Residential Property Taxation:  
A Capital Value Banding Approach

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A capital value banding system relies upon the concept of dividing properties into different categories according to an estimate of their capital value for the purposes of determining a property tax bill. Rather than valuing the properties to a discrete figure and assigning them to a band, the property values are estimated according to a range of values or bands (HMSO, 1991). It is of course possible to value to a discrete figure and then to place the property into the appropriate value band. An obvious advantage of banding is that less accuracy is required in the valuation process (Plimmer et al 2002). An obvious disadvantage is that you cannot apply a flat tax rate to arrive at a tax bill. Banding is used predominantly in the United Kingdom and whilst there is little current international practice of banding, there does appear to be a growing international interest (Plimmer et al, 2002). This paper will look at theoretical and methodological issues surrounding the design of a capital value banded system. By case study analysis of a large data set of residential sales we here determine the extent to which a banded approach can be made to perform to an acceptable standard (approximating a discrete value system) and thus indicate ways in which policy makers can utilise a banded approach.

An international review of property taxation undertaken by McCluskey et al (1998) considers a range of measures to evaluate the appropriate property tax base, encompassing the need for relevant transaction data on which to assess property, the quality of this data, the defensibility of assessments, horizontal and vertical equity, understanding of the system by tax payers, administrative efficiency, equity and fairness of administration, and the relationship between ability to pay and market value. Another review by Beaumont (1992) into the criteria/characteristics of the optimal form of property taxation offers the view that the central issue that perennially

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challenges property taxation throughout the world is the perceived fairness of the property valuation system.

For a tax to be acceptable to the local electorate, it must achieve a balance between economic efficiency (those who benefit from services, pay) and fairness or equity (those who pay, can pay) (Plimmer et al., 2000). This raises important issues surrounding the horizontal and vertical equity of the tax; for example, the Council Tax in Great Britain has poor vertical equity and is seen as highly regressive (Giles and Ridge, 1993). The options open to policy makers are varied and can include local sales/consumption and income taxes along with direct charging for services. It does seem likely however that a property tax of some sort will be retained in most international jurisdictions. The challenge for many will be to what extent can fully discriminating capital value property tax systems be justified in terms of such issues as cost of introduction and annual maintenance.

**Capital Value Banding:**

**The Theory**

It is important to examine the perceived strengths and weaknesses of banding systems per se. This requires an examination of the way banding works in other jurisdictions, to then examine how importing other systems might affect a particular jurisdiction and then to look at the possibility of tailoring a banding system specifically for the jurisdiction. This should then expose techniques and approaches that could be modified in other jurisdictions. As the Great Britain system is the only major example of banding in practice, it is vital to examine how it performs as a basis for further development.

The three key elements of banded systems are firstly, the band widths; secondly, the multiplier per band; and thirdly, the multiplier ratio of lowest band to highest band. These elements can be modified in different ways to examine whether a banding system can perform adequately in terms of progressivity, a key factor in assessing the fairness of a tax. This element is of particular importance as any change to the tax basis is likely to have a considerable redistributive effect. The negative aspects of this in terms of public acceptance are likely to be ameliorated should the new tax be seen as more progressive and therefore more “fair.” Should it be seen as regressive and thus, to an extent, unfair, this would exacerbate an already heated debate.

The strength of a banding system rests on the robustness of the valuation of the property on which it is levied. The GB banding system was designed to avoid the problems of the earlier rates system by placing properties into wide valuation bands. This means that there would have to be major changes in relative property prices before significant numbers of households are being unfairly treated (DETR, 1998b). A large part of the appeal of banding lies in the simplicity of its structure, the low cost and the apparent ease of valuation. In the long run this is undoubtedly true; properties, as opposed to people, are relatively immobile and the problem of evasion is therefore diminished. Banding at least partly mitigates the need for the individual valuation of every property. A further advantage of banding is that home improvements and small changes in capital values resulting from the vagaries of the property market need not lead to changes in a property’s valuation band and thus unpalatable increases in yearly tax bills.

Plimmer et al (2002) highlight the advantages of banding as:

- A quicker process, when timing is important;
- A cheaper process, when costing is important;
- It makes the valuer’s task easier;
- It is a robust system that is expected to be capable of containing
value movements within its broad framework;

- The volume of appeals is reduced because banding affords a less precise area of valuation dispute; and
- It allows for a process of competitive tendering by using the expertise of the private sector.

**Disadvantages**

Weighted against these attractions is the fact that, as with any system of banded rather than continuous taxation, decisions at the margin become more contentious. For example, some people on band boundaries may face a substantial difference in payments, depending on the band into which their properties fall. In addition, banding may result in a regressive tax system, which could well lead to costly and time consuming appeals. The approach can also have other drawbacks dependent upon the particular system adopted, as evidenced by the Council Tax in GB, which is discussed in more detail later in the paper.

**The GB Banding System**

A banded property tax system (Council Tax) for domestic property was introduced in Great Britain in 1993. The Department of Environment’s green paper (1991) laid out the basic underpinnings of the banded system:

- 8 valuation bands (A through H);
- A 3:1 ratio between the bill paid by the highest band (H) in comparison with lowest (A);
- Band D to represent the reference band from which the tax paid for the other bands is related;
- A system of “ninth” to determine the relevant tax multipliers per band, with Band D representing ‘nine ninth’ or one (see table 1); and
- A starting point for Band A of “six ninth” or 0.67

The key attraction to the government of the Council Tax was the establishing of a series of value bands developed by reference to the average value of dwellings in the different regions; therefore bands are distinct for England, Scotland and Wales (see table 1). The Council Tax system came into force in April 1993 and was based, albeit loosely, on property values as at 1 April 1991.

The banding system finally adopted in GB is depicted in table 1. Tax is payable

**TABLE 1. Valuation Bands in Great Britain**

<table>
<thead>
<tr>
<th>Valuation Band</th>
<th>Scotland (£)</th>
<th>England (£)</th>
<th>Wales (£)</th>
<th>Proportion of Band D bill payable</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Up to 27,000</td>
<td>Up to 40,000</td>
<td>Up to 30,000</td>
<td>6/9</td>
</tr>
<tr>
<td>B</td>
<td>27,001 – 35,000</td>
<td>40,001 – 52,000</td>
<td>30,001 – 39,000</td>
<td>7/9</td>
</tr>
<tr>
<td>C</td>
<td>35,001 – 45,000</td>
<td>52,001 – 68,000</td>
<td>39,001 – 51,000</td>
<td>8/9</td>
</tr>
<tr>
<td>D</td>
<td>45,001 – 58,000</td>
<td>68,001 – 88,000</td>
<td>51,001 – 66,000</td>
<td>9/9</td>
</tr>
<tr>
<td>E</td>
<td>58,001 – 80,000</td>
<td>88,001 – 120,000</td>
<td>66,001 – 90,000</td>
<td>11/9</td>
</tr>
<tr>
<td>F</td>
<td>80,001 – 106,000</td>
<td>120,001 – 160,000</td>
<td>90,001 – 120,000</td>
<td>13/9</td>
</tr>
<tr>
<td>G</td>
<td>106,001 – 212,000</td>
<td>160,001 – 320,000</td>
<td>120,001 – 240,000</td>
<td>15/9</td>
</tr>
<tr>
<td>H</td>
<td>Over 212,000</td>
<td>Over 320,000</td>
<td>Over 240,000</td>
<td>18/9</td>
</tr>
</tbody>
</table>
in the proportions on the eight Bands A to H. The banding system means that the amount of Council Tax payable will vary according to the value of the property but only within a limited range. People in the lowest band of property will pay about two-thirds of what properties in the middle bands in that area will pay; those in the highest band will pay three times more than those in the lowest band (see figure 1). The Government in its white paper, Modern Local Government: In Touch with the People (DETR 1998a), stated that the Council Tax was working well as a local tax as it had been widely accepted and was generally well understood.

Problems of GB Banding
Whilst the green paper (DoE 1991) describes the workings of the GB banding system, it does not explain the rationale for any of the factors used to build the system. This results in a system which is hard to defend from a methodological perspective. The Council Tax has another major drawback in that it exhibits strong regressive tendencies (Giles and Ridge, 1995; Kenway and Palmer, 1999). While the proportional liability, i.e. the actual amount of tax, rises from one band to the next band, the percentage of the tax to the capital value decreases. Figure 2 illustrates the regressive nature of the Council Tax, in that, as the value of a property increases the tax bill as a percentage of capital value (i.e. effective tax rates) decreases.

The green paper (DoE, 1991) that presaged the Council Tax is very descriptive but weak in its justification for the structure of the tax. This suggests that banding as a methodology may not be at fault for the regressivity, but rather the particular set-up adopted. The regressive nature of the Council Tax is largely a function of three key variables: the number of bands, their value width and the multiplier. The adjustment of these variables either in isolation or collectively can alter the levels of regressivity. The review of the English Council Tax contained in the white paper makes a recommendation to alter the width of the bands to reflect movements in house prices since 1991 (HMSO, 2001). The changes proposed in fact do not alter the regressivity of the tax. The multiplier remains the same at three and the number of bands stays at eight although through enabling legislation these can be altered.

Support for the idea of modifying the number of bands and particularly for
introducing additional bands at the top and bottom of the price spectrum, also comes from COSLA (2001); Plimmer et al (1999); Kenway and Palmer (1999) and Hills and Sutherland (1991). In all cases, the introduction of additional bands reduced the regressivity of the banding system. Kenway and Palmer (1999) examine the impact of increasing the tax multipliers from 3:1 to 6:1. This again is found to reduce regressivity. The results seem in line with Longley et al. (1996) who suggest that it is the tilt in the tax ratio that has increased the regressive nature of the Council Tax over rates. Overall, the research into the regressive nature of the Council Tax confirms that the major source of the regressivity stems from the tax take function.

It would appear that despite academic concern regarding the regressivity of the tax, the fundamentally unchanged system is likely to form the central core of domestic property taxation across three of the four UK jurisdictions for at least the next decade (Welsh Assembly Government, 2002; COSLA, 2001; HMSO, 2001). Against this backdrop, it is unsurprising that a banding approach is at least being investigated for potential use in a number of developing countries where its perceived simplicity would be at a premium (Plimmer et al, 2002).

A Banding Case Study
In order to introduce a banded system, several issues are required to be addressed. The first of these is the issue of data availability and accuracy. The second involves the construction of a banding methodology in order to arrive at an appropriate set of bands in terms of number and width. The third issue concerns the appropriate set of multipliers to determine the relative amount of tax take per band. The fourth stage is to establish a tax bill for each band by analysis of the relative number of properties in each band in the area concerned.

The following section will look at each of these issues in turn. It will then go on to investigate the results of different approaches, such as importing the existing GB system and alternatively creating a “bespoke” banding system to suit the jurisdiction concerned and to perform better in terms of equity.

Data
Real property sales information for this case study has been provided by the Valuation & Lands Agency (VLA) who

![FIGURE 2. Effective Tax Rates for Council Tax Bands](image)
provided key data on property sales over the period 1998-2002. Excluded from this data were first time sales from developers and sales from the Public Sector to their tenants under the “right to buy” scheme. The data was further “cleaned” by the removal of those properties which had obvious data “errors,” blank fields and agricultural dwellings where there was a high probability that farmland was also part of the sale price. The total number of sales used in the analysis was 46,407, or approximately 7% of the total dwelling stock.

The selling price for each dwelling has been used as a proxy for the assessed value under a capital value rating system (Hattersley et al, 1989). It is accepted that there may be cases where the selling price may not be an accurate and objective proxy for assessed value, for example, the case of a special purchaser or sales to connected parties. However, in the majority of cases it is reasonable to assume that normal market forces and general buyer and seller behaviour applied so as to determine open market selling prices.

Given that data over a five-year period was used it was necessary to adjust selling prices to a common valuation date, i.e. 1 April 1999. Applying this common valuation date would allow for a more objective cross comparison between the various district councils. A time adjusted sales price (TASP) was calculated using a regression based technique that calculates the monthly growth rate implied by the data itself. An implied monthly growth rate index was calculated for each of the district councils included. These indices were then used to adjust each sale price to reflect its assumed value as of the common date. Whilst the market for each property type or each area within a district council have not performed equally over the period, it is felt that this methodology gives the most accurate estimation possible of house prices at a common date. The approach is well documented (Gloudemans, 1999) and is the accepted approach for sales price/value adjustments through time. This adjusted sales data is then separated into bands in a variety of banding scenarios. The relative percentages of properties which fall into each band are calculated from this sample and extrapolated up to produce figures for total properties in each band in the wider population of properties.

**Methodology**

Properties are grouped into different ranges of values, which include the English, Scottish and Welsh Banding systems along with several new scenarios designed for the case study data and which seek to provide some consistent methodological rationale. The scenarios will consider different band change points and widths, number of bands and different valuation band weighting systems. The case study and associated scenarios suggest a variety of banding methodologies, including the established systems of the GB jurisdictions (outlined in table 1), the appropriate multiplier for each band and each ratio in each different valuation band system. The next step is to provide a number of banding scenarios which are suggested by the data itself. Banding systems generated in this way should achieve a better “fit” than currently experienced in GB.

**The Multipliers**

In order to work out the tax bill it is first necessary to establish a multiplier for each band. As noted earlier, the Council Tax in GB uses a system of “ninths” which are shown in table 1. It also adopts a ratio of Band H to Band A of 3:1. In order to expand the range of ratios it is necessary to adopt some consistent rationale with which to calculate the multipliers under different scenarios. The approach adopted is considered in greater detail later in the paper.
Converting to a Tax Bill

The requirement of assessing the tax bills is common to all of the scenarios requiring a calculation of the number of Band D (GB) equivalents which lie in each band. This is worked out by multiplying the number of properties in each band by the multiplier for each band. The number of Band D equivalents in each band is then totalled to give the total number of Band D equivalent properties in the study area. This allows us to divide the total billable amount by the total number of Band D equivalent properties to arrive at the Band D tax bill. Tax bills for the other bands are then allocated by multiplying the Band D bill by the relevant multiplier for each band. This relationship can generally be expressed as follows:

\[ B_j = \sum r_i N_i \]

where \( B_j \) = tax base, \( r_i \) = relative tax rate, and \( N_i \) = number of dwellings in Band \( i \).

The Effective Tax Rate (ETR)

The extent to which the various scenarios are regressive or progressive is assessed by comparing the effective tax rates (ETRs) for each band. The ETR is worked out by calculating the midpoint of each valuation band and dividing the bill for each band by the midpoint figure for each band. The results for each band are then plotted. This allows us to assess the progressivity/regressivity of the scenario according to the direction and inclination of slope. This approach has been used to assess the implications of a number of potential scenarios, grouped together to form the case study that follows.

Scenarios 1–3: Using the GB Council Tax System

The first three scenarios allow us to examine the result of introducing the existing Council Tax methodology from each of the three GB Council Tax jurisdictions. The ETRs for each band for each jurisdiction are illustrated in figure 3.

Analysis of these results confirms that the GB systems are highly regressive. This is in line with research carried out in each of the three GB jurisdictions, all of which indicates that the current Council Tax system is highly regressive (Kenway and Palmer, 1999; IRRV, 1999). The excessively high ETR in Band A is partially explained by the fact that the midpoint figure is a midpoint between £0 and £40,000. Few properties fall below the midpoint of £20,000 and certainly
very few in good condition fall below £10,000. As such the reported ETR is, to an extent, under emphasised. In the top band the ETR has in this case also been, to an extent, over reported. This is due to the fact that very few properties fall into Band H in any of the banding systems. Whilst the analysis using the midpoints for top and bottom bands is subject to debate, it is apparent that different approaches would still present a picture of a regressive tax. Therefore, this research has concluded that an eight-banded structure with a 3:1 multiplier could not achieve acceptable standards of progressivity and fairness.

**Developing a “Bespoke” Banding Structure**

The next step is to develop a banding system which reflects both a defendable underlying rationale and which relates directly to the source data and thus is tailored for a local jurisdiction. This resulted in a number of scenarios which are detailed below.

It was necessary to examine the effect of changing the ratio of the bottom band to the top band. In the GB Council Tax this is fixed at 3:1 and expressed via the system of “ninth.” This does not give any obvious indication of multipliers to be used once higher ratios are adopted. In order to look at different ratios, a common multiplier methodology was required. The approach also adds additional bands, taking note of the requirement apparent from the published work to smooth the progression in terms of band widths (Kenway and Palmer, 1999).

It was decided to consider an eleven banded structure (three more than that used in GB). The band which represents a multiplier of “1” becomes Band E. In order to arrive at band change points the average property value in the data set was calculated. Analysis was originally carried out utilising both the mean property value and the median, or 50th percentile. Whilst use of the mean places 50% of the value of properties above and below the upper threshold of Band E, the median places 50% of the properties above and below this threshold. Either approach would appear to be defendable from a theoretical perspective. On balance of methodological consistency and performance in initial testing, the median was selected as the most appropriate measure of the “average” property value for the purposes of this research.

The median is thus inserted as the top limit for Band E. The top of Band A was calculated as the five percentile figure (the capital value below which 5% of the properties lie). This allowed the change points for Bands A–E to be calculated as equal arithmetic steps.

In order to calculate the change points for Bands F–K, a similar exercise was undertaken, with the K threshold representing the ninety-fifth percentile (the capital value above which 5% of the properties lie). With the figure for the top of Band E and the K threshold, it was then possible to calculate the intervening change points as equal arithmetic steps. For both the fifth percentile and ninety-fifth percentile, some minor rounding was carried out to bring the band change points to an acceptable round number. In the case of the fifth percentile, this fell between £25,000 and £30,000. Analysis was undertaken utilising both, with results strongly favouring the use of the £30,000 figure. As a result this was utilised for the analysis herein.

In terms of multipliers, a common start point of 0.5 was used, although the rationale for this is debatable. In order to attain some measure of consistency in comparing between ratios, some common start point is necessary. Whilst lowering it may decrease the regressivity in Band A, it will also reduce the multiplier for the top band, which may have an overall regressive effect. This methodology was then applied to ratios from 3:1 to 10:1.
In order to fine tune the ETR analysis, it was necessary to examine the calculation of the midpoint for Bands A and K. It was decided to extend the use of percentiles as an investigative tool by inserting new proxy figures for the bottom of Band A (the 0.5 percentile) and the top of Band K (the 99.5 percentile). It is suggested that this increases the relevance of the ETR in these bands, whilst retaining an explainable, defensible and replicable methodology. The bands created are depicted in table 2 with the results displayed in figure 4.

It is immediately apparent that this set of scenarios exhibits much flatter and more proportional profiles. Use of the £30,000 threshold has resulted in a very proportional profile between Bands B and J for the 5:1 ratio, making it appear to be the best scenario. The 6:1 ratio also adopts a relatively proportional profile. In order to determine which appears to be the better ratio to select, it is important to examine the implied increase in rates bill, in absolute and percentage terms (figures 5 and 6).

It can be seen that whilst neither ratio performs poorly in terms of rates bill
increases, the lower ratio of 5:1 performs the better of the two, as would be expected. The 5:1 ratio would therefore appear to be the best performing ratio.

Overall, it would appear that for the purposes of introducing banding in the case study area, the 5% median, £30,000 methodology, using the 5:1 scenario would be the most appropriate. The bands, number and percentage of properties per band, tax bills and ETRs are shown in table 3.

Whilst the “best pick” scenario does not show an absolutely flat line, it does constitute considerable improvement over the existing GB Council Tax. This can be seen in figure 7, which presents a comparison between the results of imposing the Welsh system of Council Tax in comparison with the system suggested herein.

Whilst still retaining elements of regressivity in the top and bottom bands, the proposed banded system is substantially less regressive, and in fact shows considerable proportionality over all but these two bands.

It can be seen that the resulting profile is generally proportional from Band B to Band J. As expected, Bands A and K show
an element of regressivity (see figure 7). Overall this is extremely proportional and certainly compares very favourably with the results of imposing the GB Council Tax.

The effect of this on the actual tax bills can be seen in table 3. As would be expected at a relatively small ratio of 5:1, the increase in tax bills from band to band is relatively even in absolute monetary terms and relatively benign in percentage terms. The tax bill rises in equal monetary steps of £47 from Bands A to E, and equal steps of approximately double this at £93 from Bands F through to K. The key area of concern is the Band E/Band F threshold. At this point the increase experienced doubles. This results in a 25% increase in the bill. Whilst this may seem high for what could be a small marginal increase in the property value near the band threshold, it is still only £47 more than the increase at the lower band thresholds and as such less than £1 per week more. Overall, a property in Band F will pay less than £2
per week more than one in Band E. In these terms, it is perhaps unlikely to be as controversial as other potential options, such as a poll tax, local income/sales tax, use of the GB model or the use of the higher ratio scenarios outlined earlier.

**Equal Numbers of Properties**

One additional scenario has been considered at this stage. This concerns the possibility of creating the bands according to equal percentages of properties per band. To retain eleven bands, this would require splitting the properties into bands including 9.09% of the data sample. When this exercise was carried out it was discovered that the majority of the bands would be less than £3000 wide. It was felt that to band to this level of accuracy would in effect require a discrete valuation of most properties and would thus defeat the purpose of banding. Any attempt to reduce the number of bands and thus to widen the bands increased the regressivity considerably.

**Conclusion**

It would appear that a methodology can be designed for a banding system that would result in a reasonably “fair” system which is to some extent proportional/progressive. However, it is also true to say that of the scenarios analysed, only a small number displayed any major element of progressivity and none were progressive across all bands. Of those that do display strong elements of progressivity, most were at high ratio levels that result in large bill increases at some band thresholds.

It was however possible to arrive at a proposed banding system or systems, which whilst not as progressive as a discrete system, perform in a very similar way. At the very least it can be said that it is possible to greatly improve upon the existing GB Council Tax system. This is achieved by analysing data available from the market in the jurisdiction to generate the bands and by using a consistent methodology in the setting of multipliers.

A note of caution is raised by the inevitable differences in results between data sets. Whilst the results of other analysis is sufficiently similar to suggest that the general methodology is workable, there is debate as to the exact ratio/approach which would work best in different circumstances. This suggests that through time and across geographical space and with different data sets, the results may be different. To an extent this is to be expected, however it does mean that periodic revaluations may require a change in the mechanics of the system. Should this prove the case this may require legislative changes and also renewed requirement to obtain public acceptance.

Given that an oft-stated strength of banding is simplicity, the complexity of the methodology is of inherent and inescapable concern. Whilst a discrete system requires two operations – the valuation of the property and the setting of a rate, banding requires a number of different aspects to be dealt with. Each aspect requires a justification, requires options to be considered and compromises to be made. Despite this, each methodological decision is still subject to criticism.

A major concern lies with the issue of the width of the bands. In the scenarios which produce proportionality/progressivity we find that the bands are increasingly narrow. As the width of bands decreases, the valuation accuracy necessary in order to allocate a property to the correct band increases. Increasingly, the banding exercise becomes a valuation exercise, negating the benefit of banding, without obtaining the simplicity and consistency of a discrete valuation system.

An aspect that again goes to the heart of the banding conundrum is the process of allocating bands to individual properties. The methodology adopted herein relies upon analysis of sample data and
extrapolation of the results to the entire population of properties. This may well prove to be inaccurate once the actual properties are banded. Against this backdrop it must be said that whilst banding does have limitations, it can be improved well beyond the performance of the GB model and therefore may well prove to be a policy option for other jurisdictions, particularly where resource implications, either physical or technical, mitigate against the adoption of a discrete value system.

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References


**Additional Sources**

