Background Paper

Wealth Tax Commission

Banding: implications and complications

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BANDING: IMPLICATIONS AND COMPLICATIONS

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1. Introduction

An *ad valorem* tax regime, in which a person's tax liability is determined by their total wealth and a schedule of tax rates, relies on knowing the exact value of a person's total wealth at a given point in time. This is a key issue with the design of a wealth tax: establishing this value can be a costly and difficult exercise for both the taxpayer and the tax authority.[1]

Using a banded tax regime may help alleviate this problem. Such a regime involves laying out a series of bands covering the wealth distribution above any personal allowance, and having taxpayers pay a charge determined by the band which their total wealth falls into.[2] For the most part, this reduces the need for exact valuations of wealth. For example, a person may be unsure whether their total wealth is £1.2 million, £1.4 million, or somewhere in between, but this does not affect their tax liability if one tax band covers everyone with between £1 million and £1.5 million of wealth – they will pay the same charge regardless.

However, this approach will not remove uncertainty for everyone. In particular, those who find themselves near the thresholds between bands will need to precisely value their wealth, as the difference between charges on either side of the threshold (and any penalties for under-declaring wealth) may be substantial: they now face a discontinuous 'jump' in tax liability rather than a smooth increase. I discuss where in the wealth distribution this will have the largest impact in Section 4. It also creates inequity, with people at opposite ends of the same band paying the same amount, while people with similar levels of wealth but either side of a threshold pay very different amounts. In Section 3 of this paper, I show that this blunt approach means some will pay quite a different amount of tax compared to an *ad valorem* regime with comparable rates.

In addition, certain assets are particularly costly or difficult to put a precise value on. For those who do need a precise point estimate of their total wealth (such as those close to a banding threshold) we can broadly characterise two key valuation problems they are likely face: the 'nuisance' of valuing (for example) every last teaspoon in their possession to arrive at an exact figure; and the difficulty of valuing large assets such as private businesses which may make up a large share of their total wealth. Section 5 shows that banding may be more useful for addressing the former problem than the latter: that is, it is most useful where the range of plausible values for true wealth is relatively narrow.[3] There is also a question of how well taxpayers know the value of their own assets: I address the possibility that taxpayers systematically overestimate some part of their wealth in Section 5.2.

The rest of this paper explores the impact of these broadly-described valuation issues, before going on to examine how the distribution and composition of wealth in the UK affect the prospects of designing a palatable banding regime in practice. I discuss how different aims may lead to different design choices in Sections 6 and 7, and touch on other issues likely to affect the practical design of such a regime: the number of people likely to fall close to a band threshold,

[1] Daly and Loutzenhiser (2020) discuss this problem in much more detail, and Wealth Tax Commission Background Papers 140-146 discuss the complexities of valuing particular assets. Troup, Barnett and Bullock (2020), Burgherr (2020), and Advani, Hughson and Tarrant (2020) all present estimates of the costs of professional advisory fees for filing, valuation of property, and (in some cases) disputes.

[2] In this paper I examine bands applied to total wealth. A by-asset approach would be possible. However it adds complexity to the design and creates incentives for taxpayers to vary their asset mix to get below band thresholds across multiple asset classes.

[3] It is also possible to address the former valuation problem by having a *de minimis* exemption for low-value items, as suggested by Advani, Chamberlain and Summers (2020). I examine how robust a banding system is to such exemptions in Section 5.

and how basic design changes generate broad-based increases or decreases in payments for taxpayers. While the primary focus in this paper is on a hypothetical wealth tax, much of this discussion will be relevant to other taxes which employ banding regimes, including Council Tax and the Annual Tax on Enveloped Dwellings.

2. Data

My primary data source is the ONS Wealth and Assets Survey (WAS), as it is the most comprehensive source of UK wealth data available. Advani, Bangham and Leslie (2020) discuss some relevant aspects of the survey's coverage, including geographical coverage (notably, the survey only captures individuals living in a private household in Great Britain[4] excluding the Isles of Scilly and the area north of the Caledonian Canal). Data reported in this paper are all from the most recent round of the survey, covering April 2016 to March 2018. Cross-sectional person weights are used to gross up observations to represent the target population of private households across most of Great Britain, around 62 million people. The rest of this section describes how I add to and adjust the WAS in this work, and why. A more detailed account can be found in Advani, Hughson and Tarrant (2020), which takes the same approach.

2.1 Wealth at the top

Because of the sampling structure of the WAS, it is likely to be most informative about the effects of banding for those with wealth up to millions or perhaps tens of millions of pounds. The WAS does include some survey observations above these levels, but they are likely to under-represent the number (and wealth) of the wealthiest individuals in the UK, as is typical for household surveys.

More critically, even if we assume that on average the WAS does provide a representative sample of numbers of people and levels of wealth at the very top, the sampling structure does not allow us to directly represent the dispersion we know exists in the upper echelons of wealth. For example, the Sunday Times Rich List (STRL, 2020), which estimates the wealth of the richest 1000 individuals and families with a connection to the UK, suggests that the total wealth of these people ranges from hundreds of millions to billions of pounds; this range is not reflected in the top few observations which should represent these individuals in the WAS.

Accepting this limitation would hamper our ability to discuss the effects of banding at the top of the distribution. Therefore, where it is important to get an impression of the full extent of dispersion at the very top of the distribution, I use either the STRL on its own, or append it to the WAS data.[5] I use the 2020 STRL, rescaled to match average aggregate wealth across the 2017 and 2018 lists. Information from the 2020 STRL has then been matched to Companies House data to identify and exclude individuals who are likely to be non-residents (and therefore whose total wealth would not likely be taxable); where multiple individuals are identified in the STRL entry, the total wealth reported is split between them.[6]

It is important to note that these two datasets are far from a perfect match: the STRL does not have such comprehensive coverage of assets as the WAS, and often represents the wealth of couples or family units rather than individuals (Watts, 2020). Advani, Bangham and Leslie (2020) provide more detail on the differences and why we might consider even the STRL an underestimate of wealth levels at the top. I implement a Pareto adjustment which attempts to correct for this, as described in Advani, Hughson and Tarrant (2020).

[4] i.e. it excludes Northern Ireland.
[5] In sections where the composition of wealth by asset type is relevant, I do not include STRL individuals, as the data do not allow such a breakdown of total wealth (although it seems likely that it primarily represents business assets).
[6] These procedures are described in more detail in Advani, Hughson and Tarrant (2020).

2.2 Other Adjustments

This is, by nature, a practical exercise which necessitates making some assumptions about the design of a wealth tax, even though there is no actual policy on which to base these assumptions. I follow recommendations from Advani, Chamberlain and Summers (2020) where possible, including in modelling a tax as levied on individuals rather than couple or family groups, and using as comprehensive a tax base as possible.[7]

I also adjust the value of physical property, taking only 25% of the reported value of household contents to reflect the distinction between replacement value (as reported in the WAS) and market value; otherwise wealth values are taken as given in the survey. This is quite a blunt approach; a by-household adjustment based on each individual's asset mix would be preferable, but the WAS data do not give enough detail to make this possible. Total net wealth is calculated as the sum of pension wealth, value of own businesses, net financial wealth, net property wealth including the main home, and the (adjusted) value of physical assets.

In generating total personal wealth using the WAS I use a combination of variables reflecting personal and household wealth. Assets which are typically jointly owned by a couple, such as a house and household contents, are assumed to be owned in equal value by the household reference person and their partner, if a partner resides in the household; other assets such as pension wealth are already assigned on an individual basis. Assets owned by children under the age of 16 are allocated to the less wealthy of the main adults in their home, splitting any excess equally such that this does not change the internal ordering of household members by wealth. This flows from an assumption that parents would (a) be liable for any child's wealth, to prevent a channel of avoidance, but (b) would be able to choose whose wealth it is added to, and would choose with a view to minimising their overall tax liability.

[7] I discuss the *de minimis* exemptions recommended by Advani, Chamberlain and Summers (2020) in Section 5.2. Throughout this paper I use 'total wealth' to indicate where I have not applied these exemptions (which is my base case) and 'chargeable wealth' where I have.

3. How banding might work

In this section I present a basic exposition of some banding schemes using the STRL data. Notwithstanding the focus on the top end of the wealth distribution, this section presents two of the key insights of this paper. The first is that banding produces noticeable inequality within bands in terms of the *rate* of tax actually paid. The second is that the shape of the wealth distribution (a positive skew with an extremely long and thin tail) means that it is very difficult to design a fully banded scheme which results in the richest members of society paying anything more than a very small share of their wealth in tax relative to others. But first, I explore how the tax charge for a band might best be set, in theory and in practice.

3.1 How to set the charge?

Within bands, how should the banding charge be determined? I take as given that one aim of any banding regime should be to remain 'close' to a more ideal *ad valorem* system (the first-best in a world without valuation problems).[8] The natural choice, from a mathematical point of view, of a single value to use as the basis for a tax charge is the wealth of the median taxpayer, although this is not a likely policy solution (not least because identifying medians relies on complete knowledge of the distribution of total wealth).[9] I explain below why the median nonetheless provides a useful benchmark against which feasible alternatives, such as the midpoint of the band, can be compared.

The median is the value which minimises the aggregate differences in the wealth of all taxpayers captured in each band, thanks to the median's mathematical property as the value which minimises the sum of absolute deviations in a distribution. In using median wealth as a basis for the charge I thus minimise the variation from the *ad valorem* system, allowing the best direct comparisons. Again by definition, it is also the point at which the number of taxpayers paying more than in an *ad valorem* regime is equal to the number paying less. However, as Section 3.4 will show, the median does present challenges when designing a charge to cover very wide bands, particularly at the top end of a distribution with a long, thin tail.

A more realistic policy choice might be to base the charge instead on the midpoint of the band: this can be defined ex ante. However, because the distribution of wealth is highly positively skewed, there will likely be more taxpayers with total wealth below the midpoint for any band than those above, which automatically implies more are paying higher taxes than under an *ad valorem* regime (this is demonstrated in Section 3.4). It would also likely sharpen the incentive for taxpayers to reduce or understate their wealth if they are towards the bottom of the band, as the midpoint will be higher than the median of the band. Other ex-ante alternative reference points might better reflect the positive skew of the distribution, such as the top of the lowest third or a quarter of the banded range. However, none of these give a clear guide for how to set a charge on the open-ended band covering the top of the distribution (whereas this is clearly defined if using the median).

[8] This is a choice aimed at maintaining a sense of fairness, such that individuals are not paying vastly different amounts in tax simply because of a design choice made for administrative convenience.
[9] While we can estimate the median from sources such as the WAS, as I do in much of this paper, our best source of information on the wealth distribution would be the data collected as part of administering the tax for the first time.

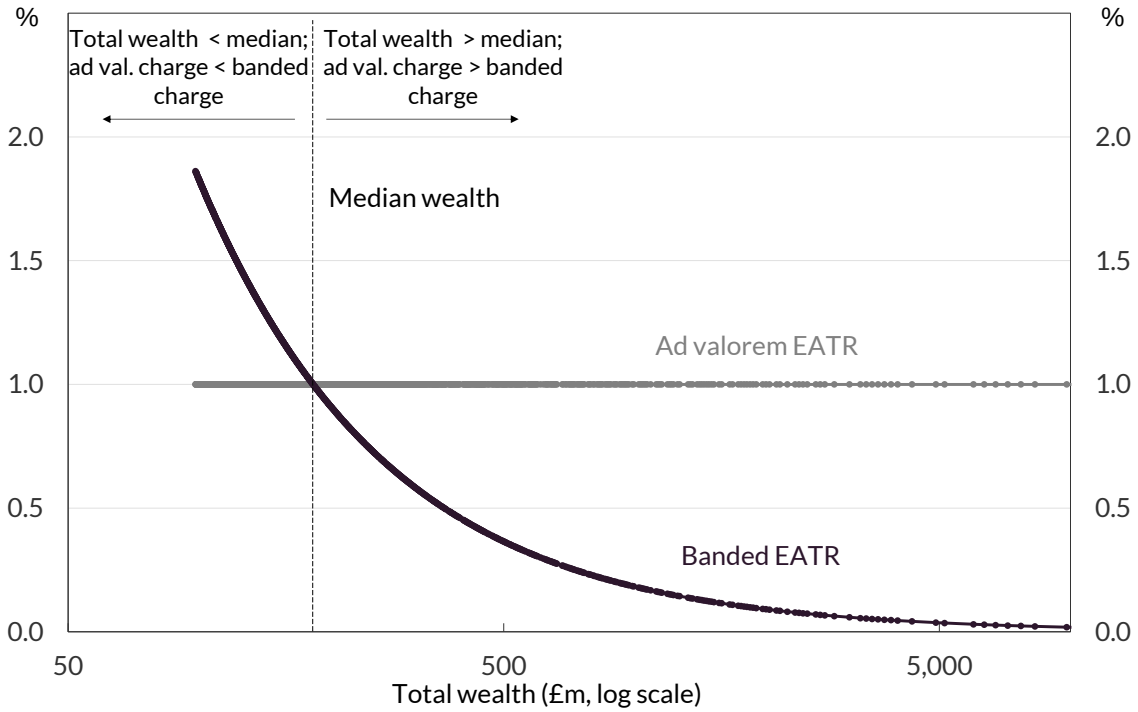
For most of this paper, I set the charge for each band at 1% (the assumed benchmark tax rate in all scenarios unless otherwise specified) of the median total wealth of taxpayers in the relevant band. I briefly explore alternatives to the median and the midpoint in Section 6.4.

3.2 Single band and horizontal inequity

Assuming that the median is taken as the basis of the charge, Figure 1 compares the effective average tax rate (EATR) – that is, tax paid divided by total wealth – paid by STRL taxpayers under an *ad valorem* regime with a banded regime in which they all fall in the same band.

In an *ad valorem* regime, each taxpayer's liability is determined as a fixed percentage of their total wealth: with an assumed tax rate of 1%, the EATR is a flat line at 1. Under a banded regime, taxpayers in the same band do not pay the same rate but rather the same charge, which I take as 1% of median wealth (£183 million, implying a charge of £1.83 million). Taxpayers with wealth above £183 million would have a lower tax liability in a banded system compared to an *ad valorem* system with a flat rate at 1%, and lower EATRs. On the other hand, taxpayers with less wealth would have a greater tax liability and EATR under a banded regime.

FIGURE 1: EATRS IN BANDED AND *AD VALOREM* REGIMES: SINGLE BAND



Notes: Figure compares the EATRs (effective average tax rates – tax paid divided by total wealth) under an *ad valorem* (ad val.) regime at 1% with those for a regime with a single band, in which the charge is based on median wealth amongst these (representative Sunday Times Rich List) individuals.
Source: Author's calculations using Sunday Times Rich List, 2020.

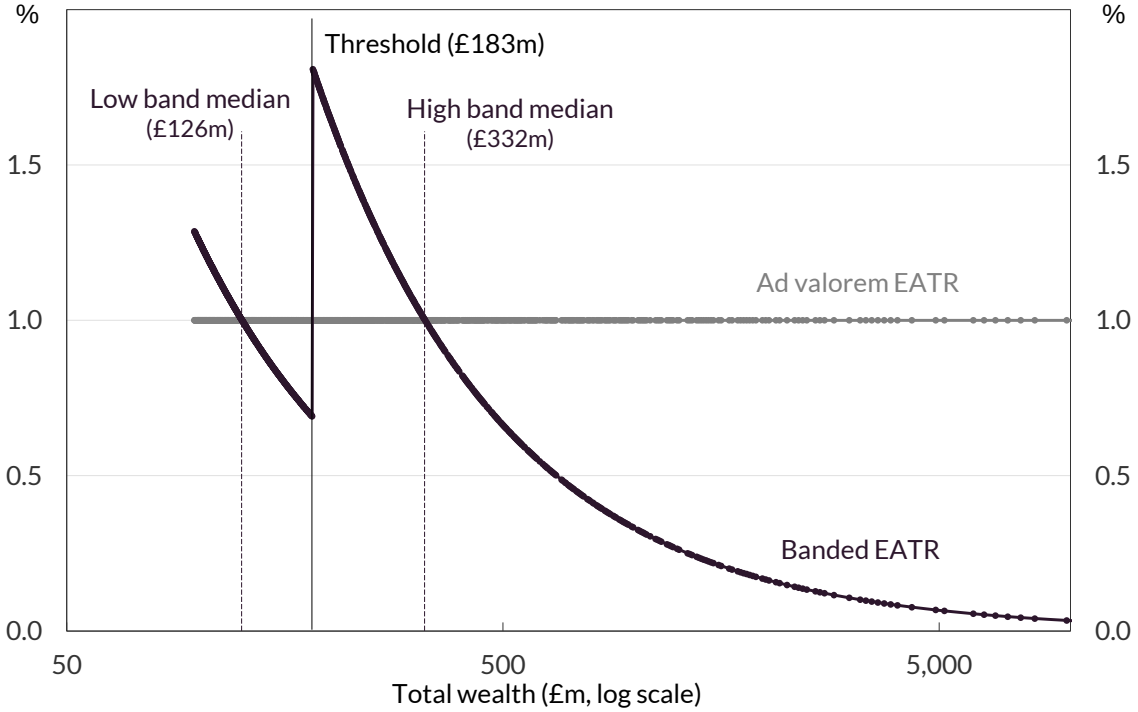
The inequity of a banded regime is clear: for taxpayers at the lower end of the STRL, this charge is a much higher share of total wealth than for those at the top end. Taxpayers with £100 million in wealth pay an effective tax rate of 1.8%, while those with £1 billion or more pay less than 0.18%. Within bands, then, we observe regressivity, with the tax having the lowest impact on the wealthiest. As shown above, too, those with wealth below the median pay more in a banded regime than in an *ad valorem* regime, while those with wealth above the median pay less in a banded regime. Banding is clearly a blunt mechanism – the summed (absolute) difference in tax liabilities compared with an *ad valorem* regime amounts to £6.1 billion (this could be represented as the areas between curves, scaled by taxpayers' wealth).

The highest band in a banded regime (in this case, shown as one band covering the range of wealth in the STRL) is conceptually equivalent to capping total liability to the wealth tax. As Figure 1 demonstrates, this represents a proportionally larger benefit to the richest members of society. In Section 6.4 I discuss alternatives to this cap for the top band.

3.3 Two bands

Naturally, it is possible to mitigate the effect of this inequity by having more than one band. In this scenario, I imagine a threshold between two bands at median STRL wealth (£183 million): taxpayers with less than £183 million pay a charge of 1% of median wealth between £99 and £183 million (£1.3 million), while taxpayers with more than £183 million pay 1% of median wealth above that (£3.3 million).[10] It is worth pointing out that this change introduces some progressivity, not by charging a higher rate, but simply by basing the charge for taxpayers with higher wealth on a larger number. That said, the regime remains regressive within bands. The *ad valorem* scenario remains unchanged (Fig. 2).

FIGURE 2: EATRS IN BANDED AND *AD VALOREM* REGIMES: TWO BANDS, MEDIAN THRESHOLD



Notes: Figure compares the EATRs (effective average tax rates – tax paid divided by total wealth) under an *ad valorem* regime at 1% with those for a regime with two bands, with the charge based on median wealth amongst these (representative Sunday Times Rich List) individuals in each band.
Source: Author's calculations using Sunday Times Rich List, 2020.

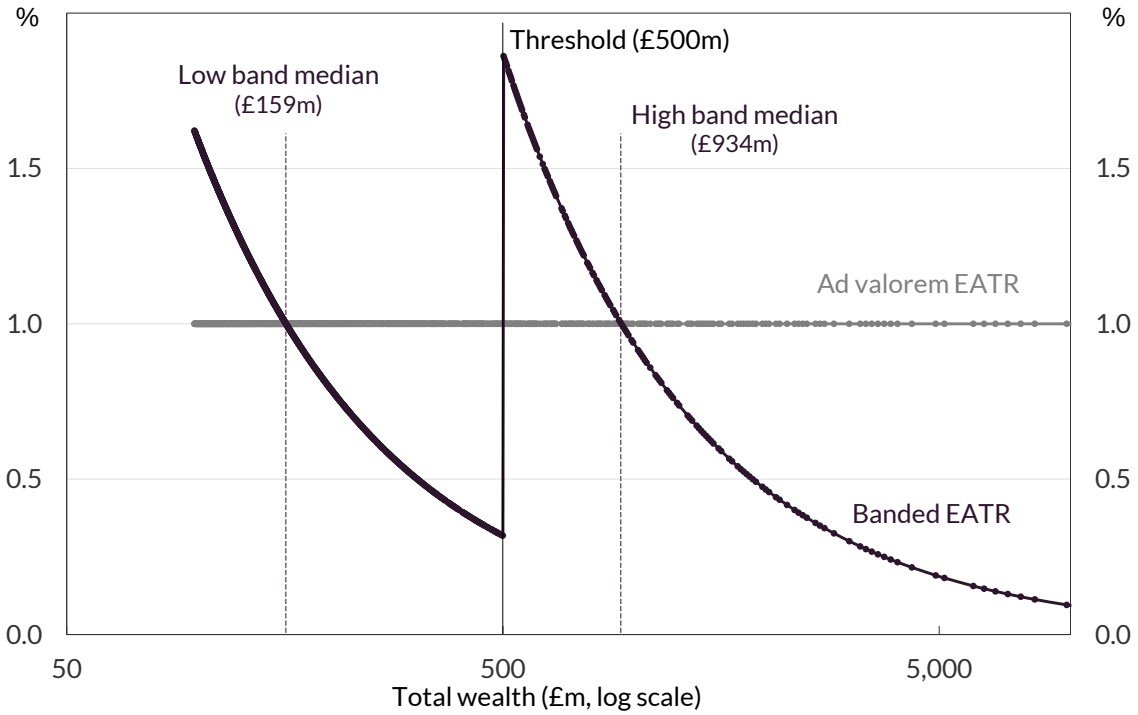
The same pattern is evident within bands: the EATR decreases as individual wealth increases, with those in the lower parts of each band paying a larger share as tax in a banded regime, while those in the upper part pay less. However, adding the second band allows for a closer approximation of the *ad valorem* regime: the sum of absolute differences in tax liabilities between regimes is £5.7 billion, meaning it is slightly better targeted than the regime with just one band. There is a noticeable jump in EATRs at the threshold, an important feature of a banded

[10] For the remainder of this paper I tend to choose round number thresholds rather than those which would be dictated by the median. Strictly, though, using median-based thresholds (or more broadly, dividing taxpayers in to groups of equal size) might be optimal in terms of minimising the deviation from an *ad valorem* regime.

regime: under this scheme, a person with £183,000,000 in total wealth would pay 0.69% of their total wealth in tax, while a person with £183,000,001 would pay 1.81%. This creates considerable incentives for avoidance, as those at the bottom of the band have only to reduce their reported wealth by enough to fall into the lower band in order to significantly decrease their tax liability. Notably, too, the wealthiest still pay a very small proportion of their wealth in tax: those with more than £670 million pay less than half the tax they would in an *ad valorem* regime.

Can the undesirable elements of this scheme (the large jump and very low EATRs at the top end) be addressed with a higher threshold between bands? Figure 3 shows an alternative scenario with a threshold at £500 million. In this scenario, only those with £1.9 billion or more pay half or less in tax than what they would in an *ad valorem* regime, although the EATR still trails off to a very low level. However there is a much more noticeable jump in EATRs at the threshold (a mechanical result of our premised tax charge) from 0.31% to 1.86%. Perhaps counterintuitively, the higher threshold has also raised the EATRs paid by people at the bottom of the higher band, who are pooled with fewer people (who have more wealth). The higher threshold does not necessarily improve the targeting of the banded regime: here, creates a much larger inequality in tax rates paid between those above and below the threshold, and thus a stronger incentive for taxpayers at the bottom of the top band to reduce their taxable wealth. Advani, Hughson and Tarrant (2020) show how a banding regime interacts with evasion to produce strong responses in effective average tax rates.

FIGURE 3: EATRS IN BANDED AND *AD VALOREM* REGIMES: TWO BANDS, HIGH THRESHOLD



Notes: Figure compares the EATRs (effective average tax rates – tax paid divided by total wealth) under an *ad valorem* regime at 1% with that for a regime with two bands, with the charge based on median wealth amongst these (representative Sunday Times Rich List) individuals in each band.
Source: Author's calculations using Sunday Times Rich List, 2020.

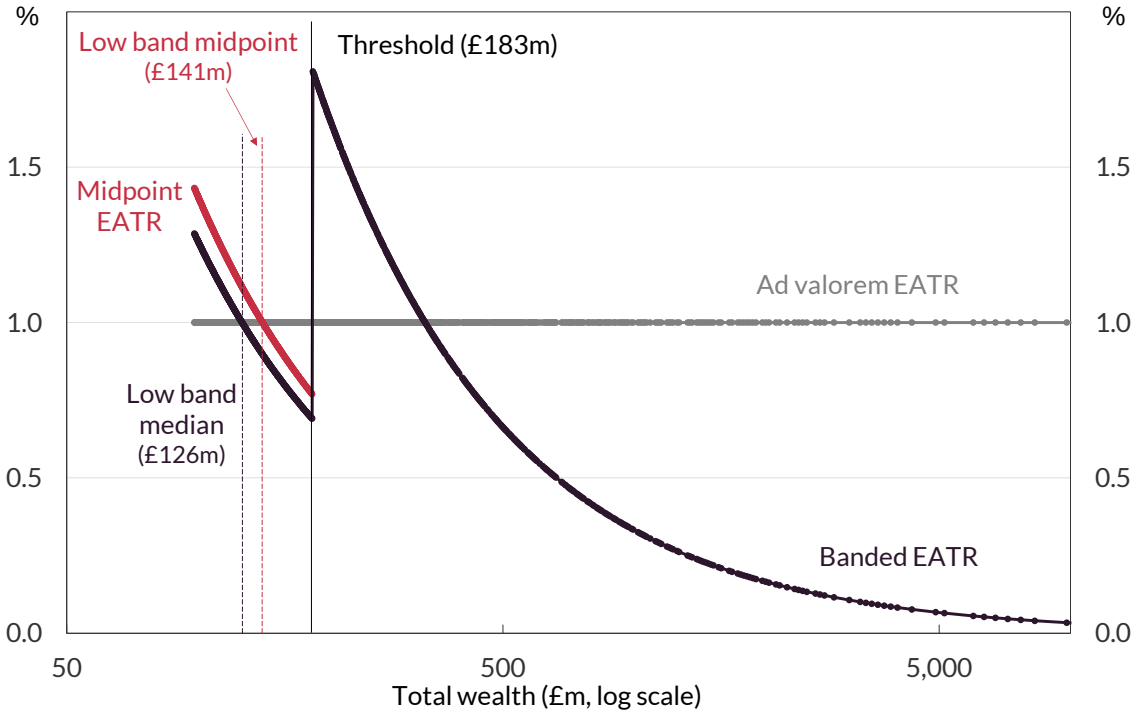
A more effective way to address these issues is to add another band (this is shown in Appendix A). Adding more bands further improves the targeting of tax charges within each band, although the same pattern of inequality is evident within bands. Eventually, of course, the number of bands may become too narrow to help reduce valuation costs: in the extreme, with

bands £1 wide we move in practice into an *ad valorem* system with jumps eliminated, but have lost the benefits of reduced administrative costs. This is a point I explore further in Section 5.

3.4 Setting the band charge with reference to the midpoint

Figure 4 shows the effect of basing the banded charge on the midpoint of the band rather than the median. The median in the lower band is below the midpoint of the band (from the positive skew of the distribution); naturally it follows that a 1% charge is higher when based on the midpoint of the band than when based on the median. As can be seen from Figure 6, this means that the EATR is uniformly higher for all those in the lower band when based on the midpoint; the aggregated absolute difference in tax liabilities in the lower band from *ad valorem* is also larger overall than when basing the charge on the midpoint (£72 million based on the midpoint compared to £39 million based on the median). While the midpoint may be a more realistic policy choice, it results in a much more drastic divergence from an *ad valorem* regime. As a result, I prefer a median-based charge as the benchmark for the remainder of this paper, although I do consider alternative approaches to setting a charge in the highest band in Section 6.4.

FIGURE 4: MEDIAN VS MIDPOINT CHARGE: TWO BANDS, HIGH THRESHOLD



Notes: Figure compares the EATRs (effective average tax rates – tax paid divided by total wealth) under an *ad valorem* regime at 1% with those for a regime with two bands, with the charge based on median wealth amongst these (representative Sunday Times Rich List) individuals in each band, and a charge (for the lower band) based on the midpoint of the band.
Source: Author's calculations using Sunday Times Rich List, 2020.

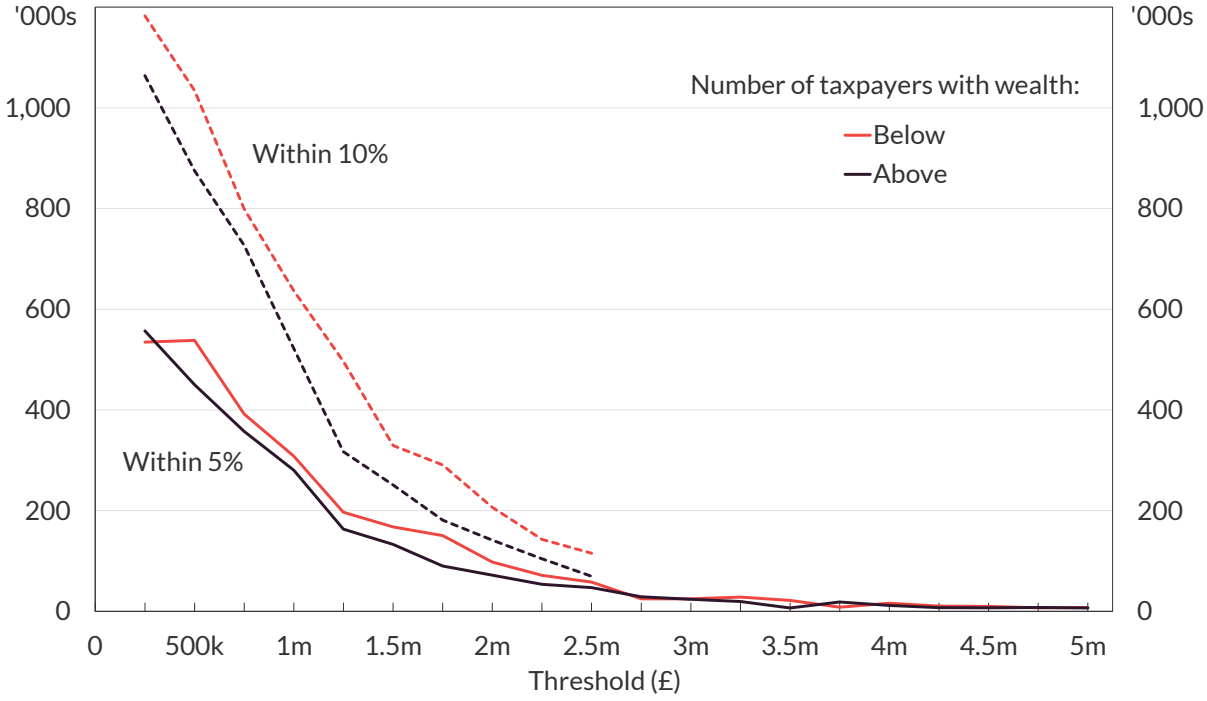
4. Uncertainty close to a threshold

How many individuals' total wealth falls close to a band threshold? That is, for how many people does banding *not* remove the difficulty of diligently assessing their assets in order to establish their tax liability? This will depend on the exact banding regime; however, assuming the thresholds are likely to be large, round numbers, I can make a simple, general point.

Figure 5 shows the number of potential taxpayers with total wealth as reported in the WAS within 5% (or 10%) of any number which is a multiple £250,000, split according to whether their wealth is above or below the threshold. For example, at a £1 million threshold, I show the number of people reporting wealth between £0.95 and £1 million (£0.9–£1 million), and £1 and £1.05 million (£1–£1.1 million). The total number of individuals with wealth 'near' potential thresholds serves as an indicator of the likely scale of administrative costs (to taxpayers and tax authorities): this decreases sharply at higher potential thresholds, from over 1 million individuals with wealth within 5% of £250,000, to around 169,000 individuals with wealth within 5% of £2 million. The number of potential taxpayers with wealth within 10% of any of these possible thresholds shows a similar pattern.

Notwithstanding the other issues addressed in this paper, this suggests the bulk of taxpayers likely to be uncertain about their wealth banding will be lower down the distribution: as the distribution thins out further up, fewer and fewer people have wealth close to any given boundary.[11]

FIGURE 5: NUMBER OF INDIVIDUALS WITH TOTAL WEALTH NEAR POTENTIAL THRESHOLDS



Notes: Figure shows the number of individuals whose total wealth is within 5%/10% below/above each point (multiples of £250,000). The 10% series is not shown above wealth of £2.5 million, beyond which the series essentially becomes a rolling average.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

[11] This follows from the overall distribution of individual wealth, which shows a similar decreasing pattern.

In much of this paper I explore the robustness of a banding strategy to individuals estimating their assets to be less valuable than they actually are: individuals have an incentive to estimate their wealth as low as possible, and tax authorities may also be more concerned with underestimation as it will reduce tax revenues. It is, of course, possible that some may believe themselves to be in a higher band than they are, a scenario I also address, or may deliberately overestimate their wealth for the peace of mind gained by comfortably avoiding queries from or dispute with the tax authority. This will be particularly relevant if the penalties for under-declaring wealth are relatively high.

Figure 5 shows, though, that the uncertainty on either side of each threshold is not symmetric: across most of the distribution there are more people with wealth within 5% or 10% less than any given threshold than there are above. This follows from the positive skew of the distribution: a larger share of people will be closer to the lower threshold of any given band than to the higher threshold. This means that if there were a systematic valuation error which leads taxpayers to underestimate the value of their wealth, it would result in more individuals' wealth being estimated in the wrong band than if there were an *over*estimate of the same magnitude.

So far this analysis has taken a simplistic view of valuation problems, implicitly assuming people across the distribution are equally likely to be uncertain of their total wealth. It is generally accepted, though, that wealthier individuals are more likely to have complex financial and business affairs (indeed, these individuals are already more likely to employ financial managers and other professionals to manage their affairs – see for example Glucksberg and Burrows, 2016). In the next section I explore how the composition of wealth changes across the distribution, and the implications this has for taxpayers estimating their total wealth in a banding regime.

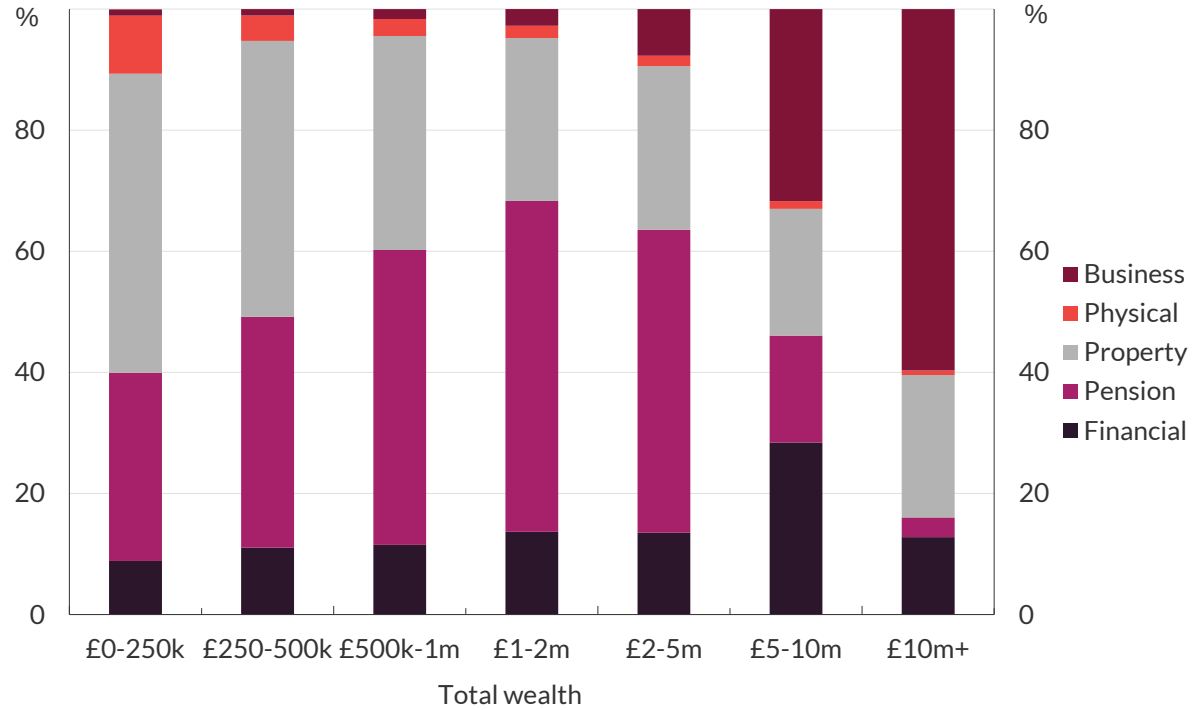
5. Impact of valuation issues

If banding is to be an effective solution to the valuation issues associated with a wealth tax, any regime must be robust to reasonable variation in valuations. In this section I examine who (in terms of wealth) tends to hold the assets that we expect will present the most important valuation challenges, and whether errors in these valuations cause a large share of individuals to estimate their banded wealth incorrectly, using an example banding scheme.[12]

5.1 Composition of wealth across the distribution

Figure 6 shows the changing composition of wealth across the distribution. At the top, business wealth (which we anticipate may cause the biggest valuation challenges) is the dominant component of total wealth. Housing wealth and other property assets make up a much larger share of wealth for individuals around the lower end and middle of the distribution, although pension wealth is similarly important, particularly in the middle.[13] Physical property makes up a decreasing share of total wealth as wealth increases. Later, I show the impact of valuation issues which affect particular components of wealth on the effectiveness of a banded regime.

FIGURE 6: COMPOSITION OF TOTAL WEALTH



Notes: Figure shows the decomposition of individual total wealth according to wealth in each broad asset categories, and by range of total wealth. All measures are net. Does not include individuals in the Sunday Times Rich List.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18.

[12] These results reflect observations from the WAS only, as STRL wealth cannot be decomposed into asset classes; however, WAS observations above £500,000 have had their business and shares wealth boosted in line with the Pareto adjustment described in Advani, Hughson and Tarrant, 2020.
[13] This is the 'middle' of the distribution only in terms of the x axis on this graph: median wealth in the WAS is just over £100,000, which is well inside the first set of bars. Figure 5 above is a better representation of the shape of the wealth distribution, although it excludes the long, thin tail of observations above £10 million.

5.2 Valuation issues

In introducing the idea of valuation problems I described three broad issues in defining total wealth: the 'teaspoon' problem (that is, the challenge of valuing all chattels), hard-to-value assets (likely to be more substantial assets such as private businesses), and systematic errors in self-reported valuations. If individuals systematically undervalue or overvalue, or leave out some assets altogether in estimating their own their wealth, a banding regime will only be effective if it can still capture a large share of individuals in the same band as their true wealth. In this section I examine how accurate such estimates might be in an aggregate sense and how they interact with a possible banding regime, with broader implications for the design of tax bands drawn out in the following section.

Valuation issue 1: effect of *de minimis* exemptions

One rationale for a banding approach to asset valuation is that is should enable taxpayers to get a fair estimate of their total wealth from just summing together the substantial assets they hold, such as financial investments, pension assets, and properties. This, it is hoped, leaves most taxpayers sufficiently clear of the band thresholds that they do not need to identify and value 'every last teaspoon' in order to be fairly certain of their tax liability.

Advani, Chamberlain and Summers (2020) take this slightly further in recommending a *de minimis* exemption from the tax base for items worth less than £3000 (except in the case of financial assets, including shares).[14] In comparing total wealth with chargeable wealth – that is, wealth excluding items exempted by the *de minimis* threshold – I examine how accurately a banded system will reflect total wealth in the presence of such exemptions. This speaks to the earlier question of how comprehensively taxpayers might need to value their total assets.

Modelling these exemptions is not straightforward in the WAS data: values are generally not reported on an asset-by-asset basis but rather aggregated by asset type. That said, some aggregates likely represent just one or two major assets (such as houses or business investments), while others will be the sum value of many smaller assets which are unlikely to be worth more than £3000 each. In line with the approach of Advani, Hughson and Tarrant (2020), I apply a £3000 exemption at as low a level as possible – for example, on the value of each business investment. Household contents, more so than other asset types, will typically reflect the value of many small items, so I apply a higher bar and only include the reported value of these assets above £100,000.

Valuation issue 2: subjective overestimates of property wealth

In the context of a hypothetical wealth tax most taxpayers would have strong incentives to be reasonably certain of their total wealth; these incentives are not present when the same individuals respond to the WAS. As noted elsewhere in this paper, and in this series, many assets are difficult to value and even estimates by professional valuers may differ. My purpose is to target the 'true' value of wealth, so it would be useful to compare subjective valuations of wealth to the true value, but by taking the WAS estimates as given I am in fact presenting the former as the latter.

[14] As they explain, these *de minimis* exemptions need to be carefully limited, to avoid creating an incentive to adjust wealth composition as a tax avoidance strategy. Advani and Tarrant (2020) show that this is a common response to wealth taxes.

As a simple exercise to check how a systematic error in valuations in a widely-held asset (which is of more concern than a random error) might affect a banding scheme, I vary owners' estimates of their total housing wealth. This is motivated by figures in Advani, Bangham and Leslie (2020) which suggest that housing wealth may be overestimated in the WAS relative to other data sources: in particular, they show aggregate net property wealth in the WAS (£5.1 trillion) is 19% higher than in the National Accounts (£4.3 trillion). For its part, the ONS (2018) noted that the average house price of a house in the WAS is around 35–45% higher than comparable figures in standard measures such as the Nationwide or Halifax indices.

To check the sensitivity of the banding regime to errors in owners' subjective estimates of the value of their housing wealth, I compare total reported housing wealth in the WAS with an estimate with housing wealth decreased by 20%.[15] This is a large adjustment, but also a conservative one compared to the figures above.

Valuation issue 3: difficulty of valuing business wealth

Certain non-financial assets, particularly business assets, are difficult to value.[16] For example, while an open market value method for valuation is generally preferred, it can be difficult to value assets which are not frequently traded, or which do not generate income.[17] Valuing businesses (especially those without a track record of income) for tax purposes is particularly complex, and even professional valuers' assessments may reasonably differ (see Daly and Loutzenhiser, 2020; Tarrant, 2020). For example, small companies often do not have the sort of financial market information which is useful in making a valuation; intellectual property assets and young start-ups with a strong potential growth trajectory may attract wildly different valuations.

Appendix A of Advani, Hughson and Tarrant (2020) estimates the costs of making valuations premised on some assets being harder to value than others. Table 1 shows how the share of individuals who hold some of their wealth in hard-to-value assets increases with total wealth: only above £5 million of total wealth do the majority of individuals own assets which are hard to value. Business wealth is the most significant hard-to-value asset, but land wealth, collectables and valuables, and some unlisted shares (likely themselves to be in private businesses) are also included.

I check the robustness of the banding regime to these problems by assessing how the regime manages if, when making their valuation, taxpayers underestimate the value of their business wealth by 20%.[18] I do this without taking a view on whether this underestimate is deliberate or not. It should be noted that this will only indicate an average tax regime effect, where it might be more realistic to model variation in undervaluation (in which most businesses are valued at an amount close to their true value, but a few are undervalued by a lot).

[15] This scenario is a departure from the rest of this paper, in which property wealth as reported is taken as the true value.
[16] While this section focuses on the challenge of valuing business assets, it is worth noting that some other types of assets, including financial products (e.g. life insurance policies) and physical goods (e.g. artwork), also present substantial challenges. Pentelow (2020) presents a more detailed examination of these issues, alongside Wealth Tax Commission Background Papers 140–145.
[17] Daly and Loutzenhiser (2020) cover this in much more detail; notwithstanding the issues covered in this section they do point out that open market values are already placed on many business assets in the UK for tax and non-tax purposes.
[18] Business wealth in the WAS is also reported by the owners, which I take here as the true value – this may be problematic in the same way as housing wealth data.

TABLE 1: SHARE OF INDIVIDUALS WITH HARD-TO-VALUE ASSETS BY TOTAL WEALTH

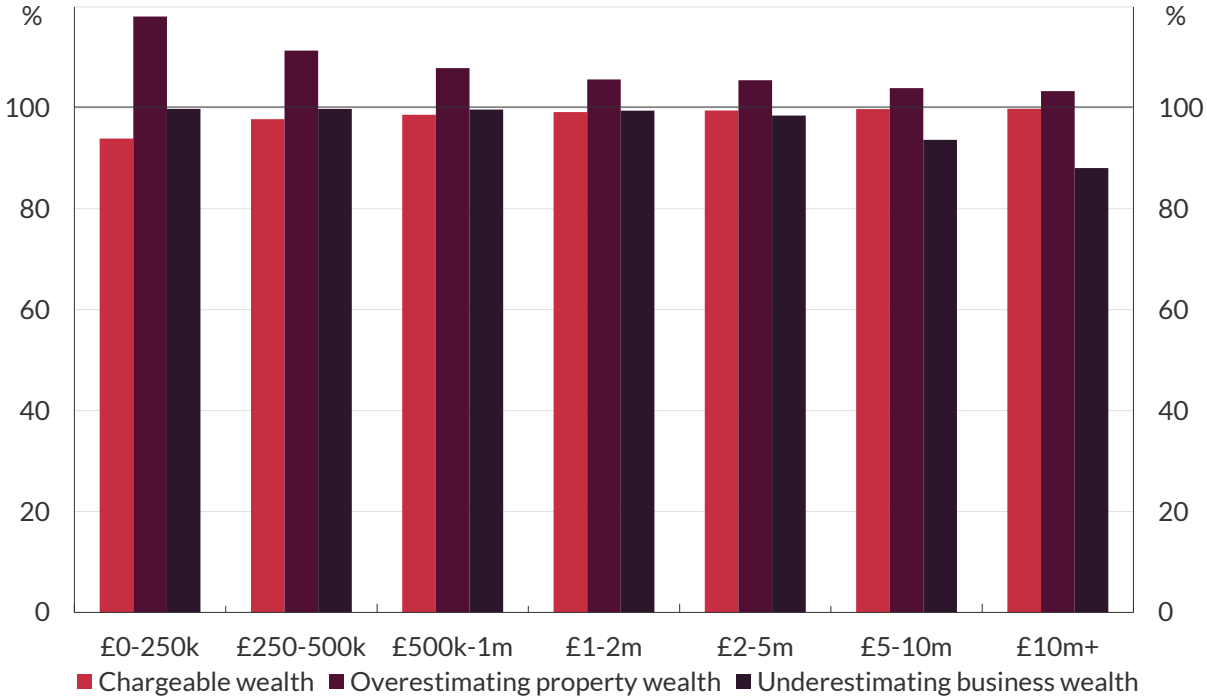
	Share of taxpayers with hard-to-value assets (%):				
	Any hard asset	Business assets	Unlisted shares	Valuables	Land
£0-250k	6.6	5.0	0.5	1.4	0.1
£250-500k	23.0	16.8	2.7	5.0	0.4
£500k-1m	31.7	24.0	4.1	6.4	0.7
£1-2m	38.4	27.5	7.9	9.3	0.7
£2-5m	52.6	38.6	16.6	10.1	1.1
£5-10m	87.8	59.1	51.7	15.6	8.1
£10m+	98.8	79.2	64.4	23.7	0.0

Notes: Hard-to-value assets are: business wealth of over £30,000, land wealth, collectables & valuables, and unlisted shares if the individuals owns only unlisted shares. See Appendix A of Advani, Hughson and Tarrant (2020) for details. Rows will not sum to 'any hard asset' amount, as an individual may have more than one type of hard-to-value asset.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18.

5.3 Distributional impact

For most of the distribution, estimates with one of these valuation issues generate a reasonable approximation of a person's total wealth. Figure 7 shows that, generally, these strategies would return estimates which represent around 90–115% of true wealth. The estimates are also highly correlated with true wealth across the bulk of the distribution.

FIGURE 7: SHARE OF 'TRUE' WEALTH CAPTURED BY ESTIMATE



Notes: Chargeable wealth refers to assets over exemption thresholds as applied to Wealth and Assets Survey data: £3000 for most asset classes; £100,000 for household contents; no exemption for shares and pension assets. x axis divided into buckets of total wealth (chargeable wealth and business wealth scenarios) or total wealth adjusted for lower property wealth estimates (property wealth scenario only); the 100% benchmark is calculated with reference to the same variables.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18.

However, Figure 7 also demonstrates the impact of the changing composition of total wealth on the accuracy of the estimates across individuals with different levels of wealth. The *de minimis*

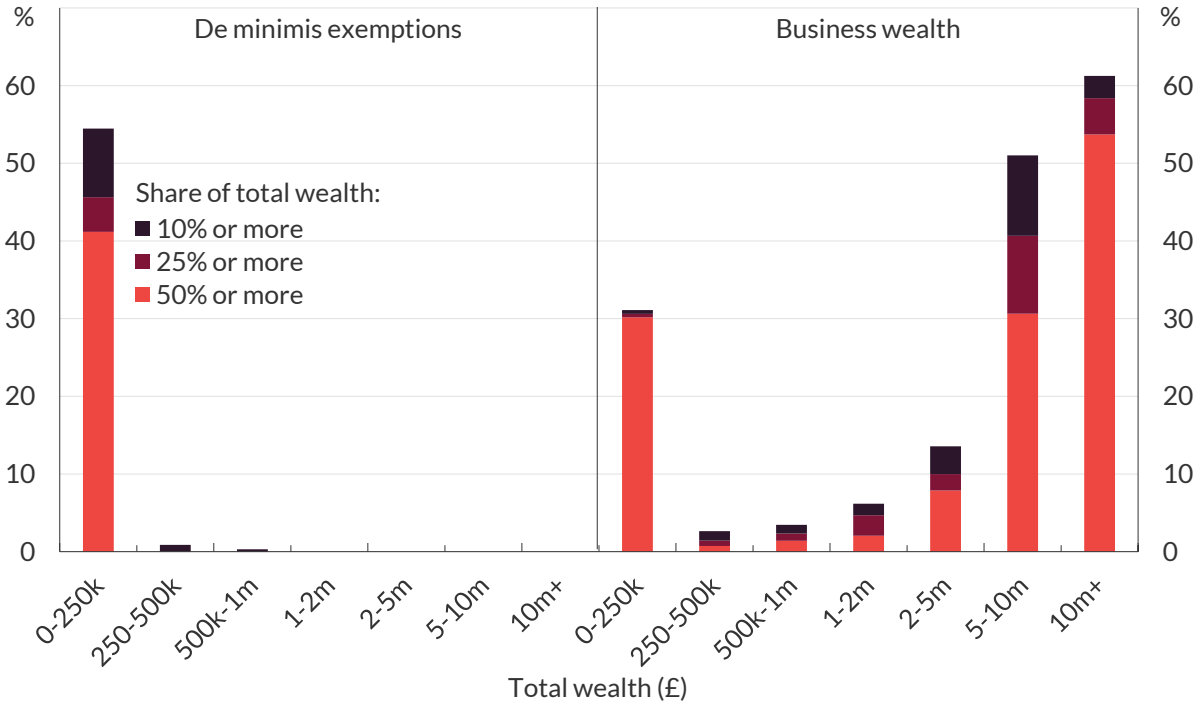
exemptions (which, as applied to WAS data, mostly reduce physical wealth) have the greatest impact on the wealth of individuals with less than £250,000 in wealth, and their impact is barely noticeable for those with £2 million or more. On the other hand, underestimating business wealth has little impact on wealth of individuals with £5 million or less, but a larger impact on those with more. Overestimating property wealth has the greatest impact on those with less wealth, although the effect is still noticeable amongst the richest individuals.

This follows naturally from Figure 6, which showed where in the distribution these assets were more important components of total wealth. It follows that an estimate of total wealth made on a reduced/ignored/increased value of those assets would follow a similar pattern. In aggregate terms, the bulking of the wealth distribution closer to zero means that underestimating physical wealth affects more individuals, while the dominance of business wealth at the top end of the distribution affects fewer (much richer) individuals.

5.4 Intensity of impact

Looking at the importance of the wealth excluded as part of *de minimis* exemptions and business wealth across the wealth distribution, we see again that these asset types tend to dominate only for taxpayers at the top and the bottom of the distribution (Fig. 8). For example, across the ranges of total wealth likely to be captured by a wealth tax, the assets excluded by *de minimis* exemptions do not make up a substantial proportion of total wealth for the vast majority of people (in stark contrast to that for people with wealth less than £250,000).[19] At the other end of the distribution, more than half of individuals with wealth over £10 million have the majority of that wealth comprised of business assets.

FIGURE 8: SHARE OF PEOPLE WITH *DE-MINIMIS*-EXEMPTED WEALTH OR BUSINESS WEALTH AS A SUBSTANTIAL PART OF THEIR TOTAL WEALTH



Notes: Figure shows share of people within stated range of total wealth for whom *de-minimis*-exempted wealth or business wealth makes up indicated share of total wealth.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18.

[19] The 90th percentile of *de-minimis*-exempted wealth as a share of total at a £500,000 threshold is 2%, and at a £2 million threshold, 0.7%.

Again this follows the pattern of the distribution of assets across the wealth distribution, although displays a more extreme trend.

5.5 An example of banding

If one of these valuation issues affects an individual's assessment of their total wealth, how accurately will individuals be able to identify which band they fall into? This depends heavily on the banding system itself. For purposes of demonstration, I take as a starting point the sets of bands used in the Annual Tax on Enveloped Dwellings (ATED) as an example of how a banding approach might be applied (Troup, Barnett and Bullock, 2020).[20]

There are a number of ways we can assess the efficacy of a banding regime. In the following, I count the number of individuals whose total (true) wealth puts them into each band, and within that, the number who would incorrectly classify themselves to a different band as a result of one of the valuation issues described above (Table 2). The primacy of each issue depends heavily on the threshold, reflecting the information in Figure 6: allowing *de minimis* exclusions and overestimates of housing wealth has a larger impact at a lower thresholds, while the impact of underestimating business wealth increases rapidly at higher thresholds.[21] This is consistent with Figures 9 and 11 above, which showed the dominance of business wealth at the top of the distribution, and Figure 10, which also showed the impact of underestimating business wealth for the richest households.

TABLE 2: NUMBER OF TAXPAYERS IN INCORRECT BAND, BY VALUATION ISSUE

Threshold per individual (£)	Taxpayers by total wealth ('000)	Taxpayers incorrectly classified due to:				Taxpayers by wealth with reduced property ('000)	Taxpayers incorrectly classified due to overestimate of property	
		Chargeable wealth		Underestimating business wealth				
		('000)	(%)	('000)	(%)		('000)	(%)
500,000	8401	223	2.7	91	1.1	7567	425	5.1
1,000,000	3058	67	2.2	66	2.2	2729	96	3.1
2,000,000	635	11	1.7	35	5.5	551	12	1.9

Notes: 'Taxpayers' captures estimated number of individuals with wealth above the given exemption threshold. Number of individuals classified into incorrect band through given valuation issue is calculated by classifying individuals into Annual Tax on Enveloped Dwellings bands by chargeable wealth, by total wealth with a 20% reduction in business wealth, and by total wealth with a 20% reduction in property wealth, and comparing with the bands according to total wealth. In the property scenario, adjusted wealth is taken as the true value of wealth, while total wealth is the estimate.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18.

[20] In a sense this may be a misleading choice: the ATED is applied to the value of an individual property (and is applied per individual asset), whereas total wealth aggregated across all the assets a person owns is likely to be a much larger value and would necessitate much wider bands.
[21] I do not report numbers for higher thresholds because of the small underlying sample size, but the pattern in Figure 8 suggests underestimating business wealth would likely continue to have a larger impact at higher thresholds.

6. Impact of design features

In this section I explore how design choices around banding affect the share of individuals who estimate themselves into the wrong band, and how individuals' tax liabilities change with those choices. There are many movable parts to such an exercise, including:

- Number of bands
- Lowest threshold
- Width of bands (including whether equal or widening)
- Highest threshold
- Highest tax payment

In most real-world scenarios, of course, these are likely to interact, but for the purpose of exposition I try to demonstrate how these behave by varying one dimension at a time – the resulting scenarios are artificial, but nonetheless informative.

6.1 Number of bands[22]

Banding regimes can be conceptualised as a pathway between a single charge for all, and a fully *ad valorem* system – the more bands there are, the closer the schedule of rates payable approximates an *ad valorem* system in which tax liability is determined exactly by a taxpayer's wealth. It follows that a larger number of bands allows for a more targeted charge: as Figure 2 showed, with more bands those paying a relatively high EATR are more dispersed, and the inequity caused by charging the same tax to everyone within the band is reduced (although the fixed charge remains regressive within bands).[23] Finally, a larger number of bands improves the policymaker's ability to graduate a tax (meaning the rate structure can be made more progressive).[24]

On the other hand, the more thresholds we add to our banding design, the less room for error there is on any estimate of wealth and the less the banding scheme helps to attenuate the valuation issues discussed in the previous section. This leads to a larger administrative burden on both the tax authority and the taxpayer. For the tax authority, narrower bands increase the likelihood that declared wealth falls close enough to a threshold to require closer inspection. For individuals, too, the more bands, the more likely a valuation error will cause them to classify themselves into the wrong band, as I show below.

For the purposes of this exercise, I imagine a varying number of bands (of equal width) covering the range of £500,000–£5 million, and one higher band which applies to wealth of £5 million or more. Figure 9 shows that, across the valuation issues explored in Section 5, the share of individuals who estimate their total wealth to be in the wrong band increases with the number of bands.

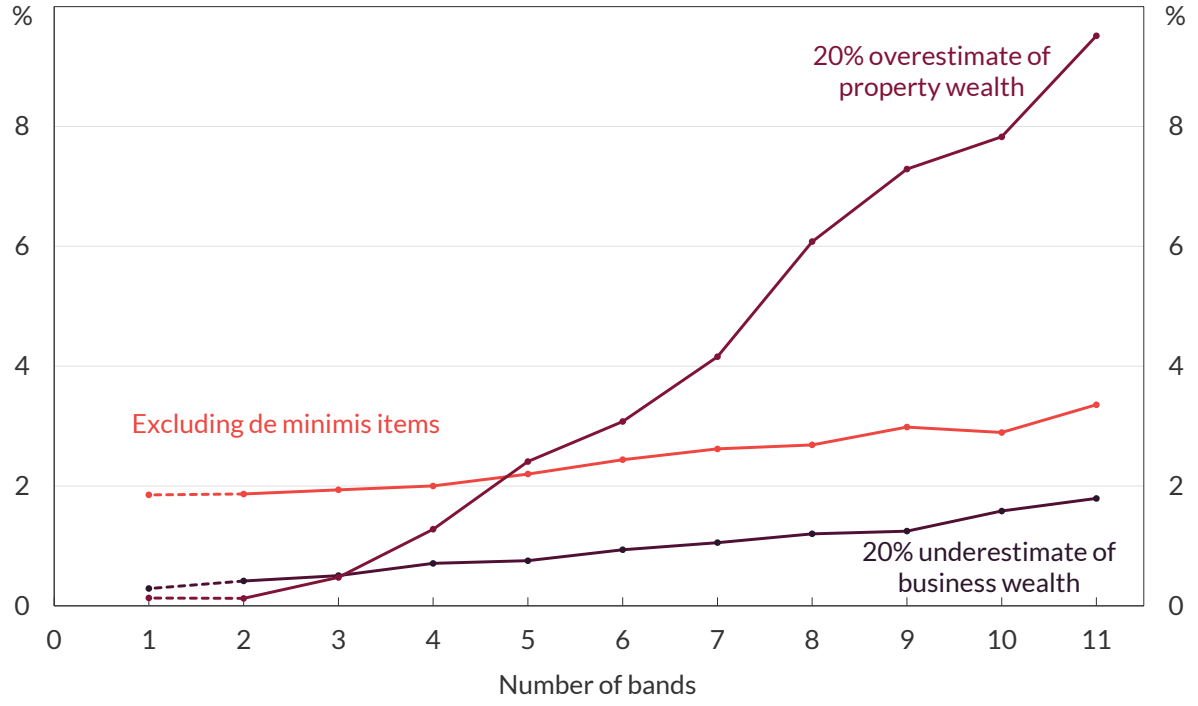
The dispersion in terms of the severity of the errors reflects the distribution of asset types explored in Section 5.1. Allowing *de minimis* exemptions puts just under 2% of individuals into a lower tax band than their actual wealth where there are only two bands – a share which roughly doubles as I increase the number of bands. This follows naturally from Figure 8, which showed few individuals hold substantial wealth in these exempted items (which are mostly physical wealth). On the other hand, the share of individuals who estimate themselves in the wrong band

[22] Over a fixed range, as in this exercise, this is equivalent to varying the width of equally-sized tax bands.
[23] The improved targeting of multiple-band regimes is demonstrated in Section 3 and Figure A1.
[24] I do not consider progressivity in this sense in detail in this paper, apart from the exposition in Figure A2.

by overestimating their property wealth by 20% increases sharply with the number of bands, reflecting the widespread importance of property wealth in this part of the wealth distribution. Excluding business wealth appears to cause the fewest individuals to mis-classify themselves, but over the range of the varying bands (up to £5 million) business wealth comprises only a small share of total wealth: this error would be much more problematic for higher-wealth individuals.

For each valuation issue we can identify where the individuals who estimate themselves into the wrong band are in the distribution: some are caught by the changing bands in the middle of that range, but some are consistently estimated to have less than the £500,000 threshold when in fact they should be captured by the tax. The total number of mis-classified individuals approaches this latter number as the number of bands decreases: even in the 'extreme' scenario where there is only one 'band' (i.e. a flat charge for everyone above the minimum threshold of £500,000), these lines converge to the share of taxpayers mis-classified at lowest threshold, as indicated by the dotted line on Figure 13. The number of bands over the tax-paying range does not affect the number of individuals who incorrectly drop below the tax-free threshold: the minimum threshold itself creates a 'lower bound' for the impact of valuation errors. This is discussed further in the following section.

FIGURE 9: SHARE OF TAXPAYERS INCORRECTLY BANDED ACROSS VARYING NUMBER OF BANDS



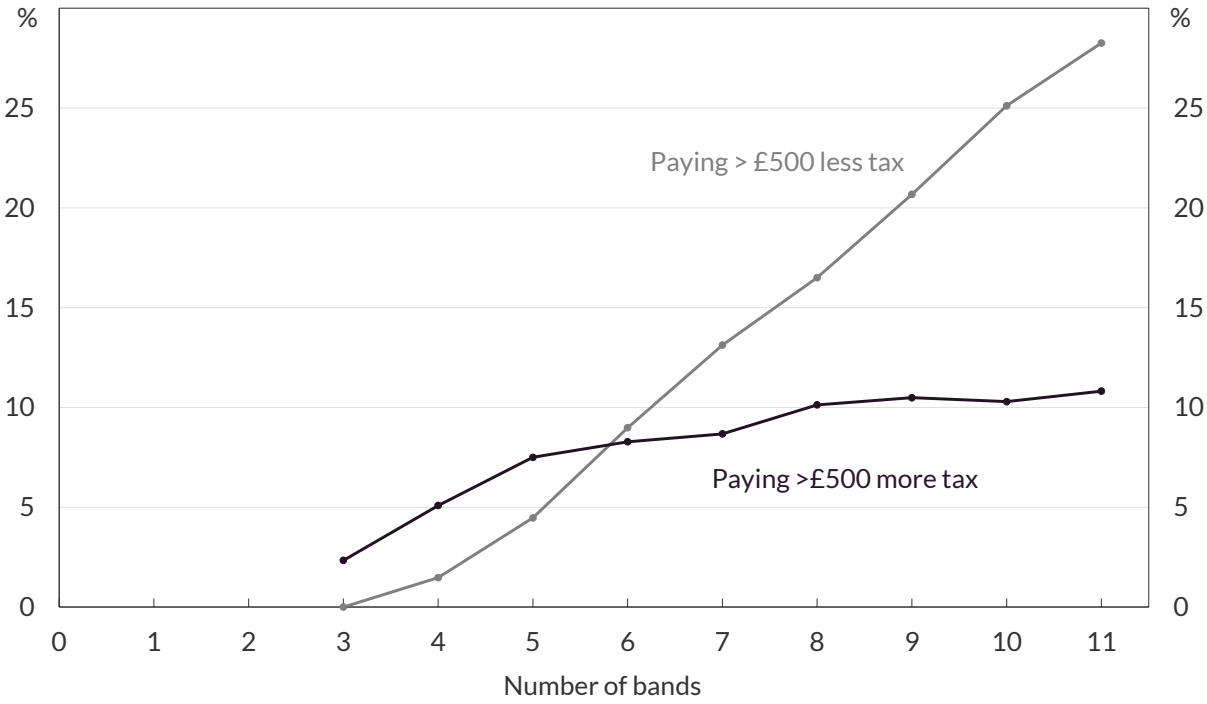
Notes: Figure shows share of individuals captured by a tax with a £500,000 exemption threshold who would be in the wrong band as a result of: applying *de minimis* exemptions as recommended in Advani, Chamberlain and Summers (2020); overestimating their property wealth (here, shown as reported value of property vs total wealth with property reduced by 20%, the latter representing 'true' wealth on which bands are based); or underestimating their business wealth. Dotted lines represent share of taxpayers banded incorrectly around the lowest (£500,000) threshold. Number of bands includes bands of equal width covering the range of £500,000–£5 million, and one higher band which applies to wealth over £5 million.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

A different perspective on the success of the banding is whether individuals pay more or less tax as the number of bands increases. As noted earlier, the more bands, the more closely tax authorities can target individuals' wealth level, the closer the fixed charge is to an individual's tax liability under an *ad valorem* tax system, and the more the necessary inequity of the banding is distributed across taxpayers of different levels of wealth.

Again, I assume that each band is taxed at 1% of the median value of total wealth in that band. The hypothesised charge behaves in a predictable way: for example, a taxpayer below the median of a band would pay a lower charge if the top threshold of the band was reduced. It follows naturally that with each addition of a new band, the vast majority of taxpayers pay less tax (shown in Figure C1).

Figure 10 focuses attention on substantial changes by only counting taxpayers whose tax liability is changed by £500 or more. Compared to a regime with just two bands (£500,000–£5 million and over £5 million), dividing the lowest band into two (i.e. three bands in total) means around 2.5% of taxpayers pay at least £500 more tax, while none pay at least £500 less. As the number of bands increases, the share of people paying significantly less tax rises steeply, while the share of those paying more rises much more slowly. The disadvantage in having a banded system is that people with very different levels of wealth pay exactly the same amount. Figure 10 suggests that quite a detailed banding regime is required to overcome this problem.

FIGURE 10: SHARE OF INDIVIDUALS PAYING (AT LEAST £500) MORE OR LESS TAX BY ADDING ANOTHER BAND



Notes: Figure shows the share of taxpayers in a wealth tax with an exemption threshold of £500,000 who would pay substantially more (less) tax under a scheme with X bands compared to one with X-1 bands. x axis reflects a varying number of bands of equal width covering the range of £500,000–£5 million, and one higher band which applies to wealth over £5 million; i.e. first comparison is between X = 3 bands and 2 bands (£500,000–£5 million; over £5 million).
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

6.2 Minimum threshold

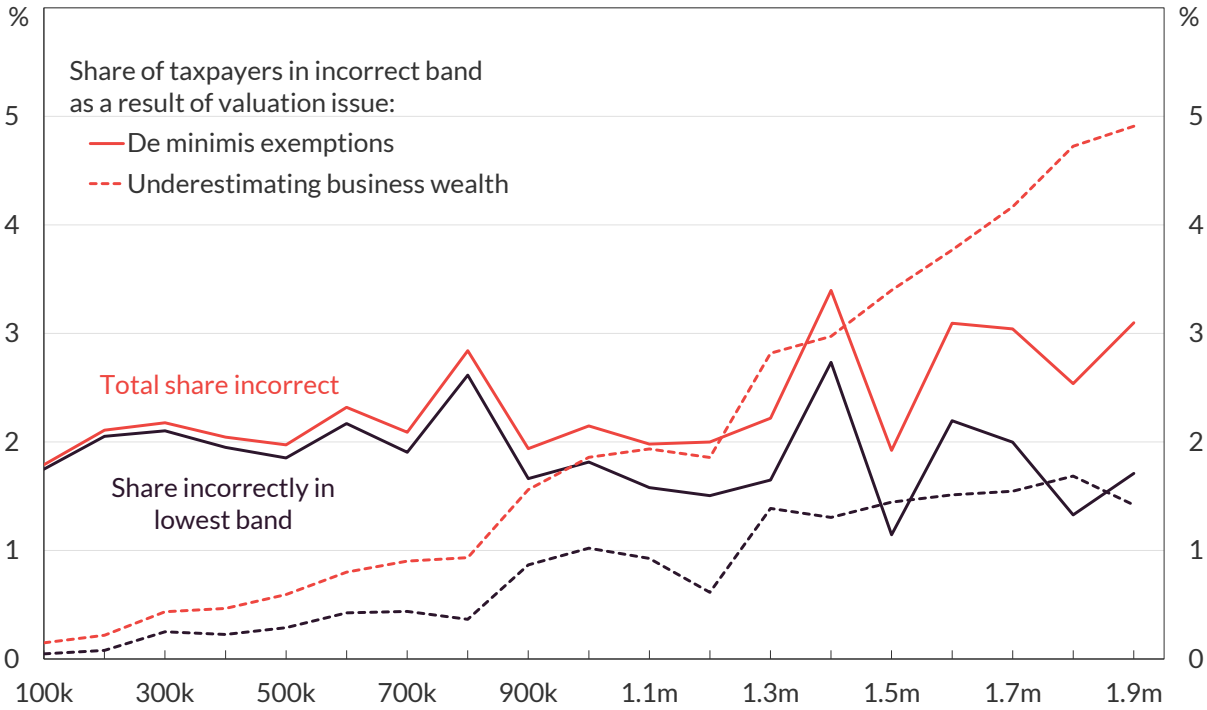
As noted above, the lowest threshold puts a lower bound on the number of individuals who estimate themselves into the wrong band as a result of the valuation issues discussed in the previous section. This is due to the concentration of taxpayers at the bottom end of the wealth distribution, as well as the way the composition of total wealth changes across the distribution.

In this section I explore how this lower bound varies by moving the minimum threshold between £100,000 and £1.9 million, with an otherwise regular series of bands: minimum threshold–

£2 million, £2 million–£10 million, £10 million–£20 million, and £20 million and over. Figure 11 shows that the share of taxpayers who would be classified into an incorrect band as a result of either taking advantage of *de minimis* exemptions or by underestimating their business wealth is low across the range of minimum thresholds explored.[25]

Perhaps surprisingly, the share of taxpayers in the incorrect band does not decrease as the minimum threshold rises. By assessing their tax liability with respect to chargeable wealth rather than total wealth, the absolute number of taxpayers who are in the wrong band does decrease, but at a similar rate as the total number of taxpayers, meaning that as a share of all taxpayers those in the incorrect band remain roughly constant or increase with a rising minimum threshold (solid lines in Figure 11). Below a minimum threshold of about £1 million, taxpayers who should be in the lowest band but, using chargeable assets, assess their wealth to be below it, make up almost the entirety of all taxpayers who are in the wrong band. Raising the minimum threshold therefore does little to avoid this problem unless the threshold is above £1 million. If taxpayers instead underestimate their business wealth, the number of taxpayers incorrectly banded remains roughly constant as the minimum threshold rises (as these errors are predominantly being made in higher bands); as fewer people are captured by the tax overall, the share of mis-classified cases actually increases (dotted lines in Figure 11).

FIGURE 11: TAXPAYERS IN WRONG BAND BY VALUATION ISSUE



Notes: Figure shows share of all taxpayers captured by a wealth tax with an exemption threshold as given by x axis who would be in the wrong band as a result of each of two valuation issues: making *de minimis* exemptions on items below £3000 (as detailed by Advani, Chamberlain and Summers, 2020), or undervaluing business wealth by 20%. A component of this share, the share of taxpayers incorrectly estimating their wealth as below the exemption threshold of the tax when their total wealth is actually above it, is shown in the dark lines.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

[25] I do not examine the valuation issues around property wealth in this section, as the error works in the opposite direction (i.e. taxpayers might mistakenly assume they are liable for the wealth tax through overestimating the value of their property). While such errors would still generate administrative costs, it is hoped this will be at least partly offset by the strong incentives for taxpayers around thresholds to assure themselves of their total wealth. Tax authorities would likely invest fewer resources into preventing the collection of too much tax, as opposed to too little.

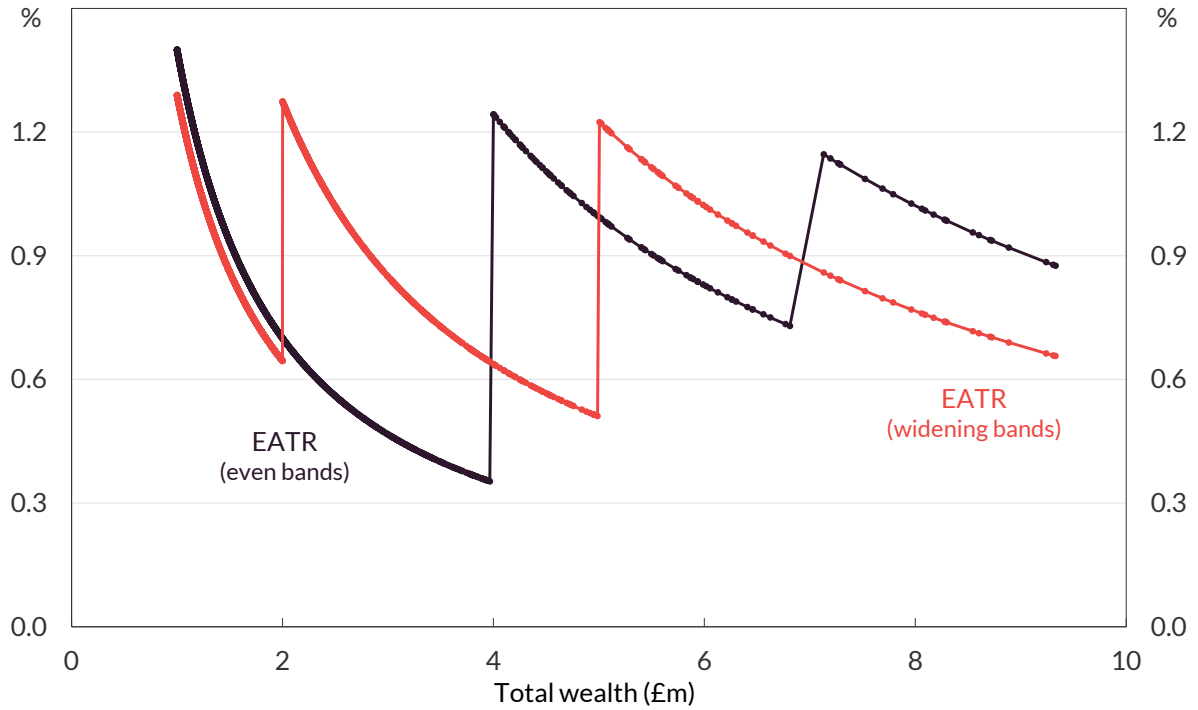
While increasing the minimum threshold means fewer individual taxpayers, the remaining taxpayers in the lowest band have a higher tax liability.[26] As a result, every increase in the lowest threshold results in an increase in the tax paid by taxpayers who remain captured in the lowest band.

As I showed earlier, higher thresholds also have fewer taxpayers close enough to be uncertain of their tax liability without knowing their total wealth precisely (Fig. 5). This suggests there would be less aggregate uncertainty with a higher minimum threshold.

6.3 Widening bands

A banding regime with bands of even widths seems unnecessarily detailed once the wealth distribution thins out. Indeed, if there is more uncertainty around wealth valuations further up the distribution, having even-sized bands may be counterproductive. However, the wider the bands, the more the EATR varies within bands. Figure 12 demonstrates this by comparing EATRs under two banding regimes: a regime with widening bands (£1 million–£2 million, £2 million–£5 million, £5 million–£10 million) compared with bands of equal widths over the same range (£1 million–£4 million, £4 million–£7 million, £7 million–£10 million).

FIGURE 12: EATRS UNDER ALTERNATIVE BANDING SCHEMES



Notes: Figure shows EATRS (effective average tax rates) for taxpayers with less than £10 million total wealth in the Wealth and Assets Survey (WAS). Dots on lines reflect actual observations from the WAS.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

It is clear from Figure 12 that wider bands produce a greater range of EATRs than narrower bands. Overall the widening regime deviates slightly less from an *ad valorem* regime than the even-banded regime (both in terms of standard deviation and average absolute deviation from 1%), although the differences are not substantial (Table 3). However, Table 3 also shows that more individual taxpayers are classified into the wrong band as a result of the *de minimis* or business wealth valuation issues under the widening band regime than under the even band

[26] This is a function of our design, where tax liability is contingent on the wealth of the median taxpayer in each band; the same would be true of a charge based on the midpoint of the band.

regime. As noted earlier, there is a trade-off between the accurate targeting of the banding regime and the flexibility allowed around valuation uncertainty.

TABLE 3: PRECISION UNDER WIDENING BAND REGIME

	EATR standard deviation	Mean absolute deviation from 1%	Number of taxpayers in wrong band ('000s):	
			Chargeable wealth	Business wealth
Even bands	0.93	0.35	57	44
Widening bands	0.92	0.30	67	65

Notes: Table shows standard deviation (absolute deviation) as a measure of variation (from an *ad valorem* rate of 1%) of effective average tax rates paid by taxpayers under two banded regimes: even bands (£1 million–£4 million, £4 million–£7 million, £7 million–£10 million) and widening bands (£1 million–£2 million, £2million–£5 million, £5million–£10 million). Fourth and fifth columns display the share of all taxpayers who are in the wrong band as a result of one of two valuation issues: making *de minimis* exemptions on items below £3000 (as detailed by Advani, Chamberlain and Summers, 2020), or undervaluing business wealth by 20%.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

6.4 Highest threshold

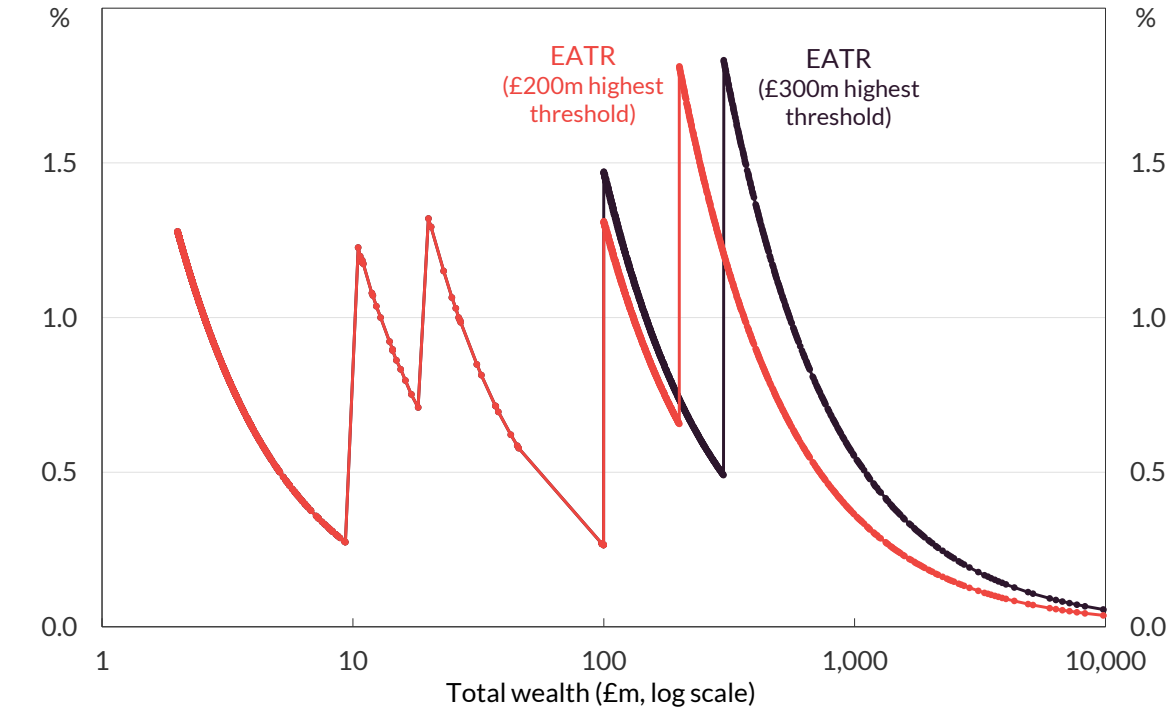
As Chamberlain (2020) discusses, a banded regime would essentially act as a cap on tax liability for the extremely wealthy, with all taxpayers with total wealth above the highest threshold paying a flat charge. I showed in Section 3 that this leads to a decreasing EATR amongst the most wealthy. Many would argue that if a wealth tax aims to decrease inequality, or at least avoid operating regressively, having a flat charge for individuals whose wealth may vary by many billions of pounds means the tax does not serve its purpose. Others see a cap as an advantage as it reduces administrative costs as well as incentives for tax avoidance (see Chamberlain, 2020).

It is of course possible to set a threshold with reference to the top of the distribution, rather than the bottom; this has been explored to a certain extent in Section 3. In this section I explore the impact of varying the threshold for the highest band, to approximate a high-end-focused wealth tax. I set thresholds at £2 million, £10 million, £20 million, £100 million, and a top threshold which varies from £200 million to £1 billion. Naturally, I include individuals from the STRL, but as we do not have a decomposition of their total wealth into asset types we cannot assess the impact of the valuation issues addressed above. However, we can assess how the hypothesised tax liability changes as the highest threshold increases.

Figure 13 shows how raising the highest threshold from £200 million to £300 million decreases the EATR of those who move to the lower band, while substantially raising the EATR of those who remain in the same band. As the threshold is raised, median wealth of both the top two bands increases: taxpayers who move from the highest band to the second-highest band pay less tax, but the move increases median wealth in both bands, and thus the tax charge for others.

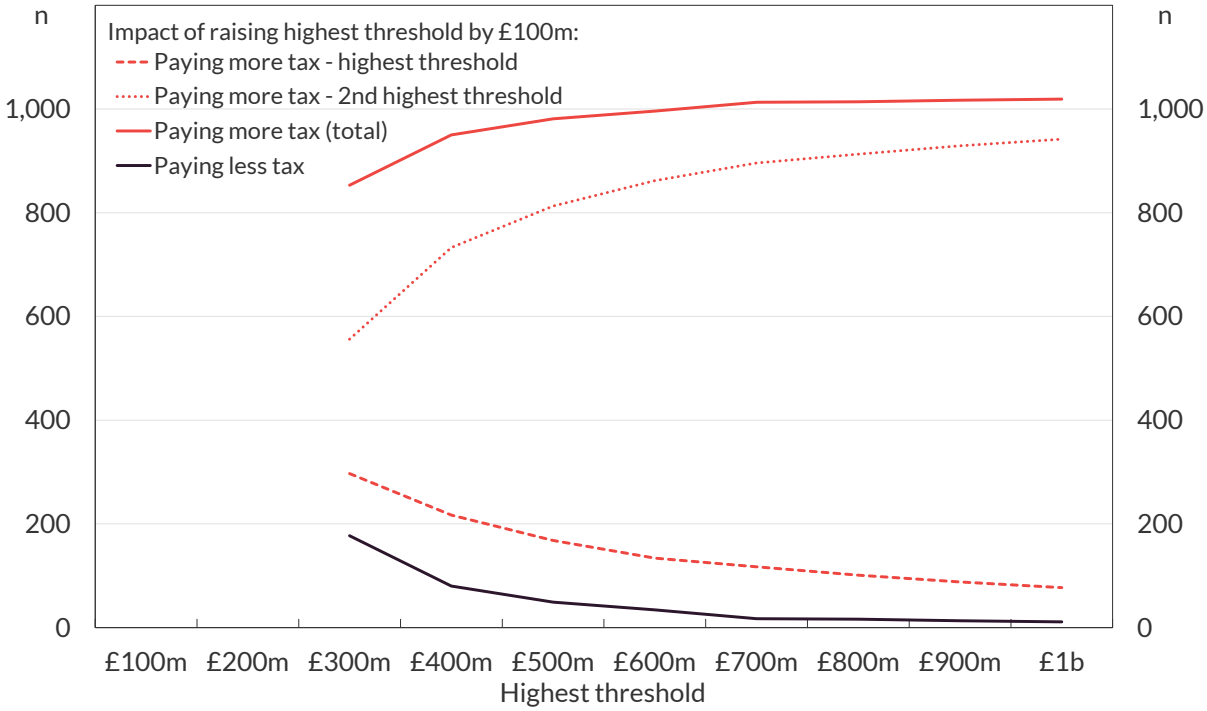
Figure 14 shows that, for every increase in the highest tax threshold over £200 million, a far greater number of individuals would pay more tax than the number paying less. However, the bulk of individuals who pay more tax as a result of an increase in the highest threshold are actually in the second highest band, not the highest band. With each increase, the charge in the highest band more closely targets the wealth of those at the very top, whose fortunes are very dispersed, but the charge in the second-highest band is less well targeted.

FIGURE 13: EFFECT OF INCREASING HIGHEST THRESHOLD



Notes: Figure shows EATR (effective average tax rate) paid by taxpayers in a banding scheme with thresholds at £2 million, £10 million, £20 million, £100 million, and a top threshold at either £200 million or £300 million.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

FIGURE 14: NUMBER OF INDIVIDUALS PAYING MORE/LESS TAX AFTER RAISING HIGHEST THRESHOLD BY £100 MILLION



Notes: Figure shows count of taxpayers paying more or less tax in a banding scheme with thresholds at £2 million, £10 million, £20 million, £100 million, and a top threshold which varies from £200 million to £1 billion, compared to the same scheme with the highest threshold £100 million lower.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

As in Figure 12, wider bands generate sharp jumps in EATRs; in particular, at the bottom of the highest band, the EATR jumps to quite a high level. This is partly the result of the mechanical way in which the tax charge is set in these scenarios: median wealth in a very wide band will naturally be a long way from the wealth of those at the bottom of the band. But both Figures 13 and 14 illustrate a key problem with attempting to apply banding to the wealth distribution: because the distribution is so thin and dispersed at the top, it becomes very difficult to closely target the *ad valorem* tax liability of those with highest wealth effectively. With few, wide bands, there is a marked inequality within bands, as those at the bottom of each band pay a charge which is much more than they would pay under an *ad valorem* scheme; while even with very narrow bands it is difficult to design a solution in which those at the top pay anything more than a trivial amount of their wealth.

Naturally, too, this exercise abstracts from any behavioural responses of the type discussed in Advani and Tarrant (2020), although I note here that large jumps in EATRs between bands would increase the incentive to reduce reported wealth enough to be in a lower band.

Alternatives to the top band

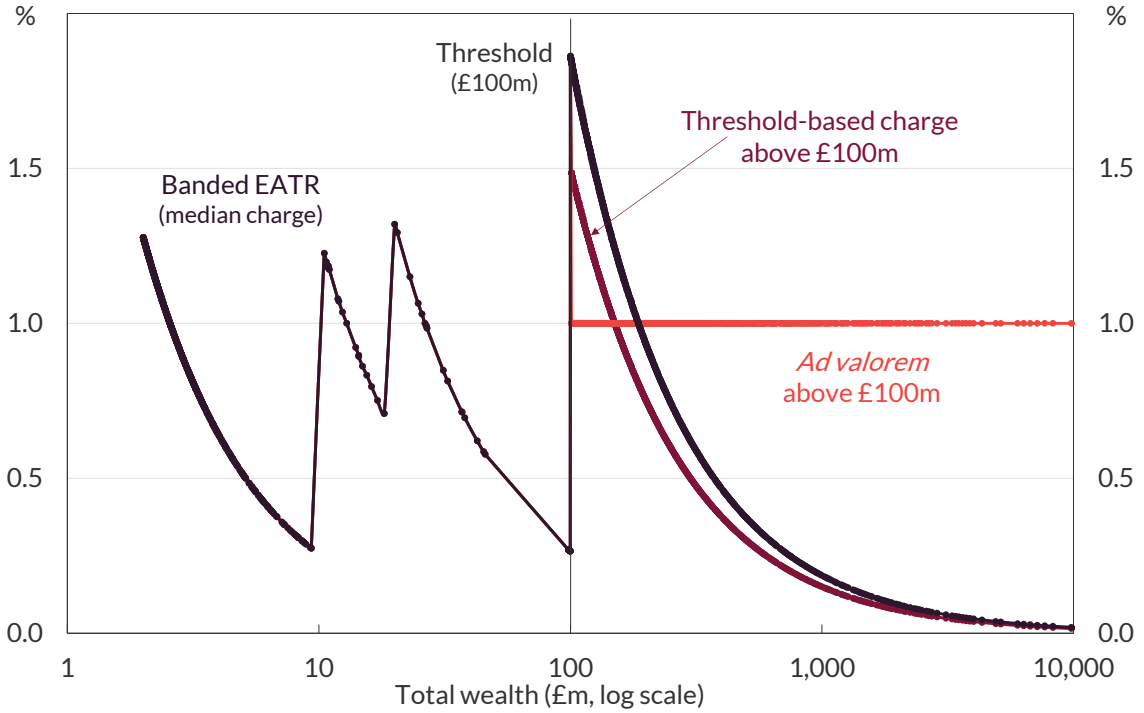
All of the banding schemes demonstrated so far in this paper result in the wealthiest paying only a small share of their total wealth in tax. Although the unscaled amounts of tax payments are still high, this may not be palatable to the general public. In this section I briefly demonstrate two alternatives to a flat charge in the top band.

Figure 15 uses the same band thresholds as in the previous section (with the highest threshold at £100 million). In the top band, the median-based charge (consistent with earlier scenarios) is compared with two alternatives: a charge based instead on the highest threshold (a 1.5 multiple of the threshold), and an *ad valorem* charge for the highest band.[27] The threshold-based charge mutes the sharp jump which occurs in the median-based charge at the threshold, ensuring that those at the bottom of the band do not pay more than 150% of their tax liability under an *ad valorem* regime; however, as a result, the EATRs paid by the more wealthy individuals in the band approach zero much more quickly. An alternative would be to charge an *ad valorem* rate to everyone above the highest threshold: this maintains equity within the highest band, at the cost of forcing those individuals to value their wealth precisely.[28]

[27] As noted earlier, the midpoint is an alternative basis for lower bands but is undefined for the highest band.

[28] Given that a key motivation for using a banding scheme is to avoid forcing taxpayers to evaluate their wealth precisely, this may seem like a counter-intuitive recommendation. However, those with extreme wealth are likely to already have professional assistance in managing and valuing their wealth, so the additional cost to them of valuing it for wealth tax purposes is lower.
A similar option would be to continue adding bands which are relatively narrow proportional to the levels of wealth, but wide relative to bottom of distribution. This allows those with wealth in this range the same advantages of reduced administrative hassle as those lower down the wealth distribution, while still remaining closer to an *ad valorem* regime. Section 7 demonstrates one such scheme; the sparseness of wealth data in this range means it is difficult to present comparisons similar to the rest of this section.

FIGURE 15: EATR WITH ALTERNATIVES FOR TOP BAND



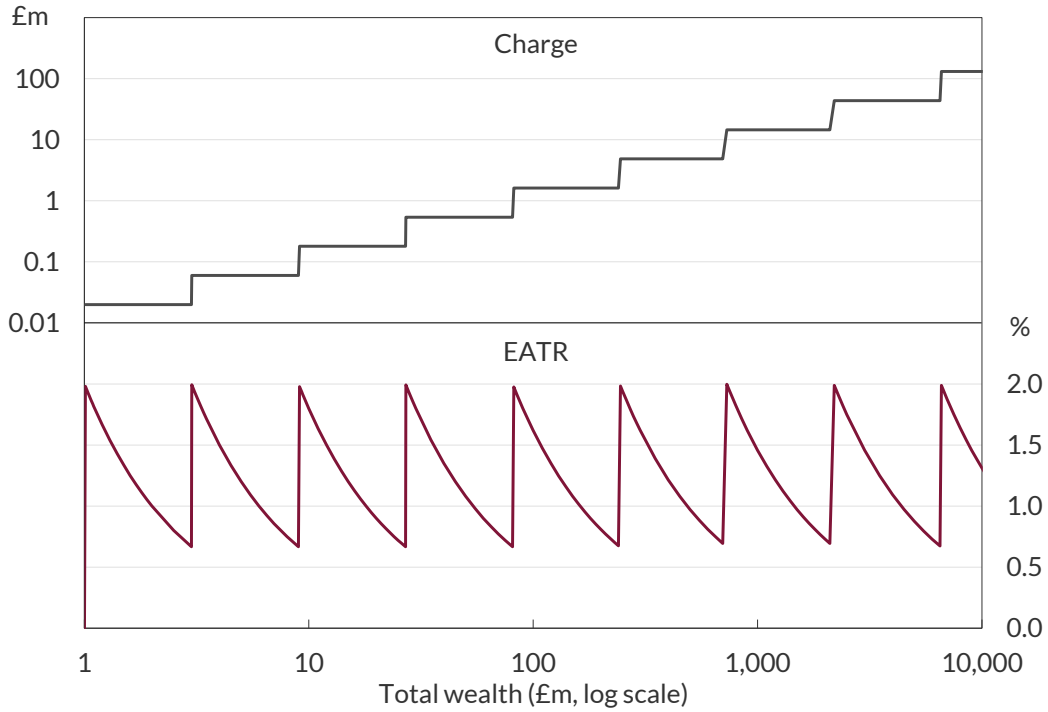
Notes: Figure shows EATR (effective average tax rate) paid by taxpayers in a banding scheme with thresholds at £2 million, £10 million, £20 million, and £100 million, with alternatives given for taxpayers in the £100 million+ band: an *ad valorem* charge (flat at 1%), and a flat charge calculated as 1% of 1.5 times the threshold (£100 million).
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

7. Limiting vertical inequity

It is possible to design a system with a view purely to limiting the height of the jumps in EATR at each threshold. This can be conceived of as placing a limit in how far a banding system can trade off equity considerations (that is, generate large differences in EATRs across people with similar wealth) for the advantage of reducing the administrative burden on taxpayers (gained through wider bands). There are reasons a policymaker might wish to limit the extent of vertical inequity, including the possibility that administrative costs have a reasonably large, fixed component, meaning that in practice the imposition on taxpayers at the bottom of the wealth distribution is actually higher than this paper so far has suggested, or political reasons related to the palatability of such a tax. As noted earlier in this paper, large jumps in EATRs also generate considerable incentives for avoidance; it follows that a banding design which limits these jumps would also limit these incentives.

One way to implement this is to set a bound on the difference between a taxpayer's actual charge and the charge that they would pay under an *ad valorem* regime. In this section I step away from any knowledge of the wealth distribution, and design a set of bands based purely on the constraint that no taxpayer should pay more than twice the *ad-valorem*-equivalent rate. In keeping with the distribution-blind nature of the exercise, I also assume the band charge is set with reference to the band midpoint; given a rate and a minimum threshold (which I set at £1 million), a series of bands can be traced out (Fig. 16).

FIGURE 16: DISTRIBUTION-BLIND BANDING SCHEME



Notes: Figure shows EATR (effective average tax rate) paid in a banding scheme with thresholds at £1 million, £3 million, £9 million, £27 million, etc., and charge for each band (calculated as 1% of the mid-point of the relevant band).
Source: Author's calculations.

This scheme captures many of the design elements that have been identified as desirable under some (if not all) optimality criteria above: a lowest threshold of £1 million to avoid losing too many taxpayers at the bottom end of the range through valuation errors, numerous bands to enable better targeting of tax charges, bands which increase in width to allow for increasing

uncertainty in higher-wealth taxpayers, a very high top threshold to closely target the wealthiest individuals, and several thresholds in the millions to billions range to cover the long, thin tail of the distribution. However there are also a number of possible design flaws, including the large jumps in actual tax payable between bands, which might incentivise tax avoidance even if, as a proportion of wealth, they are not large.

Taking this design to the distribution in the WAS/STRL data, the implied total tax liability is £86 billion, with the aggregated absolute difference across individuals from their *ad valorem* tax liability totalling £27 billion, a large part of which is due to the use of the midpoint as a basis for the band charge. That is, while there are many desirable elements to this scheme it still represents a substantial departure from *ad valorem*.

Table 4 shows that, because of the moderately high exemption threshold of £1 million, this design keeps errors made through using chargeable wealth to a low level, and the low error rate associated with an underestimate of business wealth (well below the equivalent 2.2% of Table 2) suggests that while the bands are numerous, they are wide enough to allow for uncertainty in business valuations. The outlier remains property wealth, which (as in Figure 9) suggests that if there is systematic overvaluation of a widely-held asset such as housing by taxpayers, a design solution will be an important part of making the tax regime work, banded or otherwise.

TABLE 4: NUMBER OF TAXPAYERS IN INCORRECT BAND, BY VALUATION ISSUE – LIMITED EATR APPROACH

Taxpayers by total wealth	Taxpayers incorrectly classified due to:				Taxpayers by wealth with reduced housing	Taxpayers incorrectly classified due to overestimate of property	
	Chargeable wealth		Underestimating business wealth				
('000)	('000)	(%)	('000)	(%)	('000)	('000)	(%)
3058	56	1.8	44	1.4	2729	356	13.0

Notes: 'Taxpayers' captures estimated number of individuals with wealth above a £1 million exemption threshold. Number of individuals classified into incorrect band through given valuation issue calculated by classifying individuals into Annual Tax on Enveloped Dwellings bands by chargeable wealth, by total wealth with a 20% reduction in property wealth, and by total wealth with a 20% reduction in business wealth, and comparing with the bands according to total wealth. In the case of the property scenario, the reduced scenario is taken as the true value of wealth, while total wealth is the estimate.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18.

8. Conclusion

The aim of this paper was not to provide a complete suite of ready-to-use tax bands (the range of choices around tax base, tax unit, thresholds, etc. is simply too large) nor to model revenue one could expect from such a regime, but rather to show where it is a useful approach and to demonstrate where some of the issues lie. To that end, I conclude by making some general points, predicated on the earlier sections of this paper.

I have explored a number of possible criteria on which decisions about design might be based, including distance from an *ad valorem* regime,[29] minimising the number of individuals whose wealth might be estimated to be in the wrong band when using a given estimation strategy, minimising the number of individuals with total wealth near a threshold, and comparing the number of individuals whose tax liability changes substantially by varying a design element. There are many optimality criteria which might be desirable, and different criteria, tax base, or tax rate(s) would suggest a different banding scheme. For example, as Section 6 above shows, a regime with fewer, wider bands is always preferred on a criterion of fewer misallocations. It might be possible to counteract this with a measure of administrative costs of banding and valuations, but that is beyond the scope of this paper. On the other hand, wider bands induce higher inequality amongst taxpayers with relatively similar levels of wealth.

Is banding an effective solution to uncertainty around asset valuations? Valuation issues can take a different form across the distribution, so the primacy of each will depend on the exemption threshold which is set. I have shown that, for most individuals (especially those with more than £250,000 in total wealth), it is not necessary to count and value every last teaspoon in their possession to generate an estimate of their total wealth which is 'good enough' for a banded regime: their 'true' wealth is well approximated by chargeable wealth. This provides a strong justification for a set of *de minimis* exemptions as recommended by Advani, Chamberlain and Summers (2020).

In the region a wealth tax is likely to cover, the challenges of valuing business wealth would be significant. The intensity of business wealth amongst richer individuals is notable. The difficulty of valuing business (and other) assets is covered in other papers in this series, and variation in estimates of the value of such assets could easily put an individual in a different band, especially if the bands are relatively narrow. It is reassuring that our estimates do not, in general, suggest that uncertainty in business valuation would cause widespread problems under a banding regime; however I note again the paucity of information, both on the dispersion and variation amongst the wealthiest individuals in the WAS and on the composition of STRL individuals' wealth, as a caution against drawing very strong conclusions here.

On a similar note, the valuations reported in the WAS are largely subjective. The scenario premised on WAS estimates of housing being substantially overstated does create widespread problems in most banding regimes examined, as housing wealth is significant across most of the wealth distribution. In practice, though, a taxpayer's incentives are aligned with guarding against overestimation (the same is only true of undervaluation in the presence of a substantial penalty scheme for understating wealth).[30] The WAS is the best source of wealth microdata in the UK, and design of a wealth tax policy should rely heavily on the best sources of information;

[29] Although this has not been discussed from this point of view in this paper, under a single tax rate this is also, essentially, an equality criterion, as in *ad valorem* all taxpayers' contribution relative to their wealth is the same.

[30] Having property valuation completed by a central agency such as the Valuation Office Agency (VOA), as recommended by Advani, Chamberlain and Summers (2020), would not only shift a large part of the compliance burden off taxpayers but also potentially provide more accurate measures of wealth.

these issues show how much more scope remains for investment in more comprehensive data and for further research in this area.

Another notable theme in this paper is that different aims can lead to different design suggestions. If invoked as a solution to valuation issues, this work suggests a banding regime with as few bands as possible would be preferred as it reduces the scope for individuals to accidentally assess their liability in the wrong band.[31] A widely-banded tax could allow a significant proportion of individuals to invest little effort in valuing such assets, and hence materially simplify their reporting burden, while also reducing the administrative cost to the tax authority. However, this work has also shown that few (and necessarily wide) bands create more inequity within and between bands, with more variation in EATRs and larger jumps in tax charges between each band. A 'fairness' criterion thus suggests more bands might be preferable, to target an *ad valorem* regime as closely as possible.

Finally, there is a case to be made for having a highly-targeted regime with a relatively high threshold. While I have not addressed administrative costs in this paper, the cost to the tax authority is likely to vary most significantly with the number of taxpayers (Burgherr, 2020 and Advani, Hughson and Tarrant,2020 explore this in more detail). Approximately 95% (98.7%) of all individuals in the UK have wealth of less than £1 million (£2 million). A tax-free threshold of £1 million or £2 million would mean a fewer absolute number of cases for the tax authority to assess. In addition, there are far fewer individuals with actual wealth falling close to any of the likely banding thresholds above £1 million.

I conclude by reiterating that a banding regime, while clearly difficult to 'get right', can still provide substantial benefits to the taxpayer and the tax authority. Section 5 discussed comparisons between an *ad valorem* and a banded regime in terms of whether taxpayers' tax liability is larger or smaller. But this is an overly simplistic discussion: even some of those paying more in a banded regime may in fact be better off overall, through not having to undertake a costly audit and evaluation of all of their wealth, while the tax authority may be able to focus their compliance resources on those declaring their wealth to be close to the top of any given band.

[31] One point not explored in this paper is whether uncertainty around valuations across multiple assets is offsetting or compounding: if the latter, applying bands to total wealth could make tax liabilities more uncertain than applying bands separately to different asset types.

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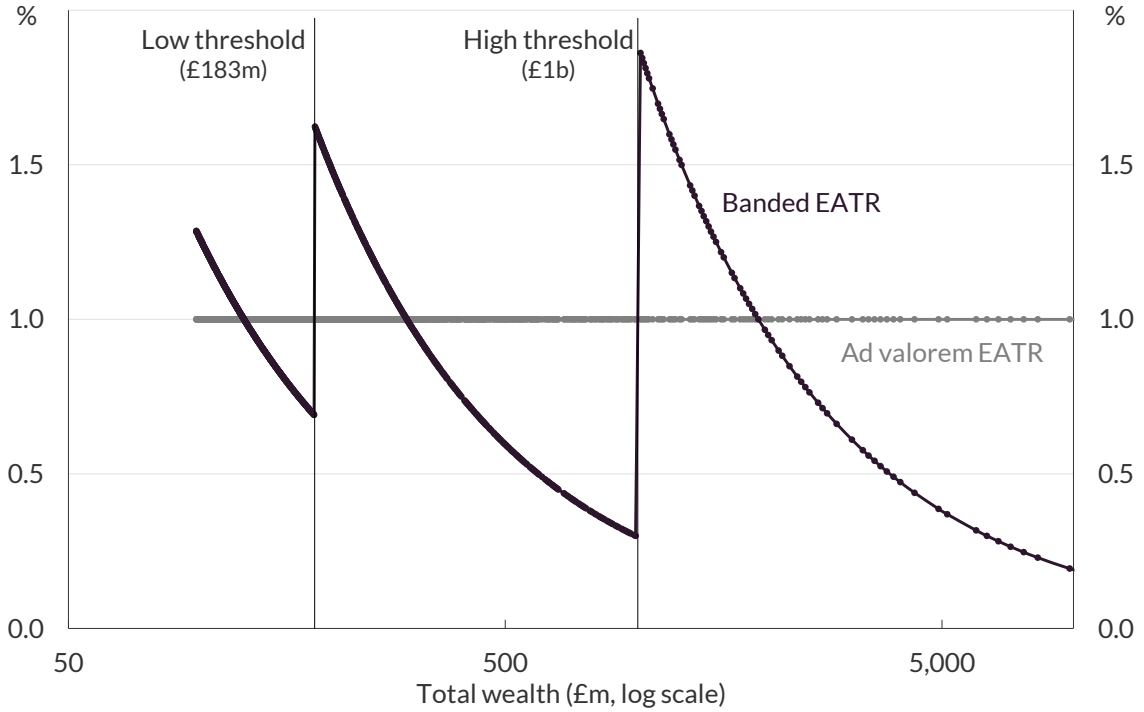
Appendix A: Additional examples of banding schemes

This section provides additional examples of possible banding schemes using Sunday Times Rich List (STRL) data.

A1. Three bands

As noted earlier, adding additional bands improves the targeting of tax charges within each band. Figure A1 shows this by dividing the STRL individuals into three bands (compared to two bands in Figure 2). The thresholds are chosen arbitrarily and there are many possible combinations here of thresholds and levies, but given a schedule of tax rates, it would be a simple exercise to find combination of thresholds which are optimal in the sense that they minimise the departure from the *ad valorem* regime.

FIGURE A1: EATRS IN BANDED AND *AD VALOREM* REGIMES: THREE BANDS

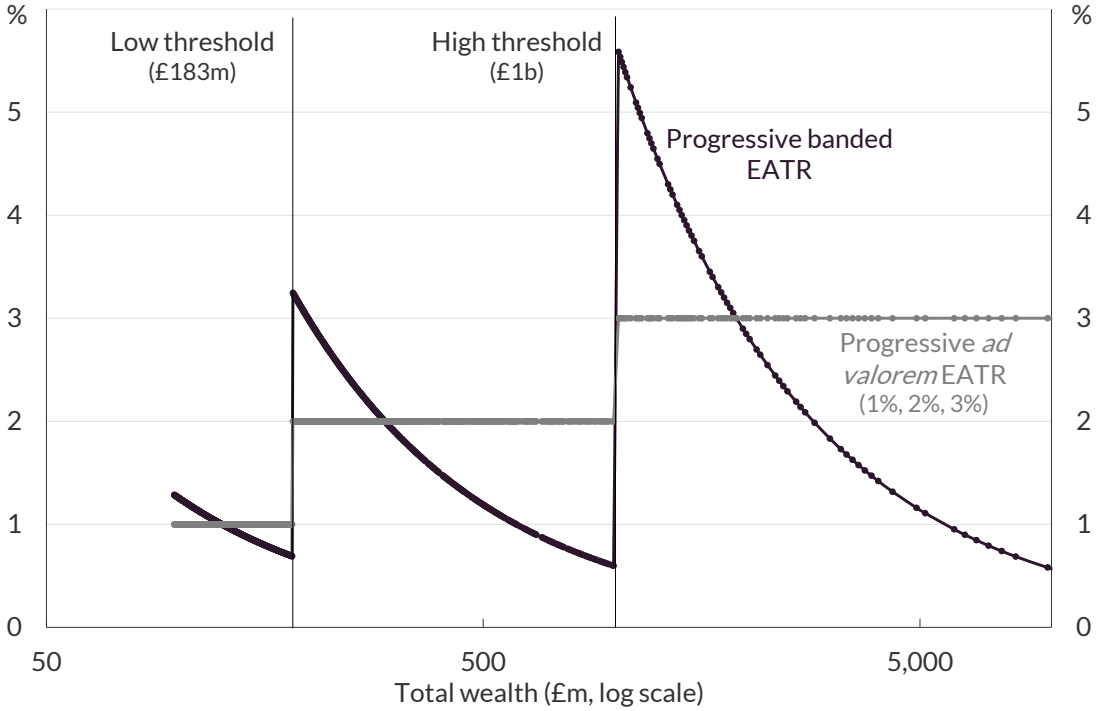


Notes: Figure compares the EATRs (effective average tax rates – tax paid divided by total wealth) under an *ad valorem* regime at 1% with that for a regime with three bands, with the charge based on median wealth amongst these (representative Sunday Times Rich List) individuals in each band.
Source: Author's calculations using Sunday Times Rich List, 2020.

A2. Progressive rates

It is possible to make the regime more progressive by charging a higher rate to higher bands. In both the *ad valorem* and banded regimes the effect of this is to shift taxpayers' EATRs (effective average tax rates) progressively higher in each band, while the decreasing shape of banded EATRs within each band remains. The large jumps in EATRs across thresholds are still a feature, and in fact are much larger because there is an increase both in the median wealth on which the charge is based and the tax rate which is applied. The effective rates continue to approach zero for the very wealthiest members of the rich list.

FIGURE A2: EFFECTIVE AVERAGE TAX RATES IN BANDED AND *AD VALOREM* REGIMES: PROGRESSIVE RATES

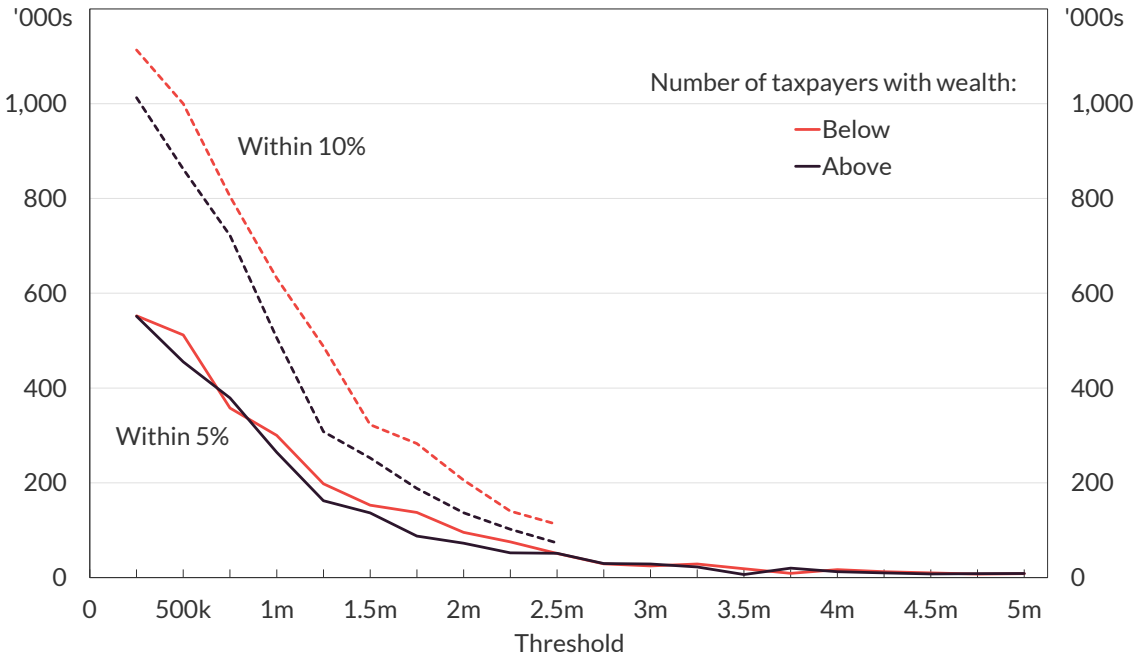


Notes: Figure compares the EATRs (effective average tax rates – tax paid divided by total wealth) under an *ad valorem* regime with rates of 1%, 2%, and 3% in each band, with that for a banded regime with the charge based on median wealth amongst these (representative Sunday Times Rich List) individuals in each band.
Source: Author's calculations using Sunday Times Rich List, 2020.

Appendix B: Chargeable wealth and banding

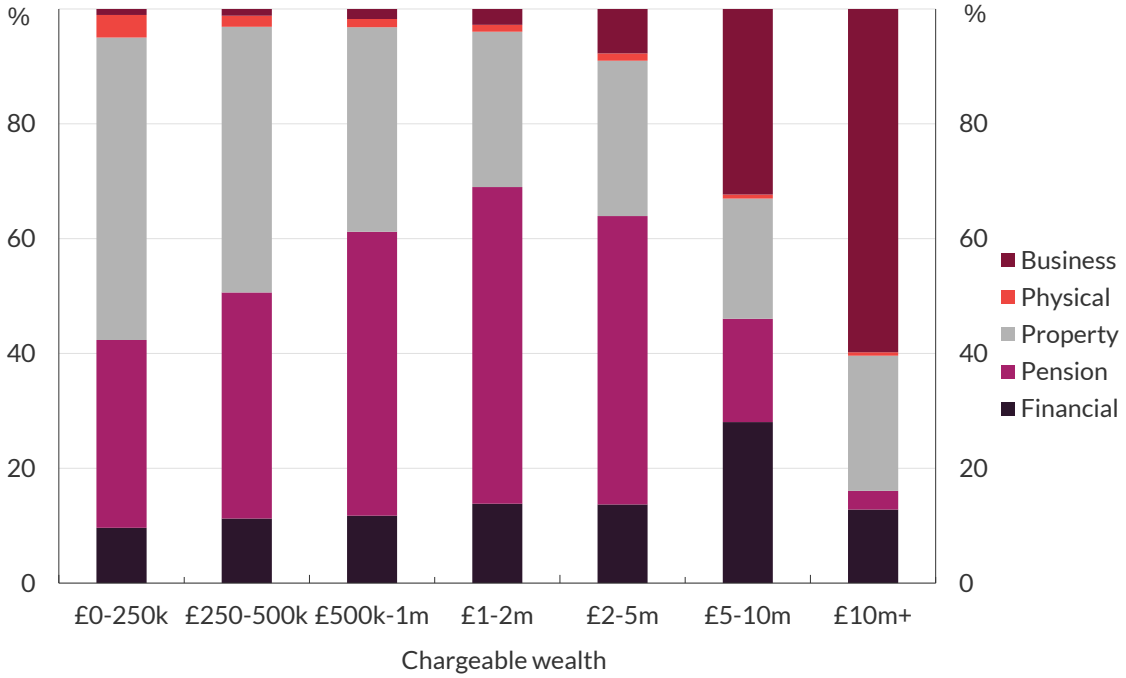
This appendix reproduces some figures from this paper using total chargeable wealth as described in Section 5.2 as the tax base, in line with the recommendation in Advani, Chamberlain and Summers (2020).

FIGURE B1: NUMBER OF INDIVIDUALS WITH CHARGEABLE WEALTH NEAR POTENTIAL THRESHOLDS



Notes: Figure shows the number of individuals whose chargeable wealth is within 5%/10% below/above each point (multiples of £250,000).
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.

FIGURE B2: COMPOSITION OF CHARGEABLE WEALTH

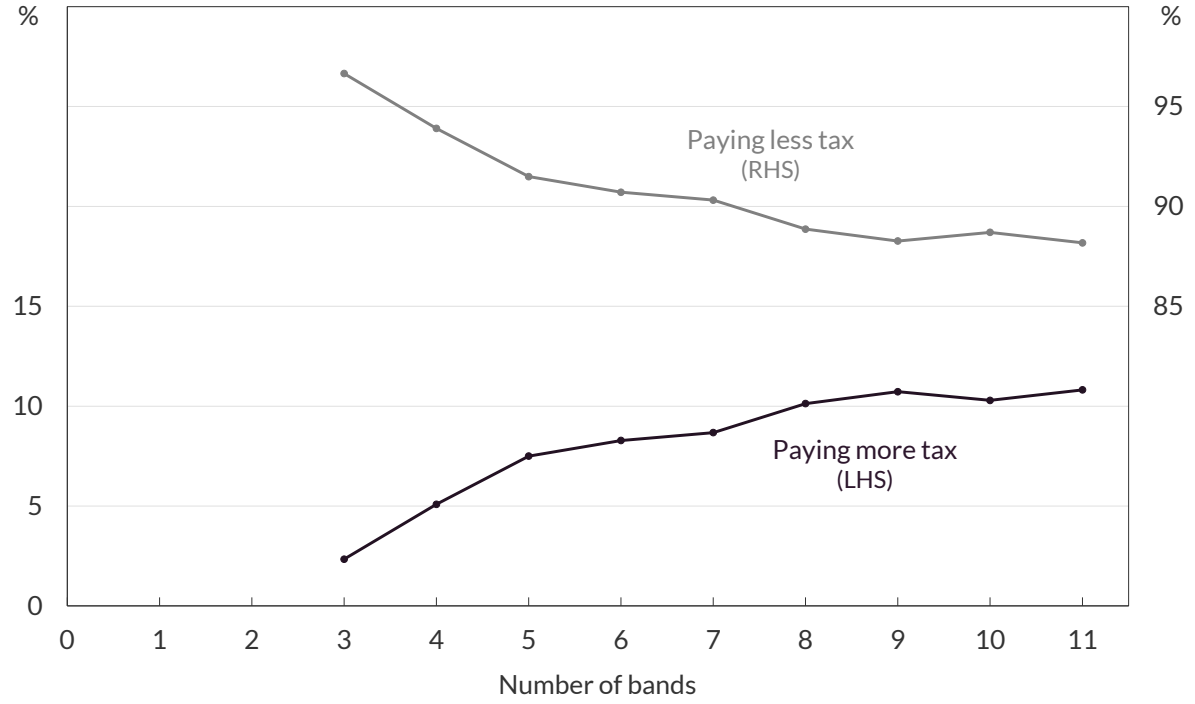


Notes: Figure shows the decomposition of individual total wealth according to wealth in each broad asset categories, and by range of total wealth. All measures are net. Does not include individuals in the Sunday Times Rich List.
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18.

Appendix C: Banding design and tax liabilities

This appendix reproduces figures from Section 6.1 showing the total share of taxpayers paying more or less tax under different banding schemes.

FIGURE C1: SHARE OF INDIVIDUALS PAYING MORE OR LESS TAX BY ADDING ANOTHER BAND



Notes: Figure shows the share of taxpayers in a wealth tax with an exemption threshold of £500,000 who would pay more (less) tax under a scheme with X bands compared to one with X-1 bands. x axis reflects a varying number of bands of equal width covering the range of £500,000–£5 million, and one higher band which applies to wealth over £5 million; i.e. first comparison is between X = 3 bands and 2 bands (£500,000–£5 million; over £5 million).
Source: Author's calculations using ONS, Wealth and Assets Survey, 2016–18, and Sunday Times Rich List, 2020.