

EXPLORING ALTERNATIVE DATA SOURCES FOR HOUSEHOLD WEALTH STATISTICS

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Exploring Alternative Data Sources for Household Wealth Statistics

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Abstract

This paper aims to explore and assess alternative data sources for wealth in order to improve existing pension wealth statistics. We find that, notwithstanding some limitations, the Wealth and Assets Survey (WAS) is currently the most comprehensive source. Then, we conduct a comparative analysis of WAS against alternative data sources, including potential new sources. Our findings suggest that, despite WAS being somewhat good at capturing variations in pension wealth across the population, it appears deficient in capturing well pension uptake for the lower three deciles. Together, pension wealth at the top end is also underreported. We recommend using alternative sources of information, such as a one-time survey and/or using a microsimulation approach to complement the available data.

Classification: D31, D14

Keywords: pension wealth, wealth distribution, inequality

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1. Introduction

Household wealth represents the availability of resources, that is, the difference between the value of a household's assets and the value of its liabilities. It is a crucial indicator of living standards and it can be used to assess financial resilience, including the ability to use assets to support the loss of income (ONS, 2022a). In particular, pension wealth statistics provide valuable insights into potential under-saving and retirement living standards (ONS, 2017, 2023). Additionally, when wealth is passed down across generations, beneficiaries may have opportunities that are not available to those who do not receive inheritances. This can have an impact on the descendants of individuals who currently have wealth and potentially on wealth inequality, particularly at the top of the distribution.

Despite the importance of household wealth for distributional analysis, there has been limited data on wealth in the UK. This paper seeks to explore and assess alternative data sources for wealth in order to improve existing wealth statistics, notably the data in the Wealth and Assets Survey (WAS). The objective is to provide an overview of possible alternatives and evaluate them in terms of whether they can complement the data in the WAS, offer quality assurance and possibly act as replacements over time. We retain a specific focus on pension wealth.

The WAS survey is a key data source for analysing the distribution of wealth across households and individuals. As a social survey, there are limitations to the data that the WAS can provide. The collection of detailed financial information (particularly on pension wealth, which accounts for over 40 per cent of the total wealth in Great Britain) is complex and puts a heavy burden on respondents. The accuracy of the data is also limited by respondent recall and low pension knowledge and engagement. Recent research, combining additional survey data with the WAS, shows that after wealth measures are underestimated by around 5 per cent (Advani et al., 2020). Integrating administrative data into the survey would reap several benefits in terms of data quality and reducing respondent burden.

Alternate data sources are available, for example, the Annual Survey of Hours and Earnings (ASHE) and Family Resources Survey (FRS), but pension wealth coverage there is limited. Likewise, coverage of HMRC RTI data and other wealth administrative data available within the ONS or Government Departments is limited. Alternate administrative data could replace survey questions that are prone to uncertainty, for example, the accuracy of self-reported figures of income or alcohol expenditure is known to be less reliable than other variables.

The remainder of this paper is organised as follows. Section 2 gives an overview of the WAS and its pension wealth data. Section 3 discusses the alternative data sources for pension wealth. Section 4 concludes.

2. Components of the Wealth and Assets Survey

In this section, we analyse which components of the WAS could be complemented or replaced by alternative data. We start with an outline of the WAS and its characteristics in subsection 2.1 and then in subsection 2.2, we discuss pension wealth measurement.

2.1. Overview of the WAS

The WAS is the only source of detailed information on household income and wealth in Great Britain. It captures information on all aspects of wealth (pensions, property, financial assets) alongside income. It is widely used within government, providing data relevant to UK tax policy, financial resilience, extreme poverty and destitution, cost of living, the Levelling Up agenda, pensions adequacy and understanding the household balance sheet for different demographics. It is also used by a range of academics for analysis relating to living standards, tax policy, financial resilience and intergenerational wealth transfers and their impact on lifetime wealth accumulation. Consideration of wealth alongside income is becoming ever more important for policy development and evaluation.

The WAS started in 2006 and is a biennial longitudinal survey. The sample comprises private households with an address in Great Britain, so individuals who are residents but non-citizens are also included. It excludes, however, individuals living in residential institutions, such as retirement and nursing homes, and homeless people. Wealth is highly skewed, with a small number of households holding a larger share of the wealth. Thus, in order to guarantee good coverage of the wealthiest, the survey oversamples postal addresses that are more likely to be in the wealthiest 10 per cent of all households. This means, however, that there are very wealthy outliers in the survey, and one needs to be careful when reporting mean values.

Table 1: Wealth and Asset Survey, sample sizes and response rates

Period	Number of households sampled	Response rate (%) - new cohort	Response rate (%) - old cohort	Response rate (%) - overall
Wave 1	30,000			55
Wave 2	20,000			68
Wave 3	21,000	51	73	65
Wave 4	20,000	53	70	66
Wave 5	18,000	55	69	65
Round 6*	16,000	46	71	63
Round 7	17,500	41	68	58

Source: ONS, WAS (2022). Note: * Moving WAS to financial years (rounds).

The longitudinal nature of the survey is its main strength as allows for a more precise analysis of changes in wealth over time. From the third wave, a new cohort sample was introduced at each wave to account for the attrition that happens between waves. Table 1 shows the sample sizes and response rates for the WAS from Wave 1 to Round 7. In Round 7 the response rates decreased because of the pandemic. In March 2020, when the first lockdown started, face-to-face interviews stopped and restarted a week later as telephone-only interviews, which led to a lower response rate than usually observed.

In WAS, wealth can be classified into four groups: net financial wealth, net property wealth, private pension wealth and physical wealth. A brief description of each group is given below:

- Net financial wealth includes any financial assets held, such as current accounts, savings accounts, Individual Savings Accounts (ISAs), endowments, investments in bonds, gilts, stocks and shares, and informal savings (money loaned to family and friends) less any financial liabilities, such as overdrafts on current accounts, outstanding credit card balances, arrears on household bills, and loans, including student loans.
- Net property wealth is the self-reported value of all property held, that is, the main residence and any other property or land owned in the UK or abroad less the outstanding mortgage debt on these properties.
- Private pension wealth comprises the value of any pension pots accrued that are not state basic retirement or state earning-related, that is, personal pensions, occupational pensions and pensions in payment.
- Physical wealth consists of the self-evaluated value of possessions and household contents, such as artworks and vehicles.

A recent study using the WAS finds that lower wealth households hold their wealth in physical assets (consumer durables) while pensions are more prevalent for the top two income deciles. In addition, for the wealthiest households financial wealth is the most prevailing asset (Advani et al., 2020).

Total wealth was only available at a household level until Round 6. That was because some information, such as the value of the main residence, was only collected from the reference person in the household. In the latest round, however, the ONS has published additional estimates on the distribution of individual total wealth by characteristics, which provide a more precise description of the wealth for each individual within the household (ONS, 2022b).⁵

⁵ WAS collects information on all adults aged 16 years and over, excluding those in full-time education and those in a government-supported training scheme.

2.2. Pension wealth

Measuring total wealth is not a straightforward task. Private pension assets, for instance, cannot easily be converted into other types of wealth for people currently working and thus, they do not affect directly living standards. Potential pension benefits in the future may impact present incentives to save and therefore should be taken into account. This is the approach taken by WAS, but it is not without discontent; see, for example, Advani et al. (2020a).

There are two main types of pension in the UK: a defined contribution (DC) pension and a defined benefit (DB) pension. A defined contribution pension scheme is a system in which benefits are determined by the investment returns on the contributions that are paid into it. It can be occupational (organised by employers), personal or stakeholder pensions. Alternatively, in a defined benefit pension scheme, which is usually workplace pensions arranged by employers, the pay-out is determined by certain rules, usually based on employees' tenure and salary.

Valuing DC pensions is relatively simple, amounting to calculating the fund value held in the pension pot at a particular point in time, similar to a savings account for example. Valuing DB pensions is more complex because they promise a guaranteed income stream from retirement, typically based on the individual's average or final salary. The ONS calculates the value of DB pensions by estimating the size of a DC pension pot that would be required to purchase an annuity with the same guaranteed income. For pensions not already in payment, this is discounted (using inflation) to give a present value. Hence, beyond changes in income provided in retirement, the value of DB pensions can vary over time with the external economic environment. These calculations are carefully and painstakingly incorporated into the WAS.

Data from round 7 of the WAS show that 57 per cent of people below the State Pension age contributed to a private pension, which is higher than before the implementation of automatic enrolment in 2012 when only 43 per cent of people were saving for retirement. This rise is explained by the increase of people paying into defined contribution pension schemes, especially private sector workers. In addition, for the first time, people were more likely to only pay to a defined contribution pension than a defined benefit pension, with 26 per cent of people reporting that more likely to only pay into a defined contribution, while 23 per cent reported that they were more likely to only pay into a defined benefit pension (ONS, 2022c).

In addition, the increase in pension enrolment is mainly driven by employees, who are eligible for auto-enrolment and account for 80 per cent of the contributions. Self-employed people represent only 20 per cent of the contributions. Comparing these two groups, the latest WAS data show that 23 per cent of self-employed people expected occupational or personal pension

to be their main source of income in retirement, while for employees this number is 52 per cent. Furthermore, 39 per cent of self-employed people reported that the main reason for not contributing to a pension is because they had too many other expenses or could not afford to contribute, compared to 26 per cent of employees.

Despite the increase in the number of people enrolled in a pension scheme, pension wealth inequality is large in Great Britain. In fact, 64 per cent of all private pension wealth is held by individuals in the top 10% of the wealth distribution, while the bottom half of the wealth distribution (deciles 1 to 5) held less than 1 per cent. Overall, the main reason people are not paying into a private pension scheme is because they are not working or have low incomes (ONS, 2022c).

Pensions are usually built over the working life and as people get older and closer to retirement, more pension wealth they are likely to have. Figure 1 illustrates the proportion of individuals with pension wealth not in payment, considering all types of pensions, and the median wealth by age group. The percentage of individuals with wealth in pensions is only 33 per cent for people aged 16-24, while for people aged 25-34 it is 69 per cent. People aged 45-54 are the ones with the highest percentage of wealth in pension not in payment (78 per cent). Looking at median wealth, as expected, it increases as people get older, and it decreases once they reach State Pension age. People aged 55-64 had the largest median wealth in pensions not yet in payment, which amounts to £107,300.

Figure 1: Wealth in pensions not yet in payment (active or preserved) by age



Source: ONS, WAS (2022)

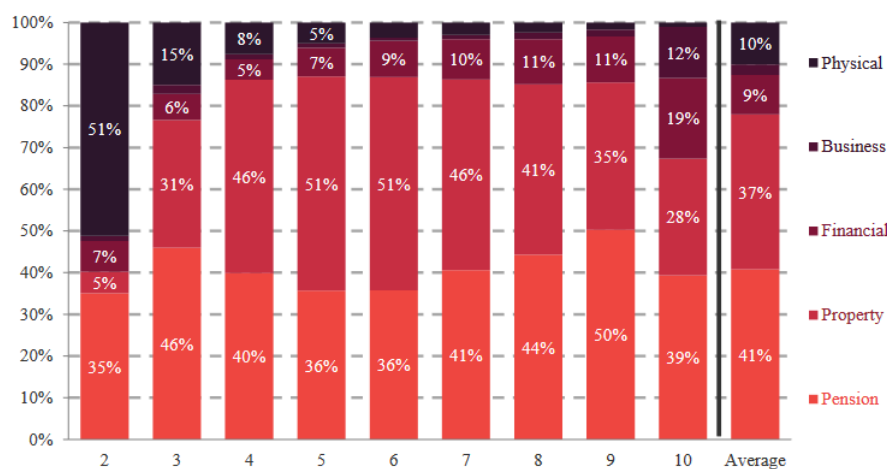
Note: Active pension wealth refers to pension pots that people are currently paying into, and preserved pension wealth refers to those pots that people are not long contributing into but are not yet in payment.

Most studies include private pensions assets in their definition of wealth (Crawford et al., 2016; Advani et al., 2020; ONS, 2022b), but not expected value for future public pension payments – despite the existing relationship between public pensions and household savings (Lachowska and Myck, 2018). Currently, the WAS only collects information on private pension wealth.

Not surprisingly given the challenges of measurement and reporting, the quality of pension wealth data collected in the WAS has been somewhat uneven. Together, wealth data in the WAS has also been a bit questionable, particularly at the top end of the income distribution and especially business wealth (Advani et al., 2020a, 2021). In particular, Round 7 data show extremely high inequality in pension wealth (Gray, 2022). The following points summarise some of these findings, also reflected by ONS (2022a,b) and validated in our calculations:

- The top decile of the population (in terms of private pension wealth) held nearly half of the total private pension wealth of the population (49 per cent); the bottom half of the population held only 5 per cent.
- In terms of net equivalised income deciles, the top decile had about 30 per cent share of total private pension wealth, and the top half about 80 per cent. These patterns have been very stable since the first waves of the WAS.
- Median pension wealth for the top 10 per cent was £637,500, falling to £7,800 in the fifth decile, £1,200 for the fourth and £0 for the bottom 30 per cent.
- Median pension wealth for people aged 55 to 64 was £107,300, with around two-thirds of people in this cohort still paying into a pension. Middle-aged people (45-54-year-olds) were the most likely to be paying into a pension, with 78 per cent of this cohort doing so.
- Round 7 was the first time more people were paying into a defined contribution pension (26 per cent) than a defined benefit pension (23 per cent).
- More than half (57 per cent) of people were actively saving for retirement during this period, up from 43 per cent before auto-enrolment was introduced in 2012. However, almost a third of people did not expect to have any pension provision beyond the state pension when they retired.
- Having a low income or not working was the most common reason for not saving for a pension (54 per cent), with self-employed workers more likely to say they could not afford to contribute to a pension than employees. Together, uptake is lower for women and young persons.

Figure 2. The average share of total net wealth contributed from different asset classes by household net wealth decile: GB, 2016–18 (Source: Advani et al., 2021, Online Appendix Figure C3)



Note: The lowest decile is excluded, as net wealth is negative. Property wealth here is measured net of mortgage debt and financial wealth is net of other financial liabilities.

Source: WAS.

Advani et al. (2020a, 2021) address the underreporting of wealth at the top end of the distribution, particularly business wealth, and report the distribution of wealth and its components (Figure 2). There is no clear pattern in variation of the share of pension wealth to total wealth across wealth deciles, averaging around 39%. This is in contrast to business assets, which shows a clear trend across the distribution.

The poorest 10 per cent are omitted from the chart because their aggregate wealth is negative, and the share of pension wealth is also a bit lower than average for the 2nd decile. Pensions hold the dominant share in the top three deciles, particularly the top two. The patterns of dominance of pensions and property wealth in the middle of the distribution and financial wealth at the very top are similar to other countries, for example, Sweden (Bach et al., 2020) and France (Garbinti et al., 2021). A central point is that, because pension wealth is held more equally across the wealth distribution, increases in pension wealth levels have a relatively lower impact on inequality, particularly relative to financial wealth (Advani et al., 2021).

In balance, it appears that WAS captures variation in pension wealth across the population relatively well (Advani et al., 2020a, 2021). Inequality is very high, with median pension wealth across the three poorest deciles at £0 and over £600,000 for the top decile. This has important implications for life experiences in retirement, and makes it very important to carefully track the pension ‘haves’ and ‘have-nots’. It seems that auto-enrolment has been successful, but the increased uptake of DB pensions has since stalled, hence we face a generation with largely DC pension savings. In this context, a drive towards extending coverage to the younger, low-earners and population with career breaks (particularly women) is policy urgent. These require a robust

evidence base, and it is not clear that the WAS is capturing well pensions uptake for specific cohorts in full granularity. This is particularly true for the lower three deciles where, it would appear, that the WAS is not picking up pension wealth adequately. Further information is urgent for both research and policy making purposes.

3. Alternative data sources for pension wealth

In this section, we discuss possible alternative data sources for pensions, including public pensions. Subsection 3.1 talks about existing data sources that could be an alternative to the WAS, and subsection 3.2 discusses potential data sources and computations that could be used to complement and/or replace the WAS.

3.1. Alternative data sources

There are two main existing aggregate wealth series for the UK relevant to pension wealth: (a) national accounts (World Inequality Database, WID <https://wid.world/>; Credit Suisse, 2019); and (b) the WAS. Inheritance tax (IHT) records provide information on wealth other than pension wealth because there is no inheritance tax on pensions. A central problem is that these two series reach quite different results as to total wealth in the UK (Advani et al., 2020b), in part because they have different target definitions of wealth and because of coverage issues, particularly at the top end. National accounts statistics on pension wealth are also placed in an international comparative context by the OECD (<https://data.oecd.org/pension/net-pension-wealth.htm>). The WAS data does not cover Northern Ireland, which therefore needs to be complemented either from alternate sources or using microsimulation (NIESR, 2016).

The ONS has calculated accrued-to-date pension entitlements in social insurance for the UK year 2018 according to the 2010 European System of Accounts (ESA, 2010).⁶ These estimates illustrate an important picture of the UK pension entitlement or liabilities that are in line with national accounts, but they do not consider future accruals and therefore cannot be used for fiscal analysis. At the end of 2018, government-managed pension schemes had liabilities of £6.4 trillion, with £4.8 trillion being state pension liabilities and £1.6 trillion being government-managed workplace pension liabilities for public sector employees. On the other hand, the non-government-managed workplace pension liabilities totalled £2.6 trillion (ONS, 2021a). These estimates give an idea of pension liabilities from the national accounts perspective. However, there is no proper times series data, although the ONS has been working on a revised series for

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<https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/datasets/uknationalaccountstable29accruedtodatepensionentitlementsinsocialinsurance>

2010 to 2015, and new estimates for 2016 and 2017 based on new data sources, Solvency II regulatory data and Financial Survey of Pension Schemes – FSPS (ONS, 2021b).

The Financial Survey of Pension Schemes (FSPS) is a quarterly survey that collects information on income, expenditure, transactions, assets and liabilities of UK-funded occupational pension schemes at an aggregated level. The information collected is used in the UK National Accounts and Balance of Payments. FSPS groups occupational schemes into two types: defined contribution (DC) and defined benefit or hybrid schemes (DBH). And it covers all occupational pension schemes for the private sector and funded public sector schemes. However, it does not include all occupational pension schemes for public sector employees, such as unfunded schemes for civil servants, teachers and NHS staff and personal pensions provided by insurance companies (ONS, 2022d).

Most of the available data used in official statistics come from surveys and administrative sources. While the former is collected for a certain statistical purpose, the latter is collected by government institutions for tax, benefits or other public administration purposes. Thus, survey data is usually designed to meet its purpose, and issues related to sample size, methodology and responses may arise compared to administrative data. On the other hand, administrative data also cannot guarantee data quality and may be subject to underreporting for tax evasion, etc. Sometimes the information available is not useful for statistical purposes and would be best captured through surveys.

As previously mentioned, the WAS is the best source of household income and wealth in Great Britain. Advani et al. (2020a, 2021) emphasize that the coverage and quality of WAS data is very good, except potentially at the top end. However, as with any survey, information is self-reported and added to non-responsiveness, particularly at the top of the distribution, bringing some challenges to computing wealth. Coverage at the top end has implications for the measurement of total wealth and inequality but not so much distribution issues, as evidenced by specific cohorts or subpopulations. Currently, there is no administrative dataset on wealth possessions in the UK. Therefore, in this section, we discuss possible alternative data sources to complement the WAS and focus on pension wealth.

A possible alternative is the HMRC Pay As You Earn (PAYE) Real Time Information (RTI) data. This is an administrative record of payments employers make to their employees, which can be used to construct statistics on employee's jobs and earnings. The dataset covers the whole population of employees instead of a sample of individuals. Employers and pension providers are required to report to HMRC payments to employees, or recipients of occupational pensions, on or before each payment date where it is practical to do so. RTI includes information about the PAYE scheme, the employee (or occupational pension recipient), and the payment.

RTI only holds information on employment and pensions that are reported through the payroll reporting process and does not include information about self-employment or pensions which are not paid via PAYE, such as State Pension and income from other sources that is seen as pension income by the individual. The RTI was fully introduced in April 2014, and all employers must register for PAYE and report under RTI when at least one employee either earns at or above the lower earnings limit – £120 per week or £520 per month (as of 2021/22) – has another job, or receives expenses or benefits from the employer (HMRC, 2022). Hence the coverage and usefulness of RTI data is somewhat suspect.

HMRC may hold alternate, and more comprehensive, data on pension wealth. For example, administrative data on pension contributions and the wealth of public sector employees is held by the government. We have tried to access these resources so far without success. It seems that these data lie in the custody of the HM Cabinet Office, and access is heavily restricted. Hence, access seems to be an issue. Moreover, pension wealth and savings behaviour may be quite different for public sector employees as opposed to private sector and self-employed or the economically inactive population. Hence, the usefulness of such data may be limited even if access issues are addressed. It is perhaps worth exploring other similar sources, such as the Scottish Fiscal Commission and similar agencies for Northern Ireland, which are not covered in the WAS. They can serve as useful complements to WAS in understanding pension savings behaviour and can constitute valuable information for microsimulation.

The English Longitudinal Study of Ageing (ELSA) collects data on pension contributions, focusing on the 50-64 years old population, and pension income for those 65 and over. This only covers England and also lacks information on the relatively younger population, which as discussed below are subpopulations of interest. Nevertheless, ELSA can provide information on which individuals participate in pension savings and how much wealth they accumulate. A similar argument can also be made for the Annual Survey of Hours and Earnings (ASHE), which collects quite detailed information on workplace pension participation. Finally, there is also the Family Resources Survey (FRS), which includes information on pension participation and income. All of these resources provide valuable information on participation that can complement WAS, but they are largely based on income and expenditure – not pension wealth directly.

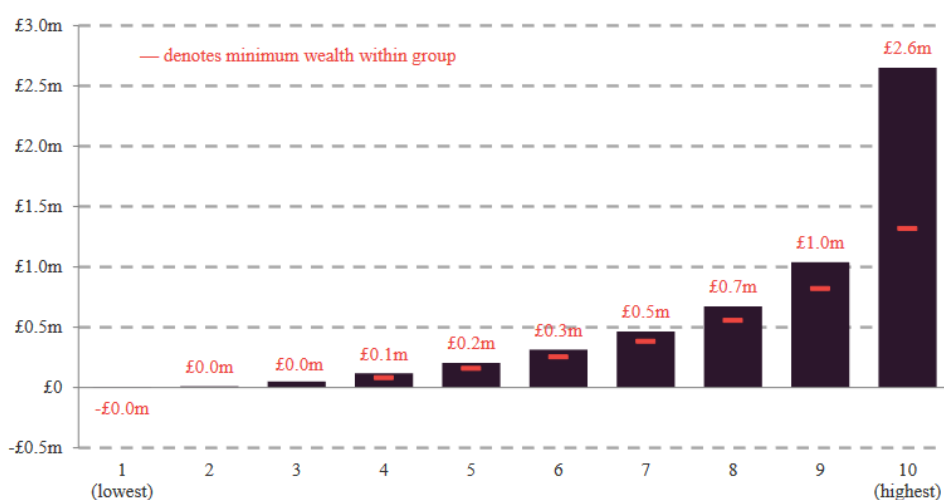
3.2. Potential alternative data and computations

Advani et al. (2020a, 2021) argue that the WAS is in general very good in its coverage and measurement of household wealth and its components, except at the top end of the distribution. They supplement data for the top end from the Sunday Times Rich List and implement a Pareto shape adjustment, together with an alternate definition of total household wealth. All of these

approaches matter for estimating total wealth, and to some extent, inequality. But it does not matter that much for understanding the distribution of pension wealth in the lower and middle ranges, and for specific cohorts of interest.

As discussed above, these distributional issues matter a lot, not only for understanding and supporting the welfare of the elderly and retired populations but also for measuring the well-being of the population at large. In our view, this is where there is a greater need to validate and potentially complement the information held in the WAS. There are several excellent summaries of information from the WAS in this space, not only from the ONS (2022a,b,c) but also elsewhere; see, for example, Butterworth (2019) and various online sources (Occam Investing, 2022; People’s Partnership, 2022).

Figure 3. Average net household wealth within each net wealth decile: GB, 2016–18 (Source: Advani et al., 2021, Online Appendix Figure C1)



Note: Wealth is measured at the household level. Total wealth includes net financial assets, net property assets, pension assets, business assets and an adjusted measure of physical wealth (including cars, home contents, collectibles, etc.).
Source: WAS.

The above sources provide excellent information, and summaries, of pension participation and wealth accumulation by age, gender, employment status, region and other interesting cohorts by socio-economic-demographic characteristics. The great value that the WAS provides here is in its rich information, beyond pension wealth, on these other characteristics. However, we think that the coverage of pension wealth (and indeed household wealth) at the bottom of the wealth distribution is inadequate. The next two rounds of WAS will be critical here, in how well they capture lockdown savings and the impact of the current cost of living crisis (Bhattacharjee et al., 2022a).

Two solutions can be suggested, and both can complement each other and the WAS. First, we suggest microsimulation as a means of complementing the information in WAS. Based on the

participation, uptake and type of pension (DC/DB) profiles as estimated from the latest round of the WAS, one can use triangulation by the rich socio-economic-demographic characteristics to estimate pension behaviour for each sampled individual and household and augment this information with pension wealth data collected in WAS. In this process, one can also use hitherto unused but valuable information on pension income and expenditure/savings for modelling which good starting points could be Dolton et al. (2019) and Iparraguirre (2020). One can implement this using cross-tabulation tables and repeated use of the Bayes Theorem to compute conditional probabilities or even by building statistical and econometric models for household finances (e.g. Bhattacharjee and Szendrei, 2021). This would imply a novel use of the microsimulation tools available at NIESR (NIESR, 2016; Bhattacharjee and Szendrei, 2021) that are integrated with NIESR's regional model NiReMS (Bhattacharjee et al., 2022b) and global econometric model NiGEM (NIESR, 2018). The essential idea is to simulate each individual's financial behaviour (and their household's) in terms of the accumulation of pension wealth and use this as a proxy to complement pension wealth data in the WAS.

The second, and related approach, would be to conduct a one-time careful survey making sure that information on pension wealth is well-covered across all relevant and interesting cohorts, particularly for the bottom of the distribution. This will complement information in the WAS and cover any changes in savings behaviour induced by lockdown savings, and the way it is being run down because of the cost of living pressures on household finances. The information from the survey can then be used, together with microsimulation as outlined above if so desired, to complement pension wealth data in the WAS.

Figure 4. Summary assessment of alternate data sources

Accuracy/ Access	High			Microsim on WAS (ASHE) / New Survey
	Medium	WID FSPS	ASHE FRS	WAS
	Low	RTI/Admin ELSA		
Data sources		Low	Medium	High
		Coverage/Relevance (for pens.wealth)		

Our summary assessment of alternative data sources and potential is shown in Figure 4. The WAS is currently the most valuable source in terms of coverage. But accuracy of the data is variable. Arguably, the quality of ASHE data on pension savings is good, but the quality of pension wealth data in both ASHE and FRS can be variable. Nevertheless, these are useful

sources. Other sources such as HMRC RTI, administrative data on public sector employees and ELSA cover only certain segments of the population and have very low coverage of personal pensions. Sources for aggregate data, such as WID and FSPS, may be reasonable but not useful for cohort-based assessments or understanding inequality. The best value may be obtained by combining WAS (or perhaps ASHE, as in Dolton et al., 2019) with microsimulation. Alternatively, a new survey can be commissioned. We turn next to these potential new sources.

3.3. A potential microsimulation approach

The WAS collects enormous amounts of data on pensions (in fact, more than 100 variables in the individual dataset), but still, it would appear that the quality of self-reported pension wealth data is lacking. Part of the problem has to do with external macroeconomic data, annuity rates and discount factors, which can be (and have been) addressed by improved financial assumptions and better data sources (ONS, 2014). Probably the greater problem lies with respondents' estimates of the value of their private pension pots, which is by no means straightforward. It is expected that respondents may have a fair idea about their pension contributions, pension income and withdrawals - all in nominal terms. But, aided by discussions with ONS colleagues, we are coming to a firm conclusion that it is the self-valuation of pension wealth where the main issue may lie. Respondents just do not have a clear sense of their pension wealth and many may not even know the precise nature of their pensions - how much the employer contributes, at what age they can reasonably expect to draw upon their pension wealth and how much, or even whether they are on DB or DC schemes. Unfortunately, the third also has implications for the valuation of pension wealth (see, for example, ONS, 2014, 2022e), which it appears is also part of the problem.

However, there are also substantial positives here: the extensive data on pensions together with rich data on socio-economic, demographic and geographic features. This potentially allows excellent opportunities for estimating pension wealth, by cohorts, using extensive triangulation by individual and household features. If, then, the assumption that data on pension contributions are better quality is valid, perhaps one can use microsimulation to obtain better estimates of pension wealth at individual and cohort levels. Importantly, this may also offer a valuable opportunity for validation of pension wealth estimates by age and demographic cohorts.

The nature of the microsimulation must be carefully calibrated to the specific needs of the problem. At NIESR, we use several different forms of microsimulation building upon the WAS data as a baseline. First, there is NIESR's dynamic microsimulation model LINDA (Lifetime Income Distribution Analysis) (NIESR, 2016) which uses dynamic optimisation to allow

individuals and households to make consumption-savings and leisure-labour choices to maximise utility over their entire lifetime. Second, there are new enhancements in NiReMS (National Institute Regional Modelling System) that calibrate aggregates to projections from NIESR's global macro-econometric model NiGEM (NIESR, 2018) but specialised to a NUTS1 regional level together with extensive modelling of individual life trajectories (Bhattacharjee et al, 2023). Finally, during the current cost-of-living crisis, NIESR has also built estimated Engel curves for essential expenditures (food, energy, housing, etc.) along the lines of Blundell et al. (1999) built over the above integration of NiReMS with LINDA (Bhattacharjee et al., 2022a).

All of the above models take a lifetime perspective because they are interested in tracking behavioural changes as a response to policy and economic shocks. In so far as the objective of simulating pension wealth goes, such an elaborate approach may not be necessary. Given an individual who may or may not have made a pension contribution in a specific Round of WAS, all that is required is simulating pension contributions over their lifetime up to that point, but not over their future life course. Planning for retired life, whether under a rational expectations framework or otherwise, may be useful in this exercise but it is not necessary to simulate their entire life course. This implies that a combination of data from the past where available (exploiting the longitudinal nature of WAS), together with either data from the past on donors matched (on relevant features) or reduced form estimates of pension contributions based on relevant features would suffice. Here, expenditure share estimates along the lines of Blundell et al. (1999) and Bhattacharjee et al. (2022a) may be helpful.

Together, one might wish to model DB/DC pension choices as well as entry and exit from pension contributions. On the first, a reduced form approach as above may be a reasonable starting point. On the second, there is also information in the WAS that is potentially useful - for example, **POJoin1** (Year joined pension scheme 1) etc., **PBQual1** (Number of years built up in occupation pension scheme 1) etc., **PPYrSt1** (Year started personal pension 1) etc., and **PPYStp101** (Reasons(s) for stopping contributions to personal pension 1) etc. Once a trajectory of (estimated) pension contributions over the past working lifetime is thus constructed (potentially in nominal terms), it should then be relatively simple to put the best minds together to estimate (current) pension wealth. Then, these can be matched with cohort-level aggregates to find out where deficiencies in WAS pension wealth data might lie. In our view, this would already constitute substantial progress.

ASHE can also serve as a complementary data source for such microsimulation (Dolton et al., 2019). Potentially one can use elements of all three datasets - WAS, ASHE and FRS - to construct reduced-form models as inputs to microsimulation. Beyond an additional focused survey, this constitutes our main suggested alternative to existing pension wealth data. NIESR

experience shows that implementation of a small microsimulation exercise of the above nature would take maybe around 6 months in addition to the time to obtain access to all datasets needed. A survey can take much longer but can provide better data validation in the medium run.

Finally, research on alternative household wealth statistics faces the fundamental problems of data paucity, accuracy and administrative barriers to accessing data. Some data are not so far from being collected on a uniform basis, such as personal pensions and retained rights in previous pensions. The accuracy of some data are variable, such as the distinction between DC/DB pensions, pension wealth at both ends of the wealth distribution, and gender. Other data are held by certain government departments, including the Cabinet Office, and pension funds, where it can take many months before access to such data is granted. All this complicates the assessment of data and the analysis of what we know and what we do not as yet know.

4. Conclusion

We critically evaluate information on pension wealth in the UK, focusing on the WAS and exploring potential alternate data sources. Our general view is that the WAS overall is very good in its coverage and measurement of pension wealth particularly in the middle half of the distribution. There is potential under-coverage at the top end of the distribution. However, this is not a particularly critical issue for pension wealth (as much as it is for business/financial wealth). Together, while this is important for the measurement of total wealth, it is not critical towards understanding participation and pension savings behaviour for the majority of the population and therefore also not critical for understanding the well-being of the elderly and the population as a whole.

However, we also find that pension wealth has under-coverage at the bottom of the distribution, particularly to the 3rd decile of the wealth distribution. This has serious consequences for understanding welfare and distribution issues, particularly for the retired and elderly populations. Alternate sources of information are scattered, but they can provide some insights particularly when combined with a microsimulation approach that we propose here. We also propose a one-time survey to complement information focused on the less wealthy individuals and households – and focused particularly on policy-critical subpopulations – the young, self-employed, poor and women.

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