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Some Principles and Issues in Designing a Means-Tested Senior Property Tax Exemption (MTSE)

(draft)

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I voiced my opinion in one of our meetings that we ought to develop a proposal for a means-tested senior property tax exemption (MTSE), even if it turns out to be nothing more than a slightly modified version of Natick's current Chapter 41 C exemption. Should you happen to agree with me, I thought it might be useful to set down a number of principles and issues for us to consider in designing an MTSE. All of them are at least mentioned in the Lexington report, which I recommend as a helpful guideline, especially the list of issues on pp. 6-8 of the hardcopy section of report that was distributed to us.

I begin with a consideration of our underlying philosophy/motivation. We have to agree at the outset on whom we are trying to help, how we want to help them, and why.

I then discuss and analyze two important issues involved in designing an MTSE:

1). How does an MTSE interact with the state's Circuit Breaker program?

I consider the interactions with four very different kinds of programs: Natick's 41C \$1,550 exemption; the Sudbury exemption; an unconditional income grant; and a Wayland-style Circuit Breaker match program. I discuss the first three in the body of the report, and the Wayland-style Circuit Breaker match in an Addendum. The Circuit Breaker match is the most complex option to analyze because the match can occur in a number of different ways. Therefore, I decided to separate it out and place it in an Addendum.

2). Issues of fairness as they relate to an MTSE, applied to the same four programs

I conclude with some additional issues that were raised in the Lexington report.

The interactions with the state CB and the issues of fairness for each of the four MTSEs are fairly complex and make up the bulk of the report. The other issues are relatively straightforward and are discussed much more briefly.

Underlying Philosophy/Motivation: Whom Are We Trying to Help and How?

We have to come to an agreement on the appropriate philosophy or motivation behind an MTSE. Because these are means-tested programs for seniors who pay property taxes, they are necessarily motivated in part by a desire to help senior couples or individuals who are homeowners and who have low or modest means. Beyond these, however, are additional motivational considerations that will lead us to choose a particular kind of MTSE. Here are some examples of what I have in mind.

a). Natick's current 41C program selects seniors with very low income and non-housing assets, without regard to the value of their homes. The underlying motivation appears to be that senior couples (individuals) with incomes at or below Natick's cut-off of \$30,000 (\$20,000), and non-housing assets at or below \$55,000 (\$40,000), will have difficulty paying their property taxes regardless of the size of the tax (property value).

b). The state's circuit breaker (CB) is motivated by the principle that seniors with low to modest incomes should pay no more than 10% of their income in property taxes. It sets an income limit roughly three times the Natick limit and also a property value limit that is quite a bit larger than Natick's average (median) property value. The state's CB program reaches well into the middle class. The CB does, however, set a limit of \$1,100 on the amount of aid. Therefore, many households end up paying more than 10% of their income in property tax after receiving the CB. Nonetheless, the belief that property taxes should be no more than 10% of income is a primary motivating factor behind the program. It is shared by the Sudbury exemption and all the Wayland-style Circuit Breaker match programs.

c). Here is another possibility that is closer to Natick's philosophy than to the state's CB philosophy: We want to help seniors below some particular income level (perhaps adding a non-housing asset limit as well), and we also want to maximize their flexibility by giving them a certain amount of income that they are free to spend as they wish. This is commonly referred to as an unconditional grant or subsidy. Flexibility is an important component of the underlying philosophy here: Why tie the aid to the any one particular expenditure, such as to the property tax?

Aid recipients generally prefer to receive unconditional aid to conditional aid that forces them to spend the money in a particular way. An objection to unconditional aid commonly raised by U.S. taxpayers is: How do we know the recipients will spend the aid responsibly? Many U.S. citizens distrust the poor and therefore prefer conditional aid. At the same time, many U.S. citizens trust the poor and prefer unconditional aid. We cannot seem to make up our collective minds: U.S. transfer programs to the poor are a mixture of conditional and unconditional aid. (Caveat: I don't know if Natick is permitted to give unconditional income grants to households, but I am assuming we can in this report.)

d). Suggestions for other possible motivations for an MTSE??

We need to address three additional design issues at the outset related to whom we are trying to help.

1). These are senior tax exemptions. We have to settle on a lower age limit. Natick's 41C exemption targets those 65 and above. Should it be higher? Lower? The same? Why?

2). There will presumably be a residency requirement. How long should it be? Natick's is currently ten years? Why so long? Are we comfortable with this requirement?

3). What is the income limit below which the household is eligible for the exemption? Property value limit? Non-housing asset limit? Are we comfortable with Natick's very low income and non-housing asset limits under the 41 C exemption, and that it does not impose a property value limit?

All of these issues will be driven in part by data. We would want to be able to estimate how changes in any of them will affect the number of seniors in our program.

A final overarching question to keep in mind for whatever MTSE we might propose is directly related to the overall cost of the program: Is the aid large enough to matter?

The size of the aid will depend on such factors as the need we uncover, the income (non-housing asset, property value), age, and residency limits we set, the aid formula we adopt, and, importantly, the cost that our taxpayers are willing to bear. Natick taxpayers spend very little under the 41C program, just over \$60,000 in FY2019. What is the maximum amount they would be willing to spend, especially after just being hit with a fairly hefty tax rate increase? We have seen references to localities imposing an overall MTSE expenditure limit of some percentage of total property tax revenue. For example, Sudbury's expenditure limit for its MTSE is 0.5% of its property tax revenue. Natick's projected property tax revenue for FY 2020 is approximately \$120 million. 0.5% of \$120 million is \$600,000, roughly ten times what we currently spend in our 41 C exemption program. Can Natick spend this amount on an MTSE program? Do we at least believe that Natick could spend substantially more than \$60,000? Has the Board of Selectman expressed an opinion on the maximum cost of an MTSE?

How Does a Local MTSE Interact with the State's Circuit Breaker Program?

The interaction of a town's MTSE with the state's Circuit Breaker (CB) program is an important determinant of the effectiveness of the MTSE. Among other things, the interaction determines the extent to which the town's tax dollars are just substituting for the state's CB dollars. Moreover, if substitution occurs, it reduces the combined subsidy a household receives from the CB and the MTSE. Bob's calculations that he sent us showing how the Wayland CB-match program works demonstrates both issues. I will use simpler, more stylized examples than Bob did to focus on the pattern of interaction of various MTSE options with the state CB and to facilitate comparisons among them. Nonetheless, an important lesson of Bob's calculations when we get to the point of choosing a particular MTSE is that the exact way in which Natick computes its MTSE and the state computes the CB matters. We have to pay attention to the details of each program.

There are three key features of the state's CB to keep in mind when considering the interactions:

- 1). Basic formula: $CB = \text{Property tax} - 10\% \text{ Income}$

The state's goal is that seniors who are eligible for the Circuit Breaker should not have to pay more than 10% of their income in property taxes.

- 2). In computing the CB, the state reduces the property tax in the current year by the amount of the local MTSE property tax exemption in the previous year. Therefore, the adjusted formula is

$$CB = \text{Property tax} - \text{Local exemption (last year)} - 10\% \text{ Income}$$

This deduction is the source of the interaction.

- 3). For reasons of overall cost control, **the CB has an upper limit of \$1,100.**

Following is an analysis of the state CB interactions with four different kinds of MTSE's, beginning with Natick's current 41 C program.

Natick's 41 C Exemption

Natick's program exempts \$1,550 of property tax for senior homeowners whose income and non-housing assets are low enough to qualify. The intention is to add \$1,550 to the state's CB each year. But since the state subtracts the \$1,550 from the property tax in computing the CB, and the CB limit is \$1,100, the difference between a household's property tax and 10% of its income must be at least \$2,650 ($\$1,550 + \$1,100$) to avoid substituting Natick \$ for State CB \$. At any difference [Property tax – 10% Income] less than this, the substitution of Natick \$ for State CB \$ is one-for-one, until the difference reaches \$1,550. At a \$1,550 difference, the CB is \$0 because Natick's \$1,550 exemption reduces the property tax to 10% of Income on its own. \$1,100 of Natick's subsidy substitutes for the CB, and the net increase in aid to the household from Natick's \$1,550 exemption relative to having only the state CB ("stand-alone CB") falls to \$450 [$\$1,550 - \$1,100$].

The same outcome applies as the difference between the property tax and 10% of income decreases from \$1,550 to \$1,100. Below \$1,100, the amount of substitution of Natick \$ for CB \$ decreases \$ for \$, and the net increase above the stand-alone CB represented by the Natick's \$1,550 exemption rises. This happens because the stand-alone CB would have decreased below \$1,100 in this range without the Natick exemption. This does not matter to the household, however, since the combined subsidy remains at \$1,550, the size of the Natick exemption, throughout the entire range.

Note: The same kinds of interactions and resulting substitution patterns arise for any fixed subsidy that directly reduces the property tax, such as the one mentioned in the Lexington report in which fixed exemptions are based only on a person's age, for people 80 and above.

Examples illustrating these patterns--Outcomes for various differences between the property tax and 10% of income as the differences decrease.

Assume: Income = \$30,000, the Natick maximum, such that 10% Income = \$3,000
Natick exemption = \$1,550

Example 1

Property tax: \$5,650; 10% Income: \$3,000: Difference = \$2,650
State CB = $\$5,650 - \$1,550 - \$3,000 = \$5,650 - \$4,550 = \$1,100$
State CB plus Natick exemption = $\$1,100 + \$1,550 = \$2,650$

Note: The state CB remains at its maximum of \$1,100 and the total aid at \$2,650 for any property tax greater than \$5,650. There is no substitution of Natick \$ for state CB \$, and the combined subsidy is \$1,550 greater than that provided by the CB, as Natick intended.

Example 2

Property tax: \$5,050; 10% Income: \$3,000: Difference = \$2,050
 State CB = \$5,050 - \$1,550 - \$3,000 = \$5,050 - \$4,550 = \$500
 State CB plus Natick exemption = \$500 + \$1,550 = \$2,050

Notes:

1). As the property tax decreases by \$600 from \$5,650 to \$5,050, the Natick exemption substitutes for \$600 of state CB aid. Natick's \$1,550 exemption increases the combined subsidy to the household by just \$950 relative to the stand-alone CB of \$1,100. [$\$1,100 + \$950 = \2050].

2). The combined subsidy of \$2,050 equals the difference [Property tax – 10% Income]. This is true for all values of [Property tax – 10% Income] between \$2,650 and \$1,550.

Example 3

Property tax: \$4,550; 10% Income: \$3,000: Difference = \$1,550
 State CB = \$4,550 - \$1,550 - \$3,000 = \$4,550 - \$4,550 = \$0
 State CB plus Natick exemption = \$0 + \$1,550 = \$1,550

Note: As the property tax decreases to \$1,550 above 10% of income, the Natick exemption substitutes for all \$1,100 of the CB. Natick's \$1,550 exemption increases the combined subsidy to the household by just \$450 relative to the stand-alone CB of \$1,100. [$\$1,100 + \$450 = \$1,550$]

Example 4

Property tax: \$4,100; 10% Income: \$3,000: Difference = \$1,100
 State CB = \$4,100 - \$1,550 - \$3,000 = (-) \$450; Therefore, CB = \$0
 State CB plus Natick exemption = \$0 + \$1,550 = \$1,550

Note: A property tax of \$4,100 is the smallest difference [Property tax – 10% Income] at which the stand-alone CB, without the Natick extension, would be at its maximum of \$1,100 [$\$4,100 - \$3,000 = \$1,100$]). It remains at \$0 given Natick's \$1,550 exemption, and the total aid to the household remains at \$1,550, \$450 more relative to the stand-alone CB of \$1,100.

Example 5

Property tax: \$3,550; 10% Income: \$3,000: Difference = \$550
 State CB = \$3,550 - \$1,550 - \$3,000 = (-) \$1,000; Therefore, CB = \$0
 State CB plus Natick exemption = \$0 + \$1,550 = \$1,550

Note: The stand-alone CB would be \$550 [$\$3,550 - \$3,000 = \550]. It remains at \$0 given Natick's \$1,550 exemption, and the combined subsidy to the household remains at \$1,550. This is \$1,000 above the stand-alone State CB of \$550. The substitution of Natick \$ for CB \$ has decreased, to \$550, but only because the stand-alone CB has decreased to \$550. The combined subsidy to the household remains at \$1,550.

Example 6

Property tax: \$3,000; 10% Income: \$3,000: Difference = \$0

State CB = \$3,000 - \$1,550 - \$3,000 = (-) \$1,550; Therefore, CB = \$0

State CB plus Natick exemption = \$0 + \$1,550 = \$1,550

Note: The stand-alone CB would be \$0 [\$3,000 - \$3,000 = \$0]. It remains at \$0 given Natick's \$1,550 exemption, and the combined subsidy to the household remains at \$1,550. There is no substitution of Natick \$ for CB.

Summary points of Natick exemption and state CB interaction.:

- 1). The intent to increase the total property tax exemption by \$1,550 relative to the stand-alone CB happens only if the difference between a household's property tax and 10% of its income is at least \$2,650 [\$1,550 + \$1,100]. The combined subsidy remains constant at \$2,650 for any difference [Property tax - 10% Income] greater than \$2,650.
- 2). The total aid received, the \$1,550 Natick extension plus the state CB, decreases \$ for \$ from \$2,650 to \$1,550, as the difference [Property tax - 10% Income] decreases from \$2,650 to \$1,550. The Natick exemption substitutes for the stand-alone CB \$ for \$ in this range. The combined subsidy equals the difference [Property tax - 10% Income] in this range.
- 3). The amount of the combined subsidy remains constant once again, equal to Natick's \$1,550 exemption, throughout the range in which the difference [Property tax - 10% Income] is between \$1,550 and \$0.
- 4). The examples assume an income level of \$30,000, but the analysis would apply unchanged for any income level. The interactions between the Natick exemption and the state CB depend only on the difference between a household's property tax and 10% of its income [Property tax - 10% Income], not the level of the household's income. This is because the state CB depends only on the difference between a household's property tax and 10% of its income.

What Do the Data Tell Us About the Circuit Breaker Interaction?

Eric sent me the property values of all 39 households who received the \$1,550 41C exemption in FY2019. He did not have income data for these households, but the data are somewhat encouraging nonetheless.

The property values were modest to low for the most part. The highest property value was \$600,600. Lowest was \$257,300.

The breakdown was:

\$600,000 and above	1
\$500,000 to \$599,999	4
\$400,000 to \$499,999	24
\$300,000 to \$399,999	8
\$200,000 to \$299,999	2

The tax rate in FY2019 was .1271.

To take a first pass at the property tax data, suppose every household was a couple and had income at the limit of \$30,000, as in the examples above. Then any couple with a property tax of \$5,650 or more would be at least \$2,650 above above \$3000 (10% Income) and would receive the highest combined subsidy of \$2,650 (\$1,550 Natick exemption plus \$1,100 maximum CB). A property tax of \$5,650 implies a property value of approximately \$444,500 at a tax rate of .1271. 19 of the 39 41C exemption recipients had that property value or higher, almost half the households, and this assumes the highest possible income. To the extent some households had lower incomes, or if any on the households have a single senior and thereby an income limit of \$20,000, then the number receiving the \$2,650 maximum combined subsidy could be higher. It cannot be lower.

To see some of the possibilities for households whose property values are below \$444,500, consider the ten households with the lowest property values, those between \$394,000 and \$257,300.

\$394,000 property value: The property tax is \$5,008 at a tax rate of .1271. To get the full \$2,650 benefit, 10% of that household's income must be at least \$2,650 below its property tax of \$5,008, or \$2,358 [$\$5,008 - \$2,650 = \$2,358$]. The household receives the full benefit if its income is \$23,580 or less.

The next threshold is [Property tax – 10% Income] = \$1,550, at which point the CB=0 and the combined subsidy is just the Natick exemption of \$1,550. $\$5,008 - \$1,550 = \$3,458$. The income threshold is \$34,580. But this is above the maximum eligible income of \$30,000. At the maximum of \$30,000, the difference [Property tax – 10% Income] is [$\$5,008 - \$3,000 = \$2,008$]. The combined subsidy is \$2,008, equal to the \$1,550 Natick exemption and \$458 from the CB. The CB decreases by \$642, from \$1,100 to \$458, as income increases by \$6,420, from \$23,580 to \$30,000. [10% of \$6,420 = \$642]. The CB never reaches zero. Therefore, the combined subsidy for this household is between \$2,008 and \$2,650.

\$257,300 property value: The property tax is \$3,268 at a tax rate of .1271. To get the full \$2,650 benefit, 10% of that household's income must be at least \$2,650 below its property tax of \$3,268, or \$618 [$\$3,268 - \$2,650 = \$618$]. The household receives the full benefit if its income is \$6,180 or less.

The next threshold is [Property tax – 10% Income] = \$1,550, at which point the CB=0 and the combined subsidy is the Natick exemption of \$1,550. [\$3,268 - \$1,550= \$1,718]. The income threshold is \$17,180. At any income above \$17,180, the CB remains at \$0 and the household's combined subsidy remains at \$1,550.

At incomes between \$6,180 and \$17,180, the CB decreases \$ for \$ from \$1,100 to \$0, and the combined subsidy from \$2,650 to \$1,550.

We do not have matching income data to know for sure what the combined subsidies of twenty of these households are. But the point of these two examples is that the combined subsidies can be at their maximum, or at least well above \$1,550, in households with very low property values, if their income are also quite low.

Finally, if the Natick tax rate becomes the proposed .1366 in FY2020, and there are no reassessments of these 39 recipients of 41C exemptions, then 28 of the 39 will receive the maximum combined subsidy of \$2,650 even if all of them are at the maximum income level of \$30,000. Since many of remaining 11 almost surely have incomes less than \$30,000 (or are single households with an income limit of \$20,000), it may well be that all but a few households will receive the \$2,650 maximum combined subsidy. This is speculative, but encouraging.

Important caveat

In all the analysis so far, I have ignored that the state adds half of water and sewer payments and some other items to the property tax-- call it an augmented property tax-- in computing the CB. This does not matter in the analysis of how the Natick exemption interacts with the state CB. Just think of the property tax numbers in the examples as the augmented property taxes, and nothing changes.

The augmentation matters, however, when looking at the data. For example, it reduces the level of the property value that would be the cut-off for receiving the full combined subsidy of \$2,650 at the maximum income limit of \$30,000. But this means that even more of the thirty-nine 41 C recipients might receive the full \$2,650. It would also affect the calculations for the two property values of \$394,000 and \$257,000, but I do not know by how much since I do not have their water and sewer bills and the other items necessary for an exact calculation.

The Sudbury Exemption

Sudbury has adopted the state's philosophy that no household having income and property value below certain levels should pay more than 10% of its income in property tax. It uses the same income limits as the State CB and a maximum property value of 110% of the Sudbury median property value. Sudbury avoids substituting its own \$ for state CB \$ by subtracting the state CB from a household's property tax in computing its own exemption and by adopting the same 10%-of-income goal for the size of the property tax.

$$\text{Sudbury exemption} = \text{Property tax} - \text{state CB} - 10\% \text{ Income.}$$

$$\text{State CB} = \text{Property tax} - \text{Sudbury exemption} - 10\% \text{ Income}$$

These formulas are identical, so that that state CB and the Sudbury exemption have no substitution effect on each other. Also,

$$\text{Property tax} - \text{CB} - \text{Sudbury exemption} = 10\% \text{ Income}$$

Their shared goal is met. Together they reduce the property tax to 10% of income.

In addition:

- 1). If the state CB by itself lowers the property tax to 10% Income, then

$$\text{CB} = \text{Property tax} - 10\% \text{ Income}$$

and the Sudbury exemption = 0. With the Sudbury exemption=0, it has no effect on the CB calculation.

- 2). If the state CB reaches its maximum of \$1,100 and the [Property tax - \$1100] is greater than 10% Income, the Sudbury subsidy fills in the difference. The formula for computing the Sudbury extension in that case is

$$\text{Sudbury extension} = \text{Property tax} - \$1,100 - 10\% \text{ Income}$$

In the next year, when the state subtracts the Sudbury subsidy from the property tax in computing the CB, its maximum contribution of \$1,100 will be required to bring the net property tax down to 10% Income. The CB remains unchanged and hence the Sudbury extension remains unchanged going forward. Also, there is no substitution of Sudbury \$ for state CB \$.

Caveat:

The state adds half of water and sewer payments and some other items to the property tax--call it the augmented property tax--in computing the CB. I am assuming that Sudbury does the same. If not, then there could be some substitution effects as they interact, along with the possibility

that the 10% goal is not met. We would have to take the exact state CB calculation into account if we adopt this kind of MTSE.

An Unconditional Income Grant

Suppose instead of a \$1,550 property tax exemption Natick offered a \$1,550 unconditional income grant. The grant would interact with the state CB because it increases the income term that is subtracted from the property tax in computing the CB. It does not decrease the property tax in the calculation. Also, since the CB formula is

$$\text{CB} = \text{Property tax} - 10\% \text{ Income}$$

the CB is reduced by only 10% of the \$1,550, or \$155.

$$\text{CB} = \text{Property tax} - 10\% [\text{Income} + \$1,550]$$

$$\text{CB} = \text{Property tax} - \$155 - 10\% \text{ Income}$$

The income grant involves a potential substitution of Natick \$ for state CB \$, but only equal to 10% of the grant. Otherwise, the nature of the interaction follows along essentially the same lines as for the \$1,550 Natick property tax exemption, although the pattern of interaction differs.

-- So long as the difference [Property tax – 10% Income] is at least \$155 above the CB limit of \$1100, or \$1,255, there is no reduction of the state CB, no substitution of Natick \$ for CB \$, and the net gain to the household is \$2,650 (\$1,550 + \$1,100)

-- If the difference [Property tax – 10% Income] is less than \$155 larger than the state CB limit of \$1100, then there is one-for-one substitution of Natick \$ for CB \$, with a corresponding reduction of the combined subsidy received, but only up to a maximum of \$155.

Three examples will suffice this time to show the pattern of the interaction

Assume: Income = \$30,000, the Natick maximum, such that 10% Income = \$3,000; and
 Natick unconditional grant = \$1,550

Example 1

Property tax: \$4,255; 10% Income: \$3,000; Difference = \$1,255 (\$155 + \$1,100)
 State CB = \$4,255 - \$155 - \$3,000 = \$1,100
 State CB plus Natick grant = \$1,100 + \$1,550 = \$2,650

Note: The state CB remains at its maximum of \$1,100 and the combined subsidy at \$2,650 for any property tax greater than \$4,255. There is no substitution of Natick \$ for CB \$, and the total aid is \$1,550 greater than that provided by the stand-alone CB, as Natick intended.

Example 2

Property tax: \$4,100; 10% Income: \$3,000; Difference = \$1,100
 State CB = \$4,100 - \$155 - \$3,000 = \$945

$$\text{State CB plus Natick grant} = \$945 + \$1,500 = \$2,445$$

Note: Since the CB calculation is now affected on the income side, the CB decreases \$ for \$ for every dollar that the property tax falls below \$4,255. It continues to decrease until the property tax is \$3,155, at which point the CB is \$0. The final example illustrates.

Example 3

Property tax: \$3,155; 10% Income: \$3,000; Difference = \$155

State CB = \$3,155 - \$155 - \$3,000 = \$0

State CB plus Natick grant = \$0 + \$1,550 = \$1,550

Note: Had there been only the stand-alone CB, the CB would have reached its limit of \$1,100 at a property tax of \$4,100 [CB = \$4,100 - \$3,000) = \$1,100], and would have decreased \$ for \$ until it reached zero at a property tax of \$3,000 [\$3,000 - \$3,000 = \$0]. Therefore, the only effect of the Natick grant on the state CB is to increase by \$155 the values at which the state CB reaches its maximum of \$1,100 (\$4,255 vs. \$4,100) and its minimum of \$0 (\$3,155 vs. \$3,000).

There is substitution of Natick \$ for state CB \$ under the income grant but it is minor, never larger than \$155. In the region of property taxes from \$3,155 to \$4,100, the substitution is exactly \$155. That is, the stand-alone CB would have been \$155 larger without the income grant in this range of property taxes.

The stand-alone state CB would have been larger without the Natick grant in the region of property taxes from \$3,001 to \$3,155; the substitution increases \$ for \$ from \$1 to \$155. Similarly, in the region of property taxes from \$4,100 to \$4,255, the substitution decreases \$ for \$ from \$155 to \$0.

The Data

Apply Eric's data on the thirty-nine 41C exemption recipients to the income grant. For households with the maximum income of \$30,000, the minimum property tax at which a household receives the maximum combined subsidy of \$2,650 is \$4,255. At a tax rate of .1271, the minimum property value is approximately \$335,000 [\$4,255/.1271]. All but three of the households have property values above \$335,000 and would necessarily receive the maximum combined subsidy of \$2,650. (And this ignores the water and sewer bills and other items that the state adds to the property tax. (See p.9.)

Concluding comments:

1). The pattern of interactions with the state CB described above applies to any income level. This is because the state CB is based on the difference between the property tax and 10% of income (augmented by the grant), not on the level of income.

2). An unconditional income grant has three distinct advantages relative to a property tax exemption of equal size:

a). It gives the recipients more flexibility to spend the grant as they wish;

b). It sharply lowers the substitution of Natick \$ for state CB \$, and therefore the reduction of the combined subsidies, over a wide range of differences between property taxes and 10% of incomes.

c). Natick could double or triple its current subsidy of \$1,550 if it were an income grant, to \$3,100 or 4,650, with only a relatively small effect on the interaction with the state's CB. The reason is that the difference [Property tax – 10% Income] that the state uses to compute its CB would decrease by only 10% of the higher grant, by \$310 and \$465. This is still minor compared with the effect that Natick's current \$1,550 property tax exemption has on the state's CB computation, and extremely minor relative to doubling or tripling Natick's property tax exemption. The latter would greatly increase the substitution of Natick \$ for state CB \$.

Fairness Issues: Horizontal Equity and Regressive / Proportional / Progressive Subsidies

“What’s fair?” is a question fraught with controversy in almost any context, and issues related to taxes and subsidies are no exception. All I can say with some confidence is that two principles are the most commonly applied measures of fairness for taxes and subsidies: horizontal equity and progressivity. They also appear to have gained majority acceptance in the United States. The measures are typically described in terms of income because income is considered to be the best single measure of economic well-being. They imply the following for subsidy programs.

Horizontal equity- This says that equals should be treated equally: two people with the same income should receive the same subsidy

Regressive / Proportional / Progressive: This describes how unequals—those with different amounts of income-- should be treated. It compares the subsidies given to people with different incomes by computing the ratio of subsidy (S) to income (Y) for each person, S divided by Y. There are three general patterns:

If the ratio S/Y is constant at all income levels, the subsidy program is said to be proportional.

If the ratio S/Y decreases as income decreases, the subsidy program is said to be regressive. People with lower incomes receive proportionally less subsidy. [Equivalently, people with higher incomes receive proportionally more subsidy]

If the ratio S/Y increases as income decreases, the subsidy program is said to be progressive. People with lower incomes receive proportionally more subsidy. (Equivalently, people with higher incomes receive proportionally less subsidy.) People with lower (higher) incomes may receive lower (higher) subsidies, but not proportionally lower (higher) subsidies. U.S. citizens overwhelmingly believe that subsidy (and tax) programs should be either proportional or progressive, with the majority favoring progressive programs.

One immediate complicating factor in applying these measures to subsidies for homeowners is that some people might, reasonably, prefer to compare the subsidies to property values rather than to income. Unfortunately, a subsidy program could be progressive in terms of income and regressive in terms of property values, or vice-versa. If so, there is no obvious way to reconcile the two measures.

In what follows, I will use the income measure to judge whether the various programs satisfy horizontal equity and are progressive. I will also refer back to the examples described above so that I can illustrate with specific numbers

\$1,550 Natick Exemption

In the preceding section, there were two regions in which everyone received the same combined subsidy, Natick exemption plus state CB:

--If the difference between the property tax and 10% of income was \$1,550 or less, everyone received \$1,550.

--If the difference between the property tax and 10% of income was \$2,650 or more, everyone received \$2,650.

Within these regions of constant combined subsidies, horizontal equity is satisfied because any two people with the same income necessarily receive the same subsidy. The subsidy is also progressive. The ratio S/Y is either $\$1,550/Y$ in the lower range or $\$2,650/Y$ in the higher range. The ratios increase as income decreases throughout each range—the program is progressive.

Comment: The Natick exemption would also satisfy horizontal equity and progressivity in terms of property values in these two regions. (Just substitute property value for income in the measures)

Matters are more complicated in the region in which the difference in the property tax and 10% of income is between \$2,650 and \$1,550. Here the combined subsidy, Natick exemption plus state CB, increases \$ for \$ as the difference increases from \$1,550 and \$2,650. With the subsidy increasing and depending on two separate values, property taxes (values) and income, both horizontal equity and progressivity can be violated. To see the possibilities in a simple manner, first consider two extreme cases:

1). Everyone in this range has the same income. The differences between property taxes and 10% of income are all due to differences in property taxes (values).

Clearly, two people with the same incomes receive different subsidies if their property taxes (values) differ, in violation of horizontal equity. Progressivity cannot be judged, since there is no variation in income.

2). Everyone in this range has the same property value (pays the same property tax). The differences between property taxes and 10% of income are all due to differences in incomes.

In this case, horizontal equity is satisfied since two people with the same income also pay the same property tax and receive the same combined subsidy. Also, people with smaller incomes have a larger difference between their property tax and 10% of their income and receive a larger subsidy. With subsidies rising as incomes decrease, the program is progressive in this range.

Unfortunately, with both incomes and property taxes (values) varying within the range, horizontal equity is almost certain to be violated for some taxpayers. There could also be

regressive or proportional patterns across certain people. For example, one person has income of \$30,000 and a property tax of \$5,550. The difference [Property tax – 10% Income] is \$2,550, [\$5,550 – \$3,000 = \$2,550], which is also the value of the combined subsidy (see the example in the preceding section). Another person has income of \$25,000 and property tax of \$4,050. The difference [Property tax – 10% Income] is \$1,550, [\$4,050 - \$2,500 = \$1,550], which is also the value of the combined subsidy. The ratios of combined subsidy to income are:

$$\$1,550 / \$25,000 = .062; \$2,550 / \$30,000 = .085$$

The person with the lower income receives a lower combined subsidy in proportion to income, a regressive pattern.

Note: The same problems of potential violations of horizontal equity and progressivity would arise if one prefers a comparison of subsidies to property values (taxes).

Qualification:

One could argue that since the subsidy is based on the difference between property taxes (values) and 10% of income, horizontal equity and progressivity should be judged in terms of this difference rather than either income or property value alone. It could be justified as an equity measure if we believe that, ideally, no one with the limited income and non-housing assets necessary to qualify for the Natick exemption should have to pay more than 10% of income in property taxes. Then the gap between the two could be used as an appropriate measure of well-being. Presumably the larger the gap, the worse off a household is by this measure, since the property tax is farther away from the goal of being 10% of income.

1). In terms of the difference [Property value – 10% Income], horizontal equity is automatically satisfied because two people with the same difference receive the same subsidy.

2). Progressivity is violated, however, in the two regions in which the combined subsidies are constant, since the ratio of combined subsidies to the difference decreases as the difference increases. People with a larger gap have lower $S/(\text{difference})$ ratios, a regressive pattern.

3). In the variable region, when the difference [Property tax - 10% Income] in the examples above rises from \$1,550 to \$2,650, the combined subsidies also rise \$ for \$ from \$1,550 to \$2,650. The ratio, [(combined subsidy) / (Property tax – 10% Income)] = 1. With the ratio constant, the combined subsidies are proportional in that range. Proportionality would likely be viewed as acceptable.

4). These properties would hold at any income level chosen, not just the \$30,000 in the examples.

The Data

According to Eric's data on the thirty-nine 41C exemption recipients, at least 19 would receive the combined maximum subsidy of \$2,650 and quite a few more would likely also receive the maximum subsidy. Most of the remaining households are likely to be in the variable region in which the combined subsidies are between \$2,650 and \$1,550. Only a few households are likely to receive just the Natick exemption of \$1,550.

For the households receiving the constant combined subsidies of either \$2,650 or \$1,550, both horizontal equity and progressivity are satisfied in terms of income. There could well be violations of both horizontal equity and progressivity, however, across households, receiving combined subsidies in the variable range between \$2,650 and \$1,550.

The Sudbury exemption

a). Under the Sudbury style program of reducing property taxes to 10% of income, horizontal equity can be violated and the aid can be highly regressive (until aid limits, if any, are reached). If two households that have the same, or nearly the same, income but different property values, the one with the larger property value receives the higher subsidy. The difference in their combined subsidies equals, or almost equals, the difference in their property taxes. This can generate huge differences in subsidies, unless a subsidy limit is imposed. According to the Sudbury Board of Assessors, the Sudbury exemptions themselves in 2015 varied from a low of \$23 to a high of approximately \$6,140. If the subsidies are so highly variable primarily because of differences in property values, then they are likely to strike many people as highly unfair if they think of horizontal equity and progressivity in the traditional way in terms of income.

One could argue, however, that these traditional measures are irrelevant. Sudbury has designed the program with a very different idea of fairness in mind, that no one with incomes and property values below certain levels should have to pay more than 10% of their incomes in property taxes. Achieving this outcome is the only thing that matters in terms of fairness, and it has been achieved. My guess is that most people will not be convinced, but the argument is not unreasonable.

In any event, the program is virtually certain to generate numerous violations of horizontal equity (two people have equal incomes but very different property values) and progressivity (one person has slightly more income than some other person and a much higher property value, and therefore a higher [(combined subsidy) / income] ratio—regressive over these two peoples)

An Unconditional Income Grant

The \$1,550 unconditional grant has two fixed portions:

1). The difference [Property tax - \$10% Income] is \$155 above \$1,100, the maximum state CB, that is, at least \$1,255 (= \$155 +\$1,100). In this region, the combined grant and state CB is \$2,650 with a \$1,550 grant.

2). The difference [Property tax - \$10% Income] is \$155 or less. In this region the state CB = 0, and the combined subsidy is \$1,550.

Horizontal equity and progressivity are satisfied within both regions, as argued above for the fixed portions of the Natick exemption.

The combined subsidy increases \$ for \$ as the difference [Property tax — 10% Income] increases between these regions since the state CB increases \$ for \$. Unfortunately, since the subsidy depends on both income and property value, there almost certainly will arise instances that violate horizontal equity and progressivity. The argument is the same as that for the variable portion of the Natick exemption, described above. So, too, is the size of the region for which the combined subsidy is variable--\$1,100—because the only variability in the subsidy is in the state CB, which varies from \$0 to a limit of \$1,100.

The Data

According to Eric's 41C exemption data, all but three of the households would receive the maximum combined subsidy of \$2,650, for which both horizontal equity and progressivity are satisfied. There could, however, be violations of horizontal equity and progressivity across the three households with the lowest property values. This is a far better outcome than for the current Natick exemption.

Additional Issues

1. Are non-housing asset limits on qualifying for aid feasible?

This only applies if, as in Natick's current program, there is a non-housing asset limit as well as an income limit. Still, one's sense from the information we have received is that localities are reluctant to give means-tested subsidies to households with large amounts of non-housing assets, even if there is no stated non-housing asset limit. How confident are town administrators that they can accurately measure these assets?

2. How should we measure income for the purposes of our MTSE?

One important issue is how much of the Social Security benefit should be included in the measure of income. The Social Security benefit is the largest portion of income for a majority of senior citizens, especially those with low overall incomes. The state includes the entire Social Security benefit in income when calculating the CB. The Natick 41 C exemption allows a small deduction of the Social Security benefit--\$4,758 for couples, \$2,379 for singles--in determining whether the household is within the income limits to qualify for the exemption? What is the rationale for this deduction? If we agree with it, should the deduction be larger?

A second issue is whether non-housing asset income should be included in income in determining qualifying limits. The answer is probably yes, in principle, but the question again arises whether town administrators are confident that they can accurately measure non-housing assets and the income derived from them.

3. The notch problem.

A household who is even \$1 above an income limit (or non-housing asset limit or property value limit, if applicable) receives no subsidy. Economists refer to this as the notch problem and it can be substantial. Under the Natick 41 C exemption, for example, a person who is at the Natick income limit this year and receives \$1 more income the next year loses between \$1,550 and \$2,600 by earning that extra dollar. This strikes many people as highly unfair, but there is really no good way around it. The notch problem affects all means-tested transfer programs.

Natick could do a phase-out, for example, lowering the subsidy by \$1 for every dollar of income about the limit to avoid such a sharp "notch." But a phase out ends up subsidizing seniors that the town did not intend to subsidize when it set the income and non-housing asset limits, perhaps even many more seniors than those it intended to help. And it can also greatly increase the overall cost of the program. One has to be very careful with phase-outs.

The Lexington report offers some additional issues to consider.

In concluding, I would reiterate a point I made in one of our meetings, that there is no perfect MTSE. Whatever we choose will be vulnerable to attack, perhaps on many fronts. This is true of transfer programs generally, and certainly true of an MTSE. To give one example, I strongly prefer an unconditional income grant, on both philosophical and practical grounds, if we are allowed to give aid in this form. Yet it is vulnerable to the charge that we have no guarantee that the grants will be spent wisely, and also to charges that it is unfair, in the form of specific violations of horizontal equity and progressivity that critics might uncover. It will also suffer from a notch problem beyond the income limits, one that could be viewed as quite severe if the grant is quite large and the income limits are fairly low. We should not be overly concerned about potential vulnerabilities. Instead, we should develop a sensible proposal for a specific MTSE to bring to the Board of Selectman, even if it should turn out to be nothing more than just a slightly modified version of the current 41 C exemption.

ADDENDUM

Match the State CB—a Wayland-style MTSE

Bob sent us an Excel document describing how the Wayland program would evolve over time for a household with a specific property value and income. He showed that the program had a number of undesirable properties. The purpose of this Addendum is to generalize and extend his findings by analyzing a Wayland-style match CB program as I have analyzed the three MTSE programs in the report.

Bob's example led to a pattern of numbers over time that was much more complex than the numbers I have been using in my various examples. This happened primarily because the state adds half of water and sewer payments and some other items to the property tax in computing the CB whereas Wayland just uses the property tax to calculate the CB. He also has property values rising over time. To simplify the calculations, I will assume they both use the same property tax values, whether augmented by water and sewer payments and other items or not, to compute their exemptions and that property values (taxes) remain constant over time. These assumptions will serve to highlight the features of the program and facilitate direct comparisons with the three programs analyzed in the report. I will also assume that Wayland uses the same income and property value limits as the state CB to determine eligibility, and sets the same maximum of \$1,100. The only difference is that the state CB subtracts Wayland's exemption in computing the CB, but Wayland does not subtract the state CB in computing its exemption, which is consistent with Bob's example. Timing is also an issue, since the calculation of the state's CB in any year depends on Wayland's exemption in the previous year.

a). Both the state CB and Wayland's exemption are initially at the maximum: the difference (Property tax – 10% Income) is greater than or equal to \$1,100.

Year 1 of the Wayland program

Wayland gives a \$1,100 exemption and so does the state CB since the state CB is based on Wayland's exemption the year before, when the program did not exit. The household receives \$2,200, \$1,100 each from Wayland and the state.

Year 2

The state considers Wayland's exemption in Year 1 in computing the CB for year 2. There are two two regions:

1). If the difference [Property tax - 10% Income] is at least \$2,200, then the state CB remains at \$1,100. When the state subtracts Wayland's \$1,100 exemption from the property tax in Year 1 in computing its Year 2 CB, [Property tax - \$1,100 – 10% Income], this difference is still at least \$1,100, the state maximum CB. Wayland's subsidy remains at the \$1,100 limit. The combined subsidy is again \$2,200. This remains true every year thereafter.

2). If the difference [Property tax - 10% income] is less than \$2,200, then the state CB decreases dollar-for-dollar until the difference reaches \$1,100, at which point the state CB is \$0. [Property tax - \$1,100 – 10% Income = \$0]. Within this range between \$2,200 and \$1,100, Wayland's exemption remains at \$1,100, since the difference [Property tax – 10% Income] is still at least as large as \$1,100. Wayland's subsidy substitutes \$ for \$ for the stand- alone state CB. The combined subsidies to the household decrease dollar-for-dollar.

Whatever the combined subsidy is, it remains the same each year. For example, if [Property tax – 10% Income = \$1,500] Wayland gives the maximum of \$1,100 each year. The state CB each year is [Property tax - \$1,100 – 10% Income] = [Property tax – 10% Income - \$1,100] = \$1,500 - \$1,100= \$400. The combined subsidy is \$1,500 [\$1,100 + \$400], equal to the difference [Property tax – 10% Income]. The stand-alone CB would have been \$1,100. Therefore, \$600 of Wayland's exemption substitutes for CB dollars and the household is only \$400 better off than it would be without the Wayland exemption [\$1,500 vs. \$1,100]

b). The difference between the property tax and 10% of income is less than \$1,100, say \$500 (any dollar amount below \$1,100 will do)

Year 1 The state CB is \$500, since Wayland's exemption did not exist the year before. The Wayland exemption is also \$500, for a combined subsidy of \$1,000

Year 2. The state CB subtracts Wayland's \$500 exemption in Year 1 from the property tax and the CB = \$0. [Property tax – 10% Income - \$500] = \$500 - \$500 = \$0]. Wayland's subsidy remains at \$500. The combined subsidy is \$500. Wayland's exemption substitutes \$ for \$ for the entire stand-alone CB. The combined subsidy remains at \$500 every year thereafter, with Wayland paying all of it.

Summary Comments:

1). Wayland \$ substitute for stand-alone state CB \$ for any difference [Property tax – 10% Income] below \$2,200. The substitution is \$ for \$.

2). Given the substitution of Wayland \$ for state CB \$, the combined subsidies can be quite small, especially for households who property tax is close to 10% of its Income. One could argue that this is okay, since the property taxes net of income are close to or equal to 10% of income when the subsidies are small. Wayland, in matching the state CB, is motivated by the desire to get the net property tax down to no more than 10% of income. Still, some households with a small difference [Property tax – 10% Income] could have both low property values and low incomes. To give them small subsidies could well be viewed as unkind.

3). When the difference [Property tax – 10% Income] is greater than \$2,200, the combined subsidy is constant at \$2,200 and satisfies both horizontal equity and progressivity. The combined subsidies decrease \$ for \$ for differences below \$2,200 until they reach \$0.

Since the payments vary in terms of the difference between a household's income and property tax, opportunities for violations of horizontal equity and progressivity abound, whether measured in terms of income or property values (taxes).

4). Bob's example revealed some circularity in the payments over time that arise primarily because the state and Wayland use different values of the property tax in computing their subsidies. This illustrates that we have to carefully consider the fine details in designing an MTSE.

Two Variations

In Bob's example and the example above, Wayland "matches" the state CB by matching the way in which the state calculates the CB, although without subtracting the state CB from the property tax in computing its exemption. There are two other possibilities, however. One is that Wayland (or some other locality's CB-match exemption) could more closely match/imitate the way that the state calculates its CB, by subtracting the state CB from the property tax in computing its exemption. This has the advantage to Wayland of avoiding the substitution of Wayland \$ for state CB \$. A second possibility is that Wayland could simply match whatever the state CB was the year before, without doing its own calculation.

Variation 1: Subtracting the state CB in calculating the Wayland exemption

The outcomes based on the difference [Property tax - 10% Income]

1). The difference is at least \$2,200. Same as above in all years. The state CB is at its limit of \$1,100 the year before the Wayland exemption comes into being. Therefore, Wayland sets its exemption at \$1,100 in its first year, because after subtracting the state CB of \$1,100 from the property tax, [Property tax - \$1,100 - 10% Income] is still equal to or greater than \$1,100. In Year 2, when the state subtracts Wayland's \$1,100 exemption from the property tax in computing the CB, the difference [Property tax - \$1,100 - 10% Income] is still equal to or greater than \$1,100. The CB remains at its limit \$1,100. Wayland makes the same calculation as the year before, and its subsidy remains at its \$1,100 limit. The combined subsidies are \$2,200 each year, forever.

2). The difference [Property tax - 10% Income] is in the range from \$2,200 to \$1,100.

In this range, the state CB remains at its limit of \$1,100, and the Wayland subsidy decreases \$ for \$ from \$1,099 to \$0. The combined subsidy equals the difference [Property tax - 10% Income]. This pattern happens because the state makes the first move, in the year before the Wayland program comes into being.

The following two examples illustrate.

Example 1

$$\underline{[\text{Property tax} - 10\% \text{ Income}] = \$1,500}$$

Year 1 The state CB is at its limit of \$1,100 because the Wayland program did not exist the year before. Wayland subtracts the state CB in computing its subsidy. The Wayland subsidy is $[\text{Property tax} - 10\% \text{ Income} - \$1,100] = \$1,500 - \$1,100 = \$400$. The combined subsidy is \$1,500 $[\$1,100 + \$400]$, equal to $[\text{Property tax} - 10\% \text{ Income}]$. There is no substitution of Wayland \$ for stand-alone CB \$

Year 2 The state subtracts Wayland's \$400 exemption from the property tax and the CB remains at \$1,100 $[\text{Property tax} - 10\% \text{ Income} - \$400] = \$1,500 - \$400 = \$1,100$. As in Year 1, the Wayland subsidy is $[\text{Property tax} - 10\% \text{ Income} - \$1,100] = \$1,500 - \$1,100 = \$400$. The combined subsidy remains \$1,500 $[\$1,100 + \$400]$, equal to $[\text{Property tax} - 10\% \text{ Income}]$. The two subsidies continue at these values every year thereafter.

Example 2

$$\underline{[\text{Property tax} - 10\% \text{ Income}] = \$1,100}$$

Year 1 The state CB is at its limit of \$1,100. Wayland subtracts the state CB in computing its subsidy. The Wayland subsidy is $[\text{Property tax} - 10\% \text{ Income} - \$1,100] = \$1,100 - \$1,100 = \$0$. The combined subsidy is \$1,100 $[\$1,100 + \$0]$, equal to $[\text{Property tax} - 10\% \text{ Income}]$. There is no substitution of Wayland \$ for stand-alone CB \$. The state pays the entire subsidy

Year 2 The state CB remains at \$1,100 since there is no Wayland subsidy to subtract from the property tax in computing the CB. The Wayland subsidy remains at \$0 since it subtracts the \$1,100 state CB in computing its subsidy. Year 2 repeats Year 1, as does every year thereafter.

For $[\text{Property tax} - 10\% \text{ Income}]$ less than \$1,100, the state CB decreases \$ for \$ until it reaches \$0 when $[\text{Property tax} - 10\% \text{ Income}]$ reaches \$0. The Wayland subsidy remains at \$0, and the combined subsidy is the state CB.

Example

$$[\text{Property tax} - 10\% \text{ Income}] = \$500 \text{ (any difference less than } \$1,100 \text{ will do)}$$

Year 1 The state CB is \$500, equal to $[\text{Property tax} - 10\% \text{ Income}]$. Wayland subtracts the state CB in computing its subsidy. The Wayland subsidy is $[\text{Property tax} - 10\% \text{ Income} - \$500] = \$500$

- \$500 = \$0. The combined subsidy is \$500 [\$500 + \$0], equal to [Property tax – 10% Income]. There is no substitution of Wayland \$ for stand-alone CB \$. The state pays the entire subsidy

Year 2 Since the Wayland subsidy in Year 1 was \$0, the state CB remains at \$500 = [Property tax – 10% Income]. The Wayland subsidy is one again \$0. [Property tax – 10% Income - \$500] = \$500 - \$500 = \$0. The combined subsidy is \$500 [\$500 + \$0], equal to [Property tax – 10% Income]. Year 2 is a repeat of Year 1, as is every year thereafter.

Comments:

1). By imitating the state CB calculation and subtracting the state CB from the property tax in computing its subsidy, Wayland avoids any substitution of Wayland \$ for stand-alone state CB \$. Wayland has a strong incentive to calculate its subsidy this way. The combined subsidies are the same for every difference [Property tax – 10% Income] whether or not Wayland deducts the state CB. But by deducting the state CB, Wayland reverses the sharing of the combined subsidies between itself and the state, in its favor.

2). The downside of avoiding substitutions in this way is that the Wayland subsidies are generally very low. They are never larger than \$1,100, the state CB limit, and fall to \$0 for all differences [Property tax – 10% Income] of \$1,100 or less.

3). The usual comments regarding fairness apply. For the region in which [Property tax – 10% Income] is equal to or greater than \$2,200, both horizontal equity and progressivity are satisfied. For [Property tax – 10% Income] less than \$2,200, the combined subsidies are variable, falling \$ for \$ until the difference reaches \$0. In this region, violations of horizontal equity and progressivity are likely to exist among some households.

Variation 2: Setting the Wayland exemption equal to the state CB

The outcomes based on the difference [Property tax - 10% Income]

1). The difference is at least \$2,200. Same as above in all years.

The state CB is at its limit of \$1,100 the year before the Wayland exemption comes into being. Therefore, Wayland sets its exemption at \$1,100 in its first year. In Year 2, when the state subtracts Wayland's \$1,100 exemption from the property tax in computing the CB, the difference [Property tax - \$1,100 – 10% Income] is still greater than \$1,100. The CB is also \$1,100, which Wayland matches. The combined subsidies are \$2,200 each year, forever.

2). The difference [Property tax - 10% Income] is less than \$2,200. Here we get a circularity year-by-year. The following three examples illustrate.

Example 1

$$\underline{[\text{Property tax} - 10\% \text{ Income}] = \$1,500}$$

Year 1 The state CB is at its limit of \$1,100. Wayland matches the \$1,100, for a combined subsidy of \$2,200.

Year 2 The state subtracts Wayland's \$1,100 exemption from the property tax and the CB = \$400 [Property tax – 10% Income - \$1,100] = \$1,500 - \$1,100 = \$400]. Wayland matches the \$400, for a combined subsidy of \$800.

Year 3 Since Wayland's subsidy was \$400 in Year 2, the state subtracts Wayland's \$400 exemption from the property tax and the CB = \$1,100 [\$1,500 - \$400] = \$1,100. Wayland matches the \$1,100, for a combined subsidy of \$2,200.

Year 4 The state subtracts Wayland's \$1,100 exemption from the property tax and the CB = \$400. Wayland matches the \$400, for a combined subsidy of \$800.

The combined subsidy cycles from \$2,200 to \$800 year-by-year. The average combined subsidy over time is \$1,500, to which the state and Wayland contribute equally. The average equals the difference [Property tax – 10% Income].

The same circular pattern exists for any difference [Property tax – 10% Income] less than \$2,200. Once the difference falls to \$1,100 and below, the combined subsidies reach \$0 in the low year.

Example 2

$$[\text{Property tax} - 10\% \text{ Income}] = \$1,100$$

Year 1 The state CB is at its limit of \$1,100. Wayland matches the \$1,100, for a combined subsidy of \$2,200.

Year 2 The state subtracts Wayland's \$1,100 exemption from the property tax and the CB = \$0 [Property tax – 10% Income - \$1,100] = \$1,100 - \$1,100 = \$0]. Wayland matches, and also gives \$0, for a combined subsidy of \$0

Year 3 Since Wayland's subsidy was \$0, the state subtracts nothing from the property tax and the CB = \$1,100 [\$1,100 - \$0 = \$1,100, which Wayland matches, for a combined subsidy of \$2,200.

Year 4 Year 2 repeats itself. The state subtracts Wayland's \$1,100 exemption from the property tax and the CB = \$0. Wayland matches, for a combined subsidy of \$0

The combined subsidy cycles from \$2,200 to \$0 year by year. The average combined subsidy is \$1,100, to which the state and Wayland contribute equally.

Once the difference (property tax – 10% income) falls below \$1,100, the average subsidies can become quite small. The last example illustrates.

Example 3

Property tax – 10% Income = \$500

Year 1 The state CB is \$500. Wayland matches the \$500, for a combined subsidy of \$1,000.

Year 2 The state subtracts Wayland's \$500 exemption from the property tax and the CB = \$0 [Property tax – 10% Income - \$500] = \$500 - \$500 = \$0]. Wayland matches, and also gives \$0, for a combined subsidy of \$0

Year 3 Since Wayland's subsidy was \$0, the state subtracts nothing from the property tax and the CB = \$500 [\$500 - \$0 = \$1,100. Wayland matches the \$500, for a combined subsidy of \$1,000.

Year 4 Year 2 repeats itself. The state subtracts Wayland's \$500 exemption from the property tax and the CB = \$0. Wayland matches, for a combined subsidy of \$0

The combined subsidy cycles from \$1,000 to \$0 year by year. The average combined subsidy over time is \$500, to which the state and Wayland contribute equally.

Comments:

1). The examples illustrate that when the difference [Property tax – 10% Income] is less than \$2,200, the average combined subsidy over time equals the difference [Property tax – 10% Income] on average over time, with a repeating pattern of high and low combined subsidies every other year.

2). Since the payments vary in terms of both income and property tax when [Property tax – 10% Income] is less than \$2,200, opportunities for violations of horizontal equity and progressivity abound, whether measured in terms of income or property values (taxes). Moreover, one suspects that the aid recipients would be quite upset with a variable pattern of combined subsidies over time, most especially when the low year is \$0.

3). Localities that intend to offer more than 1X the state CB, say 2 or 3 times the CB, generate even more variability, but the low year will still be zero unless the difference [Property tax – 10% Income] is at least that same multiple X \$1,100]. Also, substitution of local \$ for state CB \$ increases.