

Valuation Background Paper

*Wealth Tax Commission*

# Valuation of pension rights

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C A G E

# VALUATION OF PENSION RIGHTS

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# 1. Introduction

The approach to the valuation of pension rights typically depends on the pension scheme's benefit structure. In the United Kingdom (UK), two benefit structures are currently in operation: *defined contribution (DC) schemes* and *defined benefit (DB) schemes*. Under a DC scheme, the amount of benefits available to the member on retirement is determined exclusively by reference to the amount of money that has accumulated in the member's fund. The fund consists of money contributed by the member (and the member's employer, where applicable) as well as the investment return on that fund. At retirement, the member's fund can be paid to the member or used to purchase an annuity for the member. By contrast, the amount paid out under a DB scheme (schemes which are always occupational, i.e. funded wholly or primarily by the member's employer) is calculated by reference to a formula specified in the scheme rules, which usually depends on the length of the employee's service and the salary earned at the time of retirement. DB schemes are more common in large organisations and the public sector, and are becoming increasingly uncommon in the private sector because of their cost and the substantial risk of a shortfall in funds available given increasing life expectancy (Thurley & McInnes, 2019).

Pension schemes registered with HM Revenue & Customs (HMRC) benefit from income tax relief on the contributions, tax-free investment growth, and an exemption from the relevant property regime for inheritance tax purposes (for detail, see 2.1.3 Inheritance tax). Unregistered pension schemes, known as Employer-Financed Retirement Benefits Schemes (EFRBS) are generally less tax-efficient than registered schemes, so valuation approaches may vary from those applied to registered schemes (Chamberlain, Harrison & Wallington, 2020).

In the context of a net wealth tax, the value of one's pension entitlement(s), or *pension wealth*, is given by the present value of the discounted future cash flows provided by the pension entitlement(s). Two conceptual points should be noted in this regard: first, the aim is to measure an individual's pension wealth 'today', as opposed to the *potential* pension wealth on retirement. Second, pension wealth is defined as the value which accrues to the *individual*, presupposing a contractual entitlement to the pension benefits. It follows that State Pension, which is more similar in nature to social security benefits such as public health care provision or unemployment benefits, does not form part of pension wealth. While there exists a legitimate expectation to receive State Pension benefits, there is no formal contractual relationship between the State and the citizen to these monetary provisions.

In general terms, the present value of DC pension wealth is equal to the accumulated contributions and investment return in the individual's pension fund. This information is readily available and regularly reported to pension scheme members. By contrast, determining the present value of rights under DB schemes requires practitioners to make assumptions about the macroeconomic environment and demographic developments.

There exists no agreed practice for the choice of assumptions as well as the DB pension valuation method itself; in fact, valuation approaches vary with the purpose of the DB wealth calculation. The complexity of DB pension valuation may be one reason why all OECD countries which have a wealth tax now, or have had one in the past, exempt pension assets from their wealth tax base (OECD, 2018). A thorough analysis of possible pension valuation methods for the purpose of a net wealth tax is nonetheless important as the exemption of pension assets violates the principles of horizontal equity between different asset classes and sets up opportunities for avoidance. A starting point for the analysis is offered already by existing valuation approaches of pension wealth in the UK, both for tax and non-tax purposes.



## 2. General principles regarding the taxation of pensions in the UK

Registered private pension entitlements in the UK are subject to cash-flow expenditure tax treatment, whereby pension entitlements are tax exempted, up to certain limits, at the *contribution* stage (e.g. contribution paid into the pension pot), and at the *accrual* stage (e.g. return earned on the investment), while taxed on the *receipt* of pension benefits, a concept which is also referred to as EET (Mirrlees et al., 2011). The income on retirement (e.g. pension benefits, annuity payments) is commonly subject to the marginal income tax rate (Mirrlees et al., 2011).

Additionally, pension entitlements might become liable to taxation under the Lifetime Allowance charge and Annual Allowance charge. While the valuation of pension wealth for inheritance tax purposes differs in that the value of pension entitlements on death is known, the relevant legislation is outlined briefly for the sake of completeness and in order to evaluate potential best practices for pension wealth valuation under a net wealth tax.

Notably, the relevant tax legislation to pension entitlements and their corresponding valuation depends on the benefit structure of the pension arrangement. The UK legislation classifies pension arrangements into four types: money purchase, cash balance, defined benefits, and hybrid. This paper generally refers to money purchase arrangements under DC pension valuation while defined benefits clearly fall under DB pension valuation (HMRC, 2020, reg PTM023200). The classification of cash balance arrangements is less clear, since characteristics of DC and DB pensions are combined. Contributions collected in the pension pot only partially determine the pot's value, as parts or the entirety of the pension pot are guaranteed to the member independent of the accumulated and invested contributions. For example, the member's employer may guarantee that the investment return will not be less than 5% per annum for as long as the member remains employed by the employer. Thereby, the investment risk is borne by the employer instead of the member which is why for the purpose of this paper, valuation approaches to cash balance arrangements will be analysed under DB pension valuations (HMRC, 2020, reg PTM023500).

Hybrid arrangements may provide either DC or DB benefits depending on certain given circumstances at the point benefits are drawn.<sup>1</sup> For example, if a pension scheme agrees to provide DC benefits on retirement or salary-related death in service benefits (but not both), it is a hybrid arrangement which will become either a DC scheme or a DB scheme depending on whether or not the member dies in service (HMRC, 2020, reg PTM023600). For tax and non-tax purposes, hybrid schemes are either treated as a separate category, or they are deemed to be either a money purchase arrangement or a DB arrangement. For example, when valuing uncrystallised pension entitlements in hybrid schemes for the purpose of the calculations of an unauthorised payment, entitlements are valued 'on the basis of whichever rights have the highest or higher value' (HMRC, 2020, reg PTM134500).

### 2.1. Valuation of DC pension wealth for tax purposes

The present value of DC pension wealth is provided by the amount of money that has been contributed to the pension fund by the member (and the member's employer, where applicable) as well as the performance of the underlying investments. The valuation methods of DC pension wealth for different tax and non-tax purposes typically adhere to the definition stated above,

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<sup>1</sup> Note: In the UK tax legislation (in Part 4 of the Finance Act 2004), cash balance is included under money purchase arrangements, for details, see HMRC (2020) reg PTM023300.

which is why the approaches generally yield similar valuation estimates irrespective of the purpose of the calculation.

### 2.1.1. Lifetime Allowance

Pensions are valued for tax purposes as part of the Lifetime Allowance, which was introduced in 2006 to set an upper limit to benefits that a person can accrue tax-efficiently over the lifetime from all registered pension schemes. For the 2020/21 tax year it is set at £1,073,100.<sup>2</sup> There is a potential tax charge when a benefit crystallisation event (BCE) occurs, for which purpose pension wealth needs to be valued. BCEs are defined in the legislation but are broadly when someone either takes a lump sum from their pension scheme, takes income from their pension scheme, transfers their pension overseas, or reaches the age of 75.

On the occasion of a BCE, DC pension wealth, defined as the value of the DC pension pot made of contributions plus return earned on the investment, is determined and tested against the Lifetime Allowance. If the maximum amount is exceeded, benefits received are charged to tax at 55% for lump sums or 25% for income). So, for example, to the extent that the member's uncrystallised fund exceeds £1,073,100 on their 75<sup>th</sup> birthday, the excess is subject to a 25% lifetime allowance charge, and will also be subject to income tax at the member's marginal rate when subsequently paid to the member.

### 2.1.2. Annual Allowance

The Annual Allowance restricts the amount that can be contributed tax efficiently to a pension (in the case of a DC scheme) or the amount by which the benefits can 'accrue' (in the case of a DB scheme) in any tax year. The upper limit of contributions under the Annual Allowance is currently set at £40,000. For those earning under £240,000 the full annual allowance is available. This means that they will receive full tax relief on contributions or growth in benefits up to £40,000.<sup>3</sup>

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<sup>2</sup> The maximum amount increases annually in line with the Consumer Price Index (CPI) (Pension Advisory Group, 2019)

<sup>3</sup> Note: It used to be the case that once a person earns more than £150,000 the Annual Allowance began to taper (the Tapered Annual Allowance). The level of income at which the taper kicks in is known as 'adjusted income'. From 2020 onwards, once a person's adjusted income exceeds £240,000 the Annual Allowance begins to taper. For every £2 that a person's adjusted income exceeds £240,000 the Annual Allowance is reduced by £1. This means, for example, that someone with adjusted income of £250,000 has an available Annual Allowance of £35,000. The minimum Annual Allowance is £4,000 for those with an adjusted income of £312,000 or more.

Calculating an individual's Tapered Annual Allowance requires reference to be made to two key concepts: threshold income and adjusted income. Threshold income is, as the name suggests, a threshold which is designed to protect those who earn less than £200,000 but who may have occasional spikes in their employer's contributions. Anyone with a threshold income of less than £200,000 does not need to consider their adjusted income. Broadly, threshold income is a person's income (from whatever source) but excluding the employer's contributions. Adjusted income is the total of a person's income plus any pension contributions made by the employer or employee. The concept of adjusted income is designed to avoid a person simply exchanging salary for greater employer contributions to avoid exceeding the £240,000 cap.

The following example may assist in understanding how the Annual Allowance affected taxpayers before it was changed recently: *Take Dr Smith. She has an adjusted income of £170,000, made up of a salary of £145,000 and her pension benefits of £25,000. Although her salary is below £150,000, when we add the pension benefits it takes her above the threshold and therefore the tapered reduction applies. Under that reduction, Dr Smith's allowance falls by £1 for every £2 that her adjusted income exceeds £150,000. As a result,*

The pension contributions made to a DC pension scheme during one tax year is referred to as the 'pension input amount'. The annual allowance is tested against the 'total pension input amount', e.g. the sum of pension input amounts under registered pension schemes and currently-relieved non-UK pension schemes, entitled to the individual pension owner (HMRC, 2020, reg PTM051100).

While the Annual Allowance charge in its current form is not directly applicable to the analysis of DC pension valuation approaches (the pension input amount for DC schemes is simply given by the gross contributions made to the individual's pension fund in a particular tax year), the tax raises two conceptually interesting points: First, HMRC already has the administrative capacity and the existing records to measure pension contributions annually. Second, in order to determine the increase in DB pension savings in a particular tax year, DB pension wealth needs to be determined in the beginning and in the end of each tax year (for details on the valuation approach, see 3.1.2 [Annual Allowance](#)). Consequently, total annual pension wealth could be calculated as the sum of (a) the value of the individual's accrued DB pension wealth (information already available to HMRC) and (b) the accumulated contributions plus return earned on investment, e.g. DC pension wealth (information partly available to HMRC, but available at the pension fund level).

### 2.1.3. Inheritance tax

Inheritance tax (IHT) is a complicated and technical subject, and while a detailed exploration is beyond the scope of this paper, a few key concepts are outlined in order to understand how IHT is charged on pensions, allowing for the evaluation of possible best practices for pension wealth valuation under an annual net wealth tax.

First, IHT is charged on dispositions which are 'transfers of value'. A transfer of value occurs when a person's estate (i.e. the property to which they are beneficially entitled) decreases in value. A typical example would be a lifetime gift. Giving property to trustees during a person's lifetime is usually a chargeable transfer on which 20% IHT can be imposed (often referred to as an 'entry' charge), but contributions to a qualifying (approved) pension scheme do not usually involve an entry charge even though they are transfers to a trust, because the pension rights the member acquires by making the contributions are within their estate and therefore their estate is not reduced in value. However, contributions made when the transferor is in ill health and so unlikely to take pension benefits (so that the tax free death benefits payable are thereby increased) can be transfers of value.<sup>4</sup>

Second, there is a special set of IHT rules for settled property which is held by trustees, known as the relevant property regime (See Appendix A, Chamberlain, 2020 for further details). This regime can impose IHT on the trustees every ten years on the value of the property held in trust. However, a qualified pension fund which is held in trust by regulated pensions trustees is not subject to these IHT charges as it is exempted from any charges under the relevant property regime.<sup>5</sup>

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*her annual allowance would drop by £10,000 from £40,000 to £30,000. Had Dr Smith's threshold income – that is, her income excluding all pension contributions – been below £110,000, the tapered reduction wouldn't apply.*

<sup>4</sup> Inheritance Tax Manual: IHTM17042 – normally contributions made more than two years before death are presumed not to be transfers of value. A contribution by a business to a registered pension scheme, QNUPS or s.615 fund is not a transfer of value if it is allowable in computing the business's profits for tax purposes, or if it is for the benefit of the business's employees. See s12 Inheritance Tax Act (IHTA) 1984.

<sup>5</sup> See s58(1)(d) IHTA – the pension fund is not within the relevant property charging regime at all.

Finally, the value of the pension fund is ignored in taxing the member's estate on death even though the member may be entitled to draw a pension or be entitled to a lump sum.<sup>6</sup>

Most registered pension schemes provide that the member can nominate the person(s) to whom they would like any death benefit to be paid. Generally, this will be merely an expression of how they wish the trustees of the scheme to exercise their discretion and will not bind the trustees. This is important because a legal right for the member to direct the trustees (a 'general power') would itself be property within the member's estate. Provided the trustees have a true discretion to identify the person(s) to whom they will pay the death benefit, the member does not have a general power, and no IHT charge will arise on the death of the member as on death it is not treated as part of his estate for IHT purposes. This means that the pension benefits can be handed on IHT free or transferred to another trust and held in trust for spouse and dependants free of IHT on death (although going forward once the fund is transferred to a new trust – which usually has to be done within two years of death – it will be within the relevant property regime thereafter).

The amount of death benefits provided to the dependent on the death of a member may require the valuation of pension entitlements. While the amount varies with the individual circumstances of the case, including the type of pension arrangements, the scheme being registered or non-registered, the age at death of the pension fund member as well as any BCE, the basis of the calculation is provided by the DC pension fund's value, given in accordance to the definition outlined above.

## 2.2. Valuation of DC pension wealth for non-tax purposes

### 2.2.1. Pension transfer

Pension transfers deal with the movement of an individual's registered pension entitlements between different schemes. Transfers can occur for a variety of reasons including changing jobs, wanting to pool small pension pots to reduce charges, pension sharing in case of divorce, or when a pension scheme is wound up (HMRC, 2020, reg PTM100010). Under such circumstances, the trustee is responsible for calculating the cash equivalent transfer value (CETV), which is defined as 'the best estimate of the amount of money needed at the effective date of the calculation which, if invested by the scheme, would be just sufficient to provide the benefits' (The Pension Regulator, 2008, p. 5).<sup>7</sup> Pension transfers from a registered scheme to another registered pension scheme, a recognised overseas pension scheme, a Pension Protection Fund (PPF) or a Financial Assistance Scheme (FAS) are accepted as authorised payments and thereby generally exempted from tax charges (HMRC, 2020, reg PTM131000). However, a 25% tax charge can still arise due to the exceedance of the member's available lifetime allowance or a 25% overseas transfer charge (Chamberlain, Harrison & Wallington, 2020).

The CETV of a DC pension is calculated by summing up the 'accumulated contributions made by and on behalf of the member together with investment returns' (The Pension Regulator, 2008,

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<sup>6</sup> See s151 IHTA. See also the recent Supreme Court decision in *HMRC v Parry* [2020]. An omission to take pension benefits when the member has reached retirement age was held in that case to be a transfer of value as the member was in serious ill health but that aspect of the law has since been changed in s12ZA IHTA and no transfer of value arises by virtue of the failure to take pension benefits.

<sup>7</sup> Note: Under particular circumstances, the trustee might decide to use an alternative method, which provides CETVs above the minimum amount for DB pension wealth (The Pension Regulator, 2008).



p. 3). Since this information is reported to pension fund members in their annual pension statement, the data are readily available, meaning that no modelling is required.

### 2.2.2. Commutation of pension

In the UK, up to 25% of the accumulated pension benefits held in registered pension schemes can commonly be withdrawn as a tax-free lump sum on reaching the specified retirement age. If the total pension wealth of all registered pension schemes is valued at below £10,000, the 'small pot' regulation applies, by which any amount can be withdrawn immediately up to three times in total. For pension wealth of up to £30,000, the 'trivial commutation' lump sum regulations applies, by which the member can make a tax free one-time withdrawal of up to 25% of the total pension value. The option to commute parts of the pension entitlement is available to a pension scheme member, who has either (a) reached normal minimum retirement age (currently age 55) for registered pension funds, (b) is eligible for early retirement by meeting the ill-health conditions or (c) has reached a protected pension age under the pension scheme<sup>8</sup> (HMRC, 2020, reg PTM063500).

In order to determine if the prospective payment qualifies as a trivial lump sum, the pension wealth has to be valued on the nomination date which falls within a 12-month commutation period (HMRC, 2020, reg PTM063500). For uncrystallised DC pension benefits held in money purchase arrangements, pension wealth is estimated as the 'cash value of the fund plus the market value of any other assets held by the arrangement to provide the individual's benefits' (HMRC, 2020, PTM134500), in line with the definition outlined above.

### 2.2.3. Divorce

In a couple's asset portfolio, pension assets may often present the largest asset class besides the family home, which is why the valuation of pension wealth is of particular importance to the financial settlements reached on divorce. Several methods exist for the purpose of splitting pension wealth, including Pension Attachment Orders (PAO), Pension Sharing Orders (PSO) and offsetting. The choice of the appropriate approach depends on the individual circumstances of the case (The Pension Advisory Group, 2019).

Pension offsetting is not only the most frequently applied method, but also the most relevant to the valuation of pension wealth in the context of a net wealth tax since it deals with the equalisation of *capital* (as opposed to the equalisation of income, which is dealt with under the pension sharing approach). It is defined as 'the process by which the right to receive a present or future pension benefit is traded for present capital or money now' (The Pension Advisory Group, 2019, p. 34). In other words, offsetting is concerned with evaluating the present value of future cash flows provided by the individual's pension entitlements.

Practitioners generally rely on the Cash Equivalent (CE) value as a starting point, which is equivalent to the CETV in the transfer of DC pension schemes. For simple DC schemes, CE figures (e.g. the fund's current value) reported by the pension fund provide a reliable basis for the present value calculations (The Pension Advisory Group, 2019). However, CE figures will generally be misleading in case of guaranteed annuity rates and defined benefit underpins. Under these hybrid schemes, (for an example, see 2. [General principles regarding the taxation of pensions in the UK](#)), DC and DB pension components should be valued separately (The

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<sup>8</sup> Note: Before 6 April 2006, particular registered pension schemes granted their members the right to draw on their pensions at the member's protected pension age, which is specific to the pension scheme and defined as the earliest age at which members are entitled to receive their benefits (HMRC, 2020, PTM062205)

Pension Advisory Group, 2019). In the case of DB schemes, CE figures definitely do not reflect the value of benefits which is why an independent pension valuation almost invariably has to be obtained (see 3.2.3 [Divorce](#)).

#### 2.2.4. Statistical purposes

The Office for National Statistics (ONS) provides one of the most comprehensive estimations of private pension wealth in the UK, largely based on the Wealth and Asset Survey (WAS) which was first run in 2006. In estimating pension wealth accrued in DC schemes, the ONS relies on the information survey respondents attain from their pension providers, e.g. the value of the pension entitlements built up at the time of the survey (ONS, 2019). For DC pensions in payment and DC pension wealth expected from a former dependant, a stochastic model has been developed which derives the market value of the discounted future cash flows.<sup>9</sup>

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<sup>9</sup> The model discounts expected future cash flows in order to attain the present market value of the expected pension entitlements. Both models are comparable to the model used to value DB cash flows; for detail, see 3.2.3. Statistical purposes.

## 3. DB pension schemes

The definition of DB pension wealth varies with the valuation purpose (e.g. taxation, divorce etc.), and consequently a variety of approaches exist which yield different estimates of DB pension wealth.

### 3.1. Valuation of DB pension wealth for tax purposes

#### 3.1.1. Lifetime Allowance for pension charges

In order to determine the pension wealth held in DB pension schemes under the Lifetime Allowance, the value is currently crudely approximated by taking 20 times the annual rate of the pension benefit payable plus a lump sum defined under the relevant pension scheme (The Pension Advisory Group, 2019). Notably, this value is likely to differ, often significantly, from the actual present value of the DB entitlements as personal characteristics and macroeconomic developments are not taken into account.

#### 3.1.2. Annual Allowance

In order to determine the applicability of tax relief under the annual allowance, the value increase of DB pension entitlements (e.g. the pension input amount under DB arrangements) is estimated for the respective tax year. Here, the difference between the opening and closing value of DB pension entitlements is compared, where every positive change counts towards the pension input amount; negative amounts are booked as nil for the input period (HMRC, 2020, reg PTM053301).

The opening value represents the capital value of the pension entitlements in the beginning the tax year, defined as the 'amount of money that might be needed to provide the expected benefit' (HMRC, 2015, reg PTM053301). Calculating the opening value requires the following steps:

- (1) First, the value of the pension entitlements immediately before the pension input period is determined. This amount can be thought of as the capital value that would be paid to the member if he or she had already reached normal retirement age at that point in time excluding any additional pension benefits.
- (2) The value attained in Step 1 is multiplied by 16.
- (3) Any rights to separate lump sum payments built up immediately before the pension input period under the DB pension scheme (e.g. in public sector pension schemes) is added to the amount attained in Step 2. Note that lump sums which are provided by commuting pension entitlements are not considered.
- (4) The amount attained in Step 3 is adjusted for inflation, adding the 12-month increase in the CPI to September, preceding the tax year for which the calculations are performed.

The closing value is estimated following the procedure outlined above while taking into account the additional year of contribution in Step 1. Notably, only the opening value is adjusted for the CPI in order to account for inflation. Furthermore, the closing value needs to be adjusted in case of (a) pension transfer, (b) pension debit or credit, (c) a BCE or (d) a reduction in member's benefit entitlements in exchange for (partial) payments of the annual allowance charge by the pension scheme (HMRC, 2015, reg PTM053301).

The following example can illustrate the calculations: Mrs. Smith is a member in a DB pension scheme which provides benefits at  $\frac{1}{60}$  of her pensionable earnings for each year in service. While she has the option to commute parts of her pension, she is not entitled to any other separate lump sum payment. Her pensionable pay is £60,000 and she has 10 years of service. Therefore, pension entitlements immediately before the pension input period are calculated as  $\frac{15}{60} * £60,000 = £15,000$ . The resulting amount is multiplied by 16;  $£15,000 * 16 = £240,000$ . Because Mrs Smith is not entitled to any separate lump sum payment, the running total remains £240,000. Inflation following the CPI is set at 3%, leaving the opening value at £247,200.

The closing value is calculated by taking:  $\frac{16}{60} * £60,000 = £16,000$ , multiplying the resulting amount by 16, which gives  $£16,000 * 16 = £256,000$ . No further adjustment is needed to the closing value as Mrs. Smith did not make or receive any pension transfers, no BCE occurred or any other reductions were made to her benefits during the period. Lastly, the difference in between the opening and the closing value ( $£256,000 - £247,500$ ) gives the increase in DB pension entitlements of £8,500 (HMRC, 2015, reg PTM053301).

### 3.1.3. Inheritance tax

While the complications in DB pension valuation rest in the *assumptions* about future economic and demographic developments, these factors are known at the pension member's death, e.g. when determining the value of pension entitlements for the purpose of inheritance tax. The benefits provided to the dependent are commonly expressed in benefit terms (e.g. salary multiples, lump sum of a fixed amount of benefits, a fixed amount relative to a dependant's pensions), which are regulated in the pension scheme's policy. Notably, a fixed amount which is made available independent of benefit terms falls under the regulation of cash balance arrangement (for detail, see 2.1.3 [Inheritance tax](#)) (HMRC, 2020 reg PTM071000).<sup>10</sup>

## 3.2. Valuation of DB pension wealth for non-tax purposes

### 3.2.1. Pension transfer

When transferring DB pension entitlements, pension wealth is calculated in two steps. The legal framework requires the trustee to first calculate the initial cash equivalent (ICE), which, under particular circumstances, is adjusted to yield the final CETV<sup>11</sup> (The Pension Regulator, 2008).

In order to calculate the ICE, the trustee is required to value both the pension owner's accumulated benefits as well as the benefit options, including the estimation of both the member's probability of drawing on the universal and discretionary options. Universal options, generally available to all members, include opting for lump sum payments on retirement, drawing on pension benefits earlier or later than the retirement age or exchanging pension benefits for an increase in death benefits on the pension owner's death. Discretionary benefits require the consent of the trustee and/ or the employer, including a rise in pension benefits and favourable terms for early retirement. The trustee can only consider options which raise the prospective ICE; options which would reduce the ICE cannot offset value-increasing options (The Pension Regulator, 2008).

<sup>10</sup> Defined benefit arrangements- Pensions Tax Manual

<sup>11</sup>The ICE provides a legal minimum for the transfer value. Trustees have the possibility to set the CETV to a higher level if required by the scheme, a shared cost scheme is in funding surplus or after the consultation and agreement with the employer (The Pension Regulator, 2008).

When calculating the accumulated pension benefits and probabilities of (contingent) benefit options, practitioners rely on stochastic models, in which assumptions are based on factors specific to the scheme, industry, and/or the member. In practice, demographic assumptions such as life expectancy or assumptions about dependents are based on the scheme's general population. In cases in which the scheme's population is not statistically large enough, an appropriate comparison group e.g. a population with similar characteristics to the member's population can be used instead. Additional characteristics (industry, geographical location etc.) can be employed to increase the precision of the estimate. To determine the appropriate real discount rate, general macroeconomic developments as well as the investment strategy of the fund are taken into account (The Pension Regulator, 2008).

### 3.2.2. Commutation of pension

For the valuation of DB pension wealth for the purpose of pension commutation, HMRC provides the following formula:

$$\text{Pension wealth DB} = (\text{valuation factor} * \text{annual pension rate}) + \text{lump sum}$$

where the *relevant valuation factor*, commonly factor 20, or otherwise determined by HMRC is multiplied by the *annual rate of the pension owner*, which is the payment the pension owner would receive if he or she was entitled to the pension benefits on the nomination date, assuming good health conditions (HMCR, 2020, reg PTM134500). Any separate lump sum payment the pension owner would be entitled to on retirement is added to the product (HMCR, 2020, reg PTM134500).

The valuation can be illustrated with the following example: *Mrs. Smith holds all her pension entitlements in a DB scheme, under which she is entitled to 1/40 of her pensionable earnings for each year in the scheme. On retirement, she is entitled to a separate lump sum of £5,000. On the nomination date, Mrs. Smith has completed 30 years of service and has pensionable earnings of £30,000. The value of her uncrystallised right will therefore be calculated as follows:*

$$£30,000 * \frac{30}{40} + £5,000 = £27,500$$

DB pension wealth held in cash balance arrangements is approximated by taking 'the amount that would be available for the provision of immediate benefit if the member was entitled to them on the valuation date' (HMCR, 2020, reg PTM134500). If benefits were reduced because the member had not reached the specified retirement age, it is assumed, for the purpose of the calculation that the member has reached the specified retirement age on the nomination date. Furthermore, it should be assumed that the member is in good health (HMCR, 2020, reg PTM134500).

### 3.2.3. Divorce

Determining the fair and equitable distribution of DB pension assets on divorce is considerably more difficult compared to DC pension wealth due to several conceptual and practical issues. First, CE figures reported by the pension provider differ significantly from the true value of the pension entitlements to the individual because necessary demographic and economic assumptions commonly vary with the purpose of the calculation and member-specific benefits are oftentimes not taken into account (The Pension Advisory Group, 2019). In fact, the pension provider will commonly apply highly optimistic actuarial assumptions in order to protect the scheme as a whole, which therefore, results in an undervaluation of the member's DB pension wealth. Second, there exists no agreed practice for the valuation of DB pension wealth on



divorce, which is why pension providers commonly come up with different pension wealth estimates (The Pension Advisory Group, 2019).

Therefore, the opinion of a Pensions on Divorce Expert (PODE) is commonly required when dealing with DB pension assets and more complicated structures within DC pension schemes, where neither relying on CE figures nor pension sharing presents a viable option (The Pension Advisory Group, 2019). In practice, the divorce lawyer of the other party will evaluate first, if the potential gains of an independent pensions report, which inevitably comes out with a higher pension wealth assessment, will outweigh its costs (commonly around £2500 plus VAT). If the true pension value is assumed to be only slightly higher than the CE presented by the other party, the costs of the PODE will not pay off.

Within a full pensions report, the PODE needs to take into account the characteristics of the pension scheme, which entails making assumptions on (a) the retirement age, (b) pension revaluation for DB schemes with final salary linking, (c) changes of pension benefits after retirement, (d) lump sum and commutation and (e) pension increase provisions (The Pension Advisory Group, 2019).

Since no agreed-on approach exists for discounting future DB pension benefits, the PODE has considerable room in choosing an appropriate method, including among others:

- (1) The **Defined Contribution Fund Equivalent (DCFE)** which is most commonly applied, providing the 'gross replacement value of a Defined Benefit pension, using the same assumptions the expert would use to determine the estimated income from a Defined Contribution scheme' (The Pension Advisory Group, 2019, p. 40). In other words, the method determines the monetary amount that would be needed to purchase an annuity which matches the DB scheme's benefit structure. Notably, many characteristics of DB pension schemes cannot be reproduced by this method as 'customised annuity products' do not exist in the market (The Pension Advisory Group, 2019). Similarly, gender-specific assumptions and life expectancy predictions are also not accounted for by this method (The Pension Advisory Group, 2019).
- (2) The **realisable value** presents an estimate for the capital value available to the pension owner over 55, net of the tax-free lump sum, drawdowns and taxes (The Pension Advisory Group, 2019).
- (3) The **Cashflow modelling** approach entails an analysis of the pension owner's risk capacity, taking into account the individual's circumstances; this approach requires the expertise of a financial planner (The Pension Advisory Group, 2019).
- (4) **Duxbury tables** are commonly used by legal practitioners to capitalise a spouse's income claim, adjusted for inflation and a degree of risk to the claimant (Duxbury tables usually consider earned income). While the application of Duxbury tables, which usually deal with present income streams and earned income, does not directly translate to the DB pension context, the approach is relatively prevalent due to the high degree of transparency and simplicity in the application (The Pension Advisory Group, 2019).

Finally, the value of the pension entitlements is offset against other non-pension assets, taking into account the effect of taxation on pension entitlements and the perceived utility e.g. considering the benefit of cash now instead of cash at some point in the future. Commonly, this will result in a 20–40% decrease of the pension valuation figure (The Pension Advisory Group, 2019).

Regardless of the chosen approach, the underlying demographic, economic and financial assumptions are central to the calculation of DB pension value. Again, experts are free in choosing the appropriate assumptions, which is why the valuation results of different PODE's can differ considerably. As a best practice, the Pension Advisory Group (2019) recommends following the Financial Conduct Authority (FCA) guidance on pension transfers as a starting point (for detail on pension transfers of DB schemes, see 3.2.1. Pension transfer).<sup>12</sup>

The approach to pension wealth valuation on divorce will be outlined with the help of the following example: *Mr. Smith is a 52-year-old senior nurse practitioner, whose CETV is set at £238,000. Note that the NHS's CETVs are commonly 20% lower than the true value to the pension holder. Therefore, the divorce lawyer of Mr. Smith decides to commission an independent actuary (e.g. the PODE), which estimates the pension value at £407,000. This value is then offset against other non-pension assets considering tax and utility adjustments, whereby the parties ultimately agree on a pension value of £318,000.*

### 3.2.4. Statistical purposes

The ONS model developed for the purpose of DB pension wealth estimations conceptualises DB pension entitlements as 'the pot of money that would have to be given to members at the date of the interview in order for them to buy the same benefits as those accrued in the pension' (ONS, 2012, p.2). In practice, future cash flows, estimated based on stochastic modelling, are discounted to their present value using the relevant discount rates, which in turn, is based on assumptions on future macroeconomic developments.

The model is defined as:<sup>13</sup>

$$Pension\ wealth\ DB_{it} = \frac{A_{Rt} Y_{it}^p}{(1 + r_t)^{R-a}}$$

where  $A_{Rt}$  presents the annuity factor, adjusted for age and gender-specific considerations at retirement age  $R$ , based on an inflation-linked annuity rate

And  $Y_i^p$  presents the annual pension income defined as:

$$Y_{it}^p = x_{it} n_{it} s_{it}$$

$x_{it}$ : accrual rate in individual's scheme in year  $t$ , e.g. the fraction of salary accrued by the employee for each year of service

$n_{it}$ : individual's tenure in the scheme in year  $t$

$s_{it}$ : individual's gross pay in year  $t$

$r_t$ : discount rate (based on AA corporate bond yields)

$R$ : Retirement age

$a$ : Individual  $i$ 's current age

<sup>12</sup> Note: Appendix Q in The Pension Advisory Group, 2019 provides a table with FCA-recommended assumptions on demographic, economic and financial variables (updated April 2019).

<sup>13</sup> Note: The model calculates pension wealth for current DB schemes. The methodological annex provides further information on how to account for more complicated pension scheme structures (e.g. pension of a future spouse, retained pension rights, pension in receipt and income drawdowns. For detail, see ONS, 2012, Chapter 5.

In other words, the yearly DB pension wealth is calculated by multiplying the *expected* tenure in the pension scheme ( $A_{Rt}$ ), adjusted for inflation, with the ‘theoretically accumulated’ pension pot ( $Y_{it}^p$ ). The numerator is therefore equivalent to the amount of money that would be needed in order to purchase an annuity which provides the given annual pension income stream. The denominator discounts the attained stock value to the present, considering the years until retirement.

## 4. International experience with pension valuation in the context of a net wealth tax

Generally, the features of pension systems are highly country-specific, as they develop in accordance to the characteristics of the population and the macroeconomic environment. However, there are some common trends in the reforms to pension systems and their approach to taxation, which are relevant to pension valuation under a net wealth tax. First, a change in the demography of developed, and increasingly also developing countries, has resulted in a paradigm shift away from DB towards DC schemes in order to increase financial sustainability in light of an ageing population (OECD, 2019). This observation also applies to the private sector in the UK where less than 10% are active members of a DB scheme (Thurley & McInnes, 2019). In the context of pension valuation for the purpose of a net wealth tax, this would mean that issues regarding the complexity of DB pension valuation in the private sector remain a relevant, though ‘decreasing’ problem. Notably, the public sector’s main pension schemes are, however, DB schemes, which seem to persist in the foreseeable future due to their relatively more generous benefits structures (Thurley & McInnes, 2019). Second, pensions are commonly a tax-favoured capital asset due to a mix of macroeconomic considerations and socio-political concerns. Notably, out of eleven OECD countries, which either levy (including Norway, Spain and Switzerland) or have levied a wealth tax in the past (including France, Austria, Germany, Finland, Ireland, Luxembourg, Netherlands and Sweden), none included pension savings within the wealth tax base (OECD, 2018).

### 4.1. Net wealth taxes and the treatment of pension assets

Pensions wealth has commonly been excluded from the tax base of countries applying a net wealth tax due to a mix of economic, socio-political and administrative considerations. Notably, the latter should be regarded separately from the *theoretical* arguments questioning net wealth taxation as administrative concerns are, to a large extent, a question of appropriate wealth tax design (OECD, 2019).

The main economic argument commonly put forward against a net wealth tax concerns the distortion of the individual’s saving behaviour, suggesting an optimal capital tax of zero, which is analysed at length in the seminal work of Atkinson and Stiglitz (1976)<sup>14</sup> (OECD, 2018). While a detailed discussion of the ‘present bias’ and supportive empirical evidence is beyond the scope of this paper, it should be noted that the automatic enrolment into employer-sponsored pension schemes in the UK has been a political response in addressing ‘life-cycle consumption smoothing’ and in particular the issue of ‘undersaving’ (Mirrlees et al., 2011). Drawing pension entitlements into the tax base through an annual net wealth tax could possibly aggravate the problem, as the nudging effect of automatic enrolment might only be effective under a tax-favoured treatment of pensions. Put differently, the preference for consumption today could possibly only be weighted up by means of a preferential tax treatment of pension wealth, which is why the principle of horizontal equity in the taxation of capital assets could actually have an overall negative effect in the context of pension wealth taxation. A more comprehensive discussion of these arguments addressing pension assets under wealth taxation and concerns regarding the effects on innovation and entrepreneurship, liquidity, composition of wealth and horizontal equity as well as tax evasion and avoidance issues is provided by the Wealth Tax Commission evidence papers, while this document focuses on *valuation* issues of pensions for the purpose of a net wealth tax, which are briefly outlined below.

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<sup>14</sup> Note: For further detail and discussion of the theory, see Diamond (2009).

For wealth tax purposes, capital assets are usually valued at their market price. In this context, the literature on wealth taxation raises three conceptual issues, which in part explain the exclusion of pensions from the wealth tax base of many countries. First, in contrast to many other capital assets, pensions are commonly non-tradable, which is why market prices – the first best valuation estimates – are not readily available. Furthermore, there is a conceptual difficulty when considering market values in the context of pensions since the value of the asset ‘now’ would be considerably less than the value assuming the continued existence of the asset (Alvaredo et al., 2015). A related concern deals with the fact that the pension owner is only allowed to claim the entitlements at a specific age or under particular restrictions, which is why, besides economic and demographic assumptions, the individual preferences for liquidity would have to be known perfectly in order to calculate the value of pension entitlements to an individual today. Lastly, the different valuation methods of DC and DB pension wealth possibly raises equity concerns since pensions assets in one scheme might be treated advantageously.

However, as also outlined above, it is already common practice to determine the present value of DB and DC pension wealth on the occasion of pension transfers and divorce, as well as for the taxation under the Annual and Lifetime Allowance charge. While the conceptual issues with the valuation of pension wealth persist, the approaches demonstrate that it is possible to determine a current pension wealth value. As noted by the Pension Advisory Group (2019), a common approach to pension valuation would go a long way to ensure more efficient and fairer valuation practices. Bringing pension wealth into the wealth tax net might actually facilitate this process.



## 5. Conclusion

While the analysis demonstrates the complexities of pension valuation for the purpose of a net wealth tax, the evaluation of already existing approaches also shows that there exists the opportunity to develop a consistent valuation approach which would go a long way in overcoming the existing conceptual and practical difficulties in pension wealth valuation. In this context, several conclusions can be drawn.

For simple DC schemes, pension wealth is defined consistently as the fund's present cash value, irrespective of the valuation purpose. This information is readily available and could be reported to HMRC on a regular basis. Difficulties only arise with the valuation of DB schemes (including cash balance, defined benefit and hybrid structures) which require assumptions on future economic and demographic developments.

From the preceding analysis, three broad approaches to the valuation of DB pension wealth can be derived. For the purpose of pension wealth valuation under the Lifetime Allowance, the Annual Allowance and the commutation of pension entitlements, multiples of the annual amount of pension benefits payable (e.g. 16 or 20) plus any separate lump sum payment are used to roughly approximate DB pension wealth. Similarly, multiples expressed in benefit terms are also used when determining DB pension rights under IHT. While this method is easily scalable considering the administrative capacity of the state, it is likely to yield pension wealth estimates which differ significantly from the true value of the pension benefits to the individual. A second approach is demonstrated in the valuation of pension benefits on divorce, where practitioners commonly approximate pension wealth by taking the DCFE, e.g. the cost of buying a money purchase pension with a comparable benefit structure today. While this method is significantly more likely to mirror the true value of the individual's pension benefits taking into account the underlying structure of the DB scheme, the method fails to reflect relevant individual characteristics such as gender-specific assumptions or life expectancy predictions since there exist no customised annuity products in the market, which is why those characteristics can consequently not be reflected in market prices. The most elaborate method is used in valuing pension wealth for the purpose of pension transfers and statistical analyses. Here, stochastic models are used to derive assumptions on the individual's behaviour (e.g. evaluate benefit options) while predictions on macroeconomic and demographic developments are grounded in thorough data analyses. Although this is likely to yield the best estimate of DB pension wealth, requirements to the underlying data base and the administrative capacity of the state are extremely high.

Any valuation approach to DB pension wealth will entail making assumptions on individual behaviour and uncertain future events which is why it will always only deliver an estimate which, by definition, can vary from the true value of the pension entitlements to the individual. The taxation of pension wealth based on certain assumptions ultimately requires weighing up potential inequities arising from the use of assumptions in pension wealth calculations against inequities introduced due to the preferential treatment (e.g. the exemption) of pension benefits under a net wealth tax.

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