitations in the sector (and several of the potential building blocks for such a satellite account are contained within this article).

Finally, to generate more robust estimates of real output and productivity will require exploration of sources for direct output volume estimates and quality adjustments, in the spirit of the Atkinson Review. Given the heterogeneity of activity in the non-profit sector, this will likely entail research into a diverse range of domains, such as social care, museums and galleries, and R&D. The data may not yet exist, or be collected and consistent – some harmonization and collection will likely be necessary before it would be suitable for use in output measurement. Such an endeavour would be a substantial undertaking and is well beyond the scope of the present article. Measuring public service output and productivity in this way was only made possible by many years of investment by the ONS in the mid-2000s, and work continues to this day to develop the methods further (Foxton, Grice, Heys and Lewis, 2019). However, an equivalent investment in measuring and understanding outputs for the non-profit sector would provide a foundation for improved understanding of the value the sector provides to the wider UK economy.

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