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THE RESIDENTIAL PROPERTY TAX CREDIT: An Analysis of the District of Columbia's Assessment Limitation

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Report Prepared for the

District of Columbia Tax Revision Commission

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EXECUTIVE SUMMARY

The District of Columbia has a Residential Property Tax Credit program. While this program technically is a property tax credit, it is in effect an assessment limitation that restricts the annual increase in taxable assessment to at most 10 percent. Assuming no change in the property tax rate, the program caps the annual increase in the owner's property taxes at 10 percent.

The Residential Property Tax Credit program was put in place at time when the District was experiencing large increases in the market value of property and was changing the process for assessing property from a triennial assessment of each property, with the increase phased-in over three years, to an annual re-assessment process. The RPT Credit was first applied to property taxes for tax year 2002. The initial cap rate was set at 25 percent. The cap rate was reduced over time, and as of 2006 the cap rate has been 10 percent.

Property owners who have applied for and been approved for a homestead exemption automatically receive the residential property tax credit. Cooperative housing associations are also eligible for the credit. Other property, including rental and commercial properties, are not eligible. When a homesteaded property is sold the new owner would pay property taxes based on the market value (that is, the assessed value) less the homestead exemption.

The Effect on the District's Property Tax Revenue

For each year 2003 through 2011 we estimated the tax liability under the assessment cap, which we refer to as the capped revenue, and what the property tax liability on homestead properties would have been if there had been no cap, which we refer to as non-capped revenue, given the existing property tax rate and homestead exemption for that year. The difference between the non-capped and capped revenues reflects the property tax revenue that was lost due to the assessment cap. Table ES-1 summarizes the results.

The revenue loss increased from $23.9 million in 2003 to $118.4 million in 2007, and has since decreased to $37.1 million in 2011. The explanation for this pattern is pretty obvious. Between 2003 and 2007 the cap rate decreased from 25 percent to 10 percent, meaning that a larger percentage of the increase in property values were eligible for the property tax cap, and thus not taxed. In addition, housing values were increasing at substantial rates. Since 2007, the increase in housing prices slowed and even decreased, and thus, the difference between the capped and non-capped values decreased. Column 3 reflects the percentage reduction in property tax liability, while column 4 is the percentage of homesteaded properties that have ratios of capped value to net assessed value of less than one, that is, homes that have reduced property taxes due to the assessment limitation.

Table ES-1. Estimated Revenue Loss Due to Assessment Limitation

[1] Year	[2] Revenue Loss (in millions of $)	[3] Revenue Loss/ Non-Capped Revenue	[4] Percent With Tax Reduction
2003	$23.9	13.5%	55.1%
2004	49.4	21.2	74.9
2005	55.9	20.4	78.9
2006	84.1	28.1	82.5
2007	118.4	33.4	85.5
2008	118.0	31.2	81.4
2009	99.6	26.4	75.0
2010	59.8	17.1	65.4
2011	37.1	11.0	55.6

For the near term, the revenue loss from the assessment limitation is likely to continue to decrease, but at a slower rate. However, housing prices are beginning to increase, and are likely to increase at increasing rates in the future. The result will likely be increasing revenue loss in the future, perhaps beginning in 2015.

The Effect on Tax Equity

Assessment limitations create dispersions between assessed value and taxable value in the same way that the errors in the assessment process create variations across property in the ratio of assessed value to market value. One measure of the inequities created by the assessment limitation is the coefficient of dispersion (COD). The COD is the average deviation of the ratio of capped value to net assessed value from the median ratio divided by the median ratio. Larger values of COD imply larger inequities, that is, a greater variation of the ratios of capped value to net assessed values.

Other than for 2003 and 2011, the COD values are high and reflect significant inequities brought about as a result of the assessment limitation. The International Association of Assessing Officers (IAAO) suggests that for property tax assessments of single-family residential properties acceptable value of the COD are between 5.0 percent and 15.0 percent. Between 2004 and 2011, the values of the COD ranged between 15 percent and 39 percent, with the COD in 5 of those 8 years being higher than 20 percent. These values are substantially larger than the IAAO standard, implying that significant inequities were created by the assessment limitation.

Another view of the equity of the assessment limitation is how the ratio of capped values to net assessed values varies by net assessed value. We ranked homesteads by net assessed value and then created 20 groups, each representing five percent of homesteads. For each group we calculated for 2007 and for 2011 the mean value of the ratio of capped value to net assessed value. These two years reflects extremes in the level of inequity created by the assessment limitation.

For 2007, the mean varies from across the first 5 groups, and then increases over the rest of the property value groups. The pattern for 2011is similar to that for 2007, but the mean ratio values are larger in 2011, implying smaller reductions in property taxes. For 2007 the mean value for the group with the largest net assessed value is 28 percent larger than the mean value for group with the smallest net assessed value. The results suggest significant vertical inequities, particularly for 2007.

Another way to measure inequity is to compare the average effective tax rates for properties that have not sold since the assessment limitation started with the average effective tax rate for properties that sold in the previous year. We estimate that homes that sold in 2006 paid, on average, an effective tax rate that is 1.70 times the effective tax rate on homes that were not sold since 2002. For properties sold in 2010 the equivalent number is 1.19.

Figure ES-1. Distribution of Capped Value to Net Assessed Value, 2007

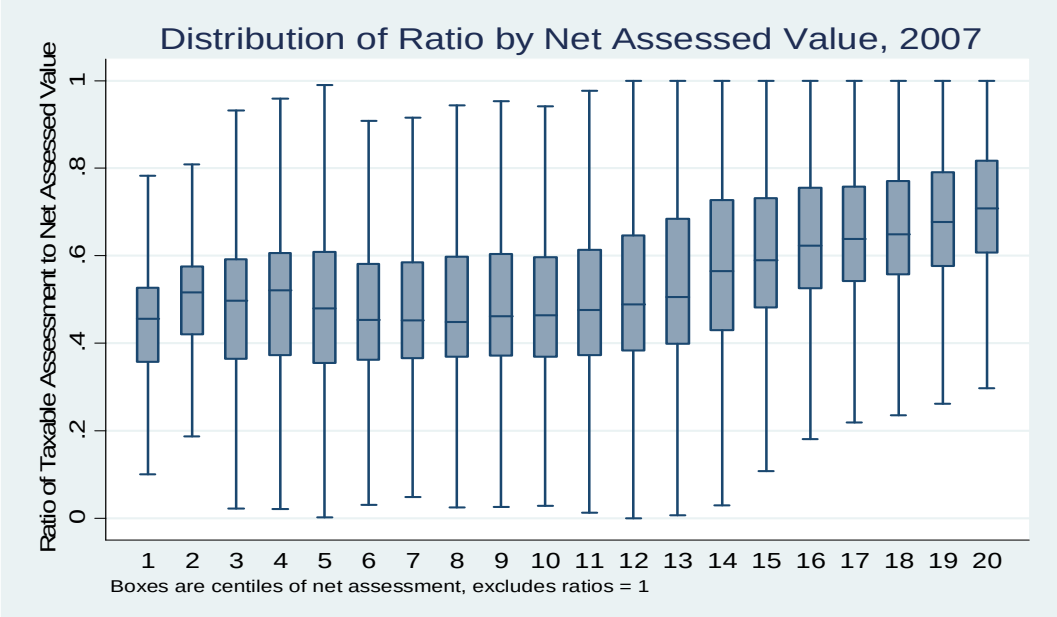


Figure ES-1 is a box and whisker graph that illustrates the horizontal inequities for 2007, that is, how the benefits of the assessment limitation vary across homes of approximately equivalent value. The graph shows the variation in the ratio of capped value to net assessed value for each of the 20 net assessed value groups. As can be seen, there is substantial variation in the ratios within any property value group.

We also consider how the benefits of the assessment limitation differ by age. The average ratio of capped value to net assessed value was 0.777 for seniors and 0.874 for non-seniors for 2011 and 0.516 and 0.642 for 2007. Thus, seniors benefit more from the assessment limitation than non-seniors.

To this point we have assumed that the property tax rate would be the same whether the homestead was taxed on the capped value or net assessed value. However, it is also reasonable to assume that if the assessment limitation did not exist, the property tax rate for residential property would be lower so that the government would collect the same revenue with and without the assessment limitation program. For 2007 under this alternative assumption we estimate that 25.1 percent of homeowners would pay lower taxes if they were taxed at the lower tax rate on their net assessed value rather than being taxed at the existing 2007 tax rate of 0.88 percent on their capped value. In 2011, 48.7 percent of homeowner would pay lower taxes if they were taxed at the lower tax rate on their net assessed value than being taxed at the existing tax rate of 0.85 percent on their capped value. Thus, under the assumption of constant property tax revenue, a substantial percentage of homeowners are worse off under the assessment limitation.

Lock-In Effect

A third possible effect of assessment limitation is whether the assessment limitation causes homeowners to move less frequently. To address this question, we estimated a regression model and find that the assessment limitation reduces the probability that a home is sold. The regression results imply that the elasticity of the probability that the home will be sold with respect to the tax benefit is -0.226. Thus, a 10 percent increase in the tax saving from the assessment limitation would reduce the probability of selling the homestead by 2.26 percent. However, the information we have available for the regression is limited and thus the results should be used with caution.

Policy Options

There are several potential changes that the Commission could consider regarding the District's assessment limitation program. There are various, potentially conflicting, reasons for making changes in the RPT Credit program. These reasons include:

- reduce the revenue loss to the District government;
- reduce the effect of property value appreciation on homeowner property taxes;
- reduce property tax inequities;
- reduce property taxes for various groups, such as the elderly or low-income households.

Among the possible alternative policies the Commission might consider are:

1. *Make no change.* This would be simplest thing to do.

2. *Eliminate the assessment limitation.* This option would eliminate the loss of revenue and the inequities that arise from the assessment limitation. It would also eliminate the tax benefit that many homeowners enjoy as a result of the assessment limitation.

3. *Phase out the assessment limitation*. Rather than immediately shifting the basis of property taxes to net assessed value for all home owners, the elimination of the assessment could be phased in.

4. *Make the capped value portable*. To reduce the effect of the assessment limitation on the probability of selling a homestead, the assessment limitation could be made portable. One way this could work is to allow a seller to take the difference between the net assessed value and the capped value and subtract that amount from the net assessed value of a newly purchased home. This option would, however, increase the loss of property tax revenue for the District.

5. *Change the provision that restricts the capped value to no less than 40 percent of assessed value.* This provision puts a limit on the size of the tax benefit to the taxpayer and on the revenue loss to the District.

6. *Change the cap rate*. Reducing the cap rate, which is currently 10 percent, would increase the revenue loss to the District but would also further reduce the property taxes homeowners pay.

7. *Convert the limitation to one that applies to the aggregate tax base.* A couple of states cap the increase in the aggregate property tax base and not the increase for individual parcels. The increase in taxable assessment for an individual homestead would be a given fraction times the increase in the value of the homestead. Thus, the taxable assessment of each homestead would increase in proportional to the increase in its value.

8. *Change how improvements affect capped value.* Currently, if an improvement is made to the homestead, such as an addition to the home, and it increases the property value by more than $100,000, the taxable value of the property reverts to net assessed value. Most states add the increase in market value due to an improvement to the capped value rather than eliminating the capped value.

I. INTRODUCTION

District of Columbia code section §47-864 provides for an owner-occupant residential tax credit. This credit, which we refer to as the Residential Property Tax Credit, is essentially a way of limiting (or capping) the increase in the taxable value of owner-occupied housing due to housing appreciation. While this program technically is a property tax credit, it is in effect an assessment limitation that restricts the increase in net assessed value to at most 10 percent. The Residential Property Tax Credit is also referred to in various places as the Property Assessment Credit and the Assessment Increase Cap. In this report we will also refer to the program as the assessment cap program or the assessment limitation program.

Abstracting from all of the details, property tax liability on a homesteaded property equals the net assessed value of a property (that is the market value less the homestead exemption) times the property tax rate. Elected officials set the property tax rate, while the assessor is responsible for estimating market value. However, an assessment limitation requires that the assessor limit the percentage increase in net assessed value to the cap rate, where the cap rate is the statutorily set maximum allowable percentage increase in net assessed value.

The effect of the District's assessment limitation is to cap the increase in assessed value for a homeowner at 10 percent, and thereby capping the increase in the owner's property taxes at 10 percent, assuming no change in the property tax rate. As discussed in detail in this report, the assessment limitation results in less property tax revenue, given the property tax rate, and to inequities across homeowners in the effective property tax rate, that is, the property tax liability divided by net assessed value. The assessment limitation program does not necessarily cap the property tax levy that a homeowner might face, since the assessment limitation program does not restrict increases in the property tax rate.[1]

The assessment limitation program is the subject of this report. We begin with a brief history of the program and then turn to an explanation of how the program works. We then consider three effects of the program, namely, its effect on the magnitude of the property tax revenue, its effect on tax equity, and its effect on the probability of selling a home. The final section contains a discussion of policy alternatives. A glossary of terms can be found in Appendix A.

[1] Some states, for example Virginia, have a requirement that the property tax rate has to be reduced in response to increases in the property tax due to appreciation in the value of property so that the property tax levy does not increase. However, the local government can raise the property tax rate from the lower rate but has to advertise the increase in the property tax rate. Other states, including the District of Columbia, have a law that limits the increase in the aggregate property tax levy, where in the case of the District the allowable increase varies by property class.

II. HISTORY OF THE RESIDENTIAL PROPERTY TAX CREDIT

The Residential Property Tax Credit (RPT Credit) program was put in place at time when the District was experiencing large increases in the market value of property and was changing the process for assessing property from a triennial to an annual re-assessment (Muhammad 2008). In 1998, the District went to a triennial assessment of each property under which each property was re-assessed once every three years. In addition, the increase in the assessed value was phased-in over three years, which was a way of reducing the impact on the property tax liability from a large increase in the property's value. This process was phased out over three years. Thus, in 2002 and 2003, 1/3rd and 2/3^{rds} of properties, respectively, were reassessed. It was not until 2004 that all properties were annually assessed at full market value. When the assessment limitation was adopted in 2002, the assessment limitation program took the existing assessed value of the property as the starting point for the limitation, even if the property had not been reassessed for 2 years.

The RPT Credit was first applied to property taxes for tax year 2002. The initial cap rate was set at 25 percent. The cap rate was reduced to 12 percent for tax year 2004 and to 10 percent for tax year 2006. The cap rate has not been changed since 2006. When the cap rate was lowered to 12 percent in 2004, the District retroactively imposed a 12 percent cap rate, that is, the taxable assessment for 2004 was calculated as if the cap rate had been 12 percent rather than 25 percent between for 2002 and 2003.

Since 2002, there have been two significant changes to the program besides the changes in the cap rate. The original RPT Credit did not apply to cooperative housing associations, but these were subsequently included in the RPT Credit program. The other major change set a minimum capped value equal to 40 percent of the assessed value, which became effective for tax year 2011.

III. HOW THE RPT CREDIT WORKS

Property owners who have applied for and been approved for a homestead exemption automatically receive the residential property tax credit, so that the owner of a homesteaded property does not have to apply separately in order to receive the credit.[2] Cooperative housing associations are also eligible for the credit.

The credit applies to only one lot or one dwelling unit in the case of a cooperate housing association. A cooperative housing association is not eligible if less than 50 percent of the dwelling units have qualified for the homestead exemption.

Other property, including rental and commercial properties, are not eligible for the residential property tax credit. A new owner is not eligible for the credit in the tax year following the year the property was purchased. Thus, a home purchased in 2011 would pay taxes in 2012 based on the 2012 assessed value less the homestead exemption. The District's code states that the credit "does not apply" if the increase in property value was due to a change in zoning that was requested by the owner of the property or due to the correction of value for prior errors in assessing the property.

Several steps are required to calculate the value of the credit. Consider a new home owner who did not receive a credit in 2012.

> Step 1. The first step in determining the value of the credit for 2013 is to calculate the value of the property's taxable assessment. Taxable assessment for 2013 equals the assessed value in 2012 less the value of the homestead exemption for 2012 times 110 percent, less the increase in the value of the homestead exemption between 2012 and 2013.
>
> Step 2. In the second step the homestead exemption for 2013 and the taxable assessment for 2013 are subtracted from the 2013 assessed value. The resulting value is then multiplied by the tax rate for 2013 to determine the value of the credit. If that value is less than zero, then the credit is zero.
>
> Step 3. To calculate the 2013 tax liability, the 2013 homestead exemption is subtracted from the 2013 assessed value and then multiplied by the tax rate. The credit is then subtracted to arrive at the tax liability.

[2]While Maryland has an assessment limitation program similar to the District of Columbia, Maryland does not have a homestead exemption. Thus, to prevent improper use of the program, Maryland requires all homeowners to submit a one-time application in order to establish eligibility for the program.

If the home owner received a credit in 2012, the process would have started with the 2012 taxable assessment, skipping Step 1.

There are other credits that the owner may be eligible for that would also be subtracted. In addition, if the owner is eligible for the senior citizen or disabled property owner tax relief, the tax liability would be reduced by 50 percent.

For 2014, the owner would start with the 2013 taxable assessment and repeat the calculation as described above. When a homestead property is sold the taxable assessment reverts back to the assessed value less the homestead exemption.

To be more specific consider the following example. We start with assumptions regarding the values of the assessed value, of the homestead exemption, and the tax rate.

- 2012 assessed value: $300,000. Since the District assesses property at 100 percent of market value, the assessed value is the assessor's estimate of market value.

- 2012 homestead exemption: $67,500. Beginning in October 2012 the homestead exemption was to increase annually by the cost-of-living adjustment, but with the increases rounded to multiples of $50.

- 2012 tax rate: 0.85 percent. This is the actual property tax rate for residential property.

- 2013 assessed value: $360,000. We have assumed that the market value of the property increased by 20 percent.

- 2013 homestead exemption: $67,550. We have assumed that the homestead exemption increases by $50.

- 2013 tax rate: 0.85 percent. We have assumed no change in the tax rate.

The following are the calculations (as spelled out in the code) necessary to arrive at tax liability.

1. Subtract the 2012 homestead exemption from the 2012 assessed value:
   $300,000-$67,500 = $232,500

2. Multiply $232,500 by 110 percent:
   $232,500 x 110% = $255,750

3. Subtract the increase in the homestead exemption between 2012 and 2013:

$255,750 – ($67,550 - $67,500) = $255,700
This is the 2013 taxable assessment.

4. Subtract the 2013 homestead exemption and the 2013 taxable assessment from the 2013 assessed value:
   $360,000 - $67,550 - $255,700 = $36,750

5. Multiply the result from step 4 by the tax rate:
   $36,750 x 0.85% = $312.375
   This is the value of the residential property tax credit.

6. Subtract the 2013 homestead exemption from the 2013 assessed value and multiply by the tax rate:
   ($360,000 - $67,550) x 0.85% = $2,485.825
   This would be the property tax in the absence of the credit.

7. Subtract the credit:
   $2,485.825 - $312.375 = $2,173.45
   This is the tax liability before the senior citizen or disabled property owner tax relief or any other credits are applied.

These 7 steps can be reduced to the following: increase the 2012 net assessed value by 110 percent, subtract the increase in the homestead exemption, and multiply by the tax rate. That is,

[($232,500 x 110%) - $50] x 0.85% = $2,173.45

For 2014, the process would start with the 2013 taxable assessment in the second step rather than with the net assessed value.

In the absence of any change in the homestead exemption, and independent of any other credits, the RPT Credit limits the annual increase in property taxes to 10 percent. However, there are situations in for which the annual increase in property taxes will be more than 10 percent. These include the following.

1. The property is sold. When a homesteaded property is sold the new owner would pay property taxes based on the market value (that is, the assessed value) less the homestead exemption. Thus, the value of the credit in the first year would be zero.

2. An increase in the property tax rate.

3. Increases in value due to a change in zoning or an improvement that increased the market value by at least $100,000.

4. If the property's market value increases by more than 10 percent following a period in which the market value had increased by less than 10 percent (this is explored below).

5. If the taxable assessment is less than 40 percent of the assessed value. We discuss this in more detail below.

Code section §47-829 provides that if the property value increases by more than $100,000 due to major renovation or improvements to the property, then that taxable assessment is reset at the new higher assessed value less the homestead exemption.

Property taxes can increase by less than 10 percent if the property tax rate is decreased or if value of the homestead exemption increases. This can also happen if the net assessed value falls below the taxable assessment.

In the numerical example presented above, if there had been no change in the value of the homestead exemption, the property tax would have been $2173.875, which is $0.425 larger than the actual value of $2173.45. This $0.425 is the reduction in property taxes due to the $50 increase in the homestead exemption, that is, $50 times 0.85%. In 2012, taxes were $1976.25 (=$232,500 x 0.85%). The 2013 tax liability of $2173.45 represents a 9.98 percent increase over the 2012 tax liability of $1976.25. The $50 increase in the homestead exemption will reduce the property taxes in all subsequent years, but the percentage increase in the property tax in subsequent years will be 10 percent.

IV. ILLUSTRATIONS OF THE ASSESSMENT CAP

The previous section explained how the RPT Credit is calculated; in this section we present some examples to illustrate how the assessment cap affects property taxes over time. The first example is shown in Table 1. We assume that the person purchased a property with an assessed value of $300,000 and that Year 1 is the first year in which the new owner pays property taxes. We assume that the assessed value increases by 20 percent per year, that the homestead exemption is $67,500 and will not increase over the period considered, and that the tax rate is 0.85%.

Column 2 is the assessed value while column 3 is the tax in the absence of the assessment cap, that is, column 3 equals column 2 less the homestead exemption times the tax rate. Column 4 is the annual percentage increase in the tax shown in column 3. Note that the percentage increase in the tax is greater than the 20 percent increase in assessed value. This is because the tax is based on assessed value less the homestead exemption.

Column 5 is the value of the RPT credit, which is zero in the first year. Column 6 is the tax liability net of the credit, while column 7 is the annual percentage increase in the tax—note that it is 10 percent in each year. Column 8 shows the percentage reduction in taxes shown in column 3, that is the reduction due to the assessment cap; over time the percent reduction increases but at a decreasing rate.

Table 1. Example 1: Annual 20% Increase in Assessed Value

[1] Year	[2] Assessed Value	[3] Tax with no Credit	[4] % Change in Pre-Credit Tax	[5] Credit	[6] Tax with Credit	[7] % Change in Post-credit Tax	[8] % Reduction in Tax ([3]-[6])/[3]
1	$300,000	$1,976		$0	$1,976		0.0%
2	$360,000	$2,486	25.8%	$312	$2,174	10.0%	12.6%
3	$432,000	$3,098	24.6%	$707	$2,391	10.0%	22.8%
4	$518,400	$3,833	23.7%	$1,202	$2,630	10.0%	31.4%
5	$622,080	$4,714	23.0%	$1,821	$2,893	10.0%	38.6%
6	$746,496	$5,771	22.4%	$2,589	$3,183	10.0%	44.9%

Assessment limitation policies in other states limit the increase in the assessed value, and any homestead exemption is deducted from the capped assessed value. The District's RPT Credit, in effect, limits the increase in the net assessed value. To see how the effects of the RPT Credit program and the typical assessment limitation program differ, consider Table 2, which contrasts

the effect of a 10 percent cap on the increase in the assessed value to the effect of the RPT Credit program.

The assumptions regarding assessed value, the homestead exemption, and tax rate for Table 2 are the same as for Table 1. Column 3 is the capped assessed value, which is allowed to increase 10 percent per year. Column 4 equals column 3 less the $65,750 homestead exemption, while column 5 is the tax liability, that is, column 4 times the tax rate of 0.85 percent. Column 6 is tax with the RPT Credit (this is column 6 from Table 1). As can be seen, the taxes in column 5 are larger than the taxes in column 6; Column 7 is the percentage difference.

Table 2. Example 2: 10 Percent Assessment Cap

[1] Year	[2] Assessed Value	[3] Capped Assessed Value	[4] Net Capped Assessed Value	[5] Tax with 10% cap on assessed value	[6] Tax with RPT Credit	[7] % Difference in Tax ([5]-[4])/[5]
1	$300,000	$300,000	$232,500	$1,976	$1,976	0.0%
2	$360,000	$330,000	$262,500	$2,231	$2,174	2.6%
3	$432,000	$363,000	$295,500	$2,512	$2,391	4.8%
4	$518,400	$399,300	$331,800	$2,820	$2,630	6.7%
5	$622,080	$439,230	$371,730	$3,160	$2,893	8.4%
6	$746,496	$483,153	$415,653	$3,533	$3,183	9.9%

In Table 2 the tax difference in year 2 is $57. The tax in year 2 under a program that limits the increase in assessed value to 10 percent is given by

A1: [($300,000 x 110% - $67500) x 0.085%],

which upon rearranging terms yields

A2: [($300,000 x 110% x 0.085%) – ($67500 x 0.085%)].

In the absence of an increase in the homestead exemption, the tax under the RPT Credit program equals:

B1: [($300,000 - $67500) x 110% x 0.85%],

which upon rearranging terms yields

B2: [($300,000 x 110% x 0.85%) – ($67500 x 110% x 0.85%)].

Breaking out the term in the 2nd parentheses yields

B3: [($300,000 x 110% x 0.85%) – ($67500 x 0.85%) - ($67500 x 10% x 0.85%)].

The only difference between A2 and B3 is the third term in B3, which equals $57. In effect, the RPT Credit program allows for an annual 10 percent increase in the value of the homestead exemption. Over time this value of the homestead exemption increases exponentially, so that by year 6 the difference in taxes (column 5 less column 6) equals $350.

Table 3 is an example in which the increase in assessed value in some years is assumed to be less than 10 percent and in some years is even negative. In particular, note that the property value fell in the 3rd and 4th year. Taxable assessment increases by 10 percent each year, regardless of what happens to the market value of the property. With the decrease in property value in years 3 and 4 and the small increase in year 5, the net assessed value is less than the taxable assessed value in years 4 and 5. (Thus, the credit is zero in those years.) Note that although the assessed value fell in year 3, property taxes actually increased. As a result of the decrease in assessed value, when the property increases in value in years 5 and 6 the net assessed value is still less than the taxable assessment, and thus the property tax increases by more than 10 percent in those years. (Note that when net assessed value is less than taxable assessment (i.e., the capped value), the tax is based on net assessed value.) However, it is still the case that the property tax under the RPT Credit program is less than without the program. In fact, the total property taxes over the 6 years shown in the table are less under the RPT Credit program ($13,500) than without the program ($13,813).

Table 3. Example 3: Decrease in Assessed Value in Some Years

[1] Year	[2] Assessed Value	[3] Tax without RPT Credit	[4] Taxable Assessment	[5] Credit	[6] Tax with RTP Credit	[7] % Change in Post-Credit tax
1	$300,000	$1,976	$232,500	$0	$1,976	0.0%
2	$360,000	$2,486	$255,750	$312	$2,174	10.0%
3	$340,000	$2,316	$281,325	$0	$2,316	6.5%
4	$310,000	$2,061	$309,458	$0	$2,061	-11.0%
5	$340,000	$2,316	$340,403	$0	$2,316	12.4%
6	$380,000	$2,656	$374,444	$0	$2,656	14.7%

The provision that the taxable assessment cannot be less than 40 percent of the assessed value adds a complication. We refer to this as the 40 percent provision. Consider Table 4. We assume a 20 percent increase in assessed value (shown in column 2), a $67,500 homestead exemption, and a tax rate of 0.85 percent. Column 3 is 40 percent of column 2. Column 4 is the taxable assessment ignoring the 40 percent provision. Column 5 would be the property tax in the absence of the RPT Credit (that is net assessed value time the tax rate), while column 6 is what the property tax would be if the tax was based on the taxable assessment shown in column 4. Column 7 is the tax liability given that the tax is based on the greater of taxable assessment (column 4) or 40 percent of the assessed value (column 3). Note that in year 7, 40 percent of assessed value (column 3) begins to exceed taxable assessment (column 4). Thus in years 7 on, the tax is based on 40 percent of assessed value. Therefore the percentage increase in the property tax exceeds 10 percent beginning in year 7, and in year 8 and forward the increase is 20 percent, which is the percentage increase in the assessed value. It is important to note that the property tax with the RPT Credit, even with the 40 percent provision, is less than what the property tax would be without the assessment limitation (column 5).

Table 4. Example 4: Restriction on Minimum Taxable Assessment

[1] Year	[2] Assessed Value	[3] 40% of Assessed Value	[4] Taxable Assessment	[5] Tax with No Credit	[6] Tax on Taxable Assessment	[7] Tax on max of TV or 40% of AV	[8] Percent Change in Tax	[9] Percent Difference [5] less [7]
1	$200,000	$80,000	$132,500	$1,126	$1,126	$1,126		0.0
2	$240,000	$96,000	$145,750	$1,466	$1,239	$1,239	10.0	18.4
3	$288,000	$115,200	$160,325	$1,874	$1,363	$1,363	10.0	37.5
4	$345,600	$138,240	$176,358	$2,364	$1,499	$1,499	10.0	57.7
5	$414,720	$165,888	$193,993	$2,951	$1,649	$1,649	10.0	79.0
6	$497,664	$199,066	$213,393	$3,656	$1,814	$1,814	10.0	101.6
7	$597,197	$238,879	$234,732	$4,502	$1,995	$2,030	11.9	121.7
8	$716,636	$286,654	$258,205	$5,518	$2,195	$2,437	20.0	126.5
9	$859,963	$343,985	$284,026	$6,736	$2,414	$2,924	20.0	130.4
10	$1,031,956	$412,782	$312,428	$8,198	$2,656	$3,509	20.0	133.6

How quickly the 40 percent provision comes into play depends on the initial assessed value and the rate of increase in property value. In particular, 40 percent of assessed value will exceed taxable assessment more quickly the lower the initial assessed value and the greater the rate of increase in assessed value. Table 5 illustrates this. Table 5 shows the year in which 40 percent of assessed value will exceed the taxable assessment, assuming a homestead exemption of $67,500, for various combinations of initial assessed value and growth rates of assessed value.

Table 5. Years Required for 40% of Assessed Value to Exceed Taxable Value

Initial Assessed Value	Growth Rate		
	15%	20%	25%
$150,000	9	5	4
$250,000	15	8	6
$500,000	19	10	8
$750,000	20	11	8
$1,000,000	21	11	8

V. ASSESSMENT LIMITATIONS IN OTHER STATES

In 2008, 19 states plus the District of Columbia had assessment limitations. We could find no additional states that adopted an assessment limitation in the past five year. Table 6 provides a summary of the existing assessment limitations.

Table 6. Property Tax Assessment Limits in the United States, 2008

State	Coverage	Eligible Property	Caps removed upon sale?	Individual parcel values or aggregate assessments?	Limit
Arizona*	statewide	all	no	individual	greater of 10% or 25% of difference between last year's limited value and current market value
Arkansas	statewide (constitutional)	all	yes	individual	homestead 5%, other 10%
California	statewide (constitutional)	all	yes	individual	lesser of 2% or inflation
Colorado	statewide (constitutional)	residential	N/A	statewide aggregate	implicit limit to hold residential burden at 45%
Connecticut	local option	all	N/A	individual	phase–in, at least 25% per year
District of Columbia	district wide	homestead	yes	individual	10%, 5% for qualifying low income
Florida	statewide (constitutional)	homestead	yes	individual	lesser of 3% or inflation
Georgia	local option (local constitutional)	homestead	yes	individual	freeze (0%)
Illinois	local option	homestead	yes	individual	7% with maximum exemption value of $33,000
Iowa	statewide	residential and agricultural	no	statewide aggregate	4%

Maryland	statewide	homestead	yes	individual	10% statewide for state taxes; local option for local taxes, ranging from 0% to 10%
Michigan	statewide (constitutional)	all	yes	individual	lesser of 5% or inflation
Minnesota	statewide	farm, residential, seasonal residential	no	individual	greater of 15% or 33% of difference between last year's limited value and current market value
Montana	statewide	all	yes	individual	16.66%/yr phase-in of reassessment over 6 yrs.
New Mexico	statewide	residential	yes	individual	3%
New York	New York City & Nassau County	residential with 10 or fewer units	yes	individual	6% (residential up to three units) or 8% (other residential) per year; 20% or 30% over 5 years respectively
Oklahoma	statewide (constitutional)	all	yes	individual	5%
Oregon	statewide (constitutional)	all	no	individual	3%
South Carolina	statewide (constitutional)	homestead	yes	individual	15% over 5 years
Texas	statewide (constitutional)	homestead	yes	individual	10%

*Arizona assessments limits apply for taxes owed to counties, cities, towns, and community college districts only.
Source: Sexton (2009). Reprinted by permission of the Lincoln Institute of Land Policy.

In most states with an assessment limitation the program is statewide, although in a few states the limitation is a local option. There are differences in what property is included in the limitation; all states include homesteaded properties, but several include all classes of real property. In most states, the cap is removed when the property is sold, although in some states the cap is portable, that is, the current owner can apply the existing cap to the home that the individual purchases, so long as it is in the same state. Most assessment limitation programs apply to the individual parcel, although two states impose the limitation on the aggregate

property tax base. The last column in Table 6 illustrates the wide variation across states in the cap rate.

VI. ECONOMIC EFFECTS OF ASSESSMENT LIMITATIONS

There are three major economic effects of assessment limitations. First, it reduces the size of the property tax base, and in the absence of an increase in the property tax rate it reduces property tax revenue. Second, it affects the distribution of the tax burden. Third, it provides a disincentive to sell and move to another home. In this section, we discuss these effects and review existing studies of these effects based on assessment limitations in other states. In Section VII, we present an analysis of these three effects for the District of Columbia's assessment limitation program.

A. Effect on the Tax Base

Assessment limitations reduce the size of the property tax base. The size of this effect depends on what categories of property are subject of the assessment limitation, the allowable increase in assessed value, i.e., the cap rate, and, assuming the cap is removed upon sale, the rate of turnover of property subject to the limitation.

Assessment limitations differ in what properties are subject to the limitation. As noted in Table 6 most assessment limitations apply only to owner-occupied property, although some, for example California's Proposition 13, apply to all property, not just residential. If only certain categories of property is subject to the assessment limitation, then obviously the effect of the limitation on the size of the property tax base will be smaller than if all property is subject to the limitation. The District's assessment limitation applies only to owner-occupied housing.

The smaller the maximum allowable percentage increase in assessed value (i.e., the cap rate) relative to the appreciation rate of property values, the larger the effect of the limitation on the property tax base. For example, if a property increases in value from $250,000 to $300,000, or 20 percent, then the property tax base would increase $50,000. But if the assessment limitation is set at 10 percent, then the growth in the property tax base will be only $25,000. On the other hand, if the cap rate is 25 percent, then in this example, the property tax base will increase by the full $50,000. Similarly, if the allowable increase in assessed value is 10 percent, then if property values increase by only 5 percent, the assessment limitation will have no effect on the property tax base.

When a property is sold, the assessed value is normally reset to market value. Thus, if a property has a capped value of $100,000 but sells for $300,000, the new assessed value is set based on a value of $300,000. If the assessed value is supposed to equal 100 percent of market value, then in this case the tax base would increase by $200,000.

To see the effect of property turnover on taxes paid consider Table 7, which considers three scenarios: no assessment limitation; a 10 percent assessment limitation with no housing turnover; a 10 percent assessment limitation with housing turnover. Assume that a property was purchased in year 1 for $200,000, an increase in property value of 15 percent per year, a tax rate of 0.85 percent, and a homestead exemption of $67,500. Table 7 shows:

1. the net assessed value each year for 10 years (column 2) and the tax on full net assessed value (column 3);
2. the taxable assessment if the house does not turnover during the 10 year (column 4) but with a 10 percent cap rate, and the tax on the taxable assessment (i.e., the capped value) (column 5);
3. the taxable assessment if the property sells in years 3, 7, and 10 (column 6), and the tax on that taxable assessment (column 7).

With no assessment limitation the total tax paid over the 10 years is $28,778.82, which is $10,829.30 more than the $17,949.52 in taxes that would be collected under the assessment limit and with no housing turnover. However, in the case where the property sells, taxes collected would be $26,909.86, so that the loss of revenue in this case due to the assessment limitation is only $1,868.96

Table 7. Effect of Turnover of Housing

	No Assessment Limitation		Assessment Limit, (No Turnover of House)		Assessment Limit (Turnover in Years 3, 7, and 10)	
[1] Year	[2] Net Assessed Value	[3] Tax	[4] Taxable Assessment	[5] Tax	[6] Taxable Assessment	[7] Tax
1	132,500	$1,126.25	132,500	$1,126.25	132,500	$1,126.25
2	162,500	$1,381.25	145,750	$1,238.88	145,750	$1,238.88
3	197,000	$1,674.50	160,325	$1,362.76	160,325	$1,362.76
4	236,675	$2,011.74	176,358	$1,499.04	236,675	$2,011.74
5	282,301	$2,399.56	193,993	$1,648.94	260,343	$2,212.91
6	334,771	$2,845.56	213,393	$1,813.84	286,377	$2,434.20
7	395,112	$3,358.45	234,732	$1,995.22	395,112	$3,358.45
8	464,504	$3,948.28	258,205	$2,194.74	434,623	$3,694.30
9	544,305	$4,626.59	284,026	$2,414.22	478,086	$4,063.73
10	636,075	$5,406.64	312,428	$2,655.64	636,075	$5,406.64
Total		$28,778.82		$17,949.52		$26,909.86

B. Equity Effects

One of the basic principles underlying the property tax is that identical properties, i.e., properties with the same market value, should be assessed at the same value. Much of the criticism surrounding the property tax, and the focus of much property tax reform, centers on the valuation process since incorrect assessments lead to disparities in property tax liabilities. An assessment limitation program creates further disparities since it results in different tax liabilities on homes of equal value, with the differences being associated with how long the owners have lived in the homes. Because property taxes with assessment limitations are closely associated with the value of the home when it was purchased rather than current value, such systems are referred to as acquisition-value assessment as opposed to market-value assessment.

To illustrate, consider two identical houses each worth $300,000 in year 1. Assume that the value of each property increases by 15 percent per year (so that market value is $524,702 in year 5) and that one of the houses sold in year 4. The taxable assessment in year 5 of the house that didn't sell is $340,403 (assuming a cap rate of the 10 percent and a homestead exemption of $67,500), while the net assessed value of the house that sold is $457,202 (which is the market value in year 5 less the homestead exemption). Thus, the owners of identical houses pay substantially different property taxes; for this example, the owner of the newly purchased house pays 1.34 times more than the other individual. This ratio is referred to as the "disparity ratio."

Daniel Muhammad (2008) studied the equity of the District of Columbia's assessment limitation using individual parcel data for 2007. To measure horizontal equity, Muhammad identified 7 property value levels and identified homesteaded properties that had values that were within $5,000 of those values. He then calculated the effective property tax rates for each parcel. He found large variations in the effective tax rates within each value class. For example, for properties that in 2007 had assessed values between $395,000 and $405,000, he found that the effective tax rates ranged from 0.03 percent to 0.75 percent. The ranges for other value classes were equivalent. As expected, he also found that the median tax rate for taxpayers who had owned the home since 2002, which accounted for 64.2 percent of homesteads in 2007, had much lower effective property tax rates than new owners, 0.36 percent compared to 0.75 percent. He does not report the average tax reduction in effective property tax rate by property value class due to the assessment limitation.

There is some research that addresses the issue of who benefits and who loses from a property tax assessment limitation in other states. Several of these studies focus on California's Proposition 13, which was adopted in 1978 and limits annual increases in assessed value to 2 percent per year. O'Sullivan, Sexton, and Sheffrin (1995a) and Sheffrin and Sexton (1998) provide the most significant analysis of the economic implications of the adoption of acquisition-value assessment in California. O'Sullivan, Sexton, and Sheffrin (1995a) calculated the actual

level of disparity in 1991 for homeowners for nine counties in California: three urban counties, three fast-growing suburban counties, and three rural and ex-urban counties, while Sheffrin and Sexton (1998) provide updated calculation for Los Angeles County for 1996. For 1996, they find that for the homeowners who had not moved since 1975, the median ratio of actual property value to capped value is 3.84. For the homeowners who have not moved since 1985, the disparity ratio is 1.22. Thus, the person who purchased his or her home in 1996 would pay 3.84 times the property taxes paid by a person with a home of equivalent value that she or he has occupied since 1975, and would pay 1.22 times the taxes paid by a person who moved into an equivalent house in 1985.

The O'Sullivan, Sexton, and Sheffrin (1995a) study looked at how the disparities created by Proposition 13 are distributed across age and income classes. In general, older and lower-income homeowners have lower effective property tax rates since these individuals are less likely to move. If the acquisition value assessment system in California was eliminated and the property tax rates adjusted to maintain the same total property tax revenue, then property taxes will go up for lower income households and down for higher income households. For example, replacing the acquisition value with market value in 1991 but maintaining the same property tax revenue would increase property taxes for an average Los Angeles County homeowner in the $10,000 to $20,000 income bracket by $206, but decrease property taxes by $109 for a household in the $80,000 to $90,000 income bracket.

Older households also benefit from the acquisition value assessment system. Seniors in Los Angeles County would pay an average of $503 more in property taxes while non-seniors would pay $152 less if the acquisition value system was replaced with a revenue-neutral market value assessment system.

These results of O'Sullivan, Sexton, and Sheffrin (1995a) are consistent with earlier work focused on Proposition 13. For example, Chernick and Reschovsky (1982) concluded that low-income households and older households benefit from Proposition 13, and that substantial horizontal inequities are created. Menchik et al. (1982) also found that low-income homeowners benefit from acquisition value assessment. Beaumont (1991) concludes that renters and younger people lose with the adoption of acquisition value assessment.

Sjoquist and Pandey (2001) measured property tax disparities in Muscogee County, Georgia. Beginning in 1983 the assessed values of homesteaded property, i.e., property eligible for a homestead exemption, for local property tax purposes were frozen in Muscogee County, that is, the cap rate is zero. Sjoquist and Pandey calculate a disparity ratio is 1.67 when they compared the property tax rates for parcels that were purchased in 1997 to the tax rates for those parcels purchased in 1985 or 1984. This is much smaller than the disparity ratios for California counties.

This is partly due to the shorter duration of the Muscogee County assessment freeze and the smaller increases in property values in Muscogee County.

No information concerning the characteristics of individual homeowners was available to Sjoquist and Pandey. So instead they regressed the mean value of the difference between fair market value and the frozen value against each socio-economic characteristic of the census tracts. They found that the average dollar reduction in assessed value due to the freeze within a census tract in Muscogee County increased with median income, mean age, and percent white in the census tract. Thus, the elimination of the freeze would increase assessed values by larger dollars amounts for higher income homeowners, for the elderly, and for whites.

Skidmore, Ballard and Hodge (2010) measured the effect of the Michigan assessment limitation on equity using survey data collected in 2008. That program was adopted in 1994 and limits assessment increases to the lesser of inflation or 5 percent. They find that a family that lived in their home since 1994 had an effective property tax rate that was 19 percent lower than the effective tax rate on a home that was purchased in 2007. This corresponds to a disparity ratio of 1.19 percent.

A common assumption is that an assessment limitation prevents large increases in property taxes for owners of properties, and thus reduces property taxes compared to what they would be in the absence of the assessment limitation. The studies of the distribution of tax saving due to assessment limitations generally assume that the property tax rate is not affected by the assessment limitation. Suppose instead that the local jurisdiction increases its property tax rate in order to maintain the same property tax revenue. In this case some property owners will pay more in property taxes under an assessment limitation than they would have without the assessment limitation. To see this consider a local government that determines that it needs a 10 percent increase in property tax revenue and that in absence of an assessment limitation the tax base increases by 10 percent. For simplicity, assume that the assessment limitation allows no increase in assessed value, i.e., it is an assessment freeze. Now consider three equal-valued homes whose net assessed value increases in value by 5, 10, and 15 percent, respectively. Without the assessment freeze no increase in the tax rate is necessary (since the base increased by 10 percent), and therefore the owners of the homes would have property tax increases of 5, 10, and 15 percent, respectively. That is, their taxes would increase by the same percentage as the increase in taxable value. On the other hand, with an assessment freeze, the local government must increase the tax rate by 10 percent. In this situation, all three owners experience a 10 percent increase in property taxes. Consider the owner who had the above average increase in property value. Without the assessment freeze his taxes would have increased by 15 percent, but with the assessment freeze they would increase by 10 percent. So, he is better off under the assessment freeze. On the other hand, consider the owner with a below average increase in property value. Without an assessment freeze his taxes would have increased

5 percent, but under the assessment freeze they would go up by 10 percent. So this owner is worse off under the assessment limitation. Even if the assessment cap was not zero, but say 3 percent, this owner would be still be worse off under the assessment limitation.

A study of this effect by the Minnesota Department of Revenue (2006) found that the state's assessment limitation increased property taxes for 78 percent of homeowners. Dye, McMillen, and Merriman (2006) studied this effect in Cook County (Illinois), where a 7 percent assessment cap was adopted. They measured the benefit to a homeowner of the assessment limitation as the difference in property taxes that the owner would pay without the assessment limitation and the property taxes with the assessment limitation but with an increase in the tax rate so that total revenue would stay the same. They found that in the first year that the limitation was in effect 75 percent of eligible homeowner benefited from the assessment cap, so that 25 percent had higher property taxes under the assessment limitation. Again, the analysis assumes that the government increases its property tax rate to maintain the same level of revenue as without the assessment cap.

C. Effect on Housing Sales: The Lock-In Effect

It is thought that assessment limitations cause home owners to delay selling their home. In deciding whether to sell, a homeowner considers the costs and benefits. On the cost side are the moving costs, which include the cost of searching for a new home, the cost of real estate agents, the cost of adapting to a new neighborhood, etc. The benefits include reduced commuting time, more appropriate size home, etc. If the home is subject to an assessment limitation program under which the tax advantage of the limitation disappears upon the sale of the home, then an additional cost of moving is the increased property taxes associated with the loss of the limitation. At the margin, this increase in property taxes should reduce the likelihood that the owner will move.

For example, consider a homeowner in the District of Columbia who is considering a move within the District in order to reduce her commuting time, but would buy a home of equivalent value. Suppose the home is worth $300,000, but the taxable assessment is $125,000. The tax on the existing home, at a tax rate of 0.85 percent, is $1062.50, while the taxes on the new home will be $1,976.25, assuming a homestead exemption of $67,500. Thus, moving will increase her annual property taxes by $913.75. This amount may be sufficient to convince the owner to remain in her existing home. Such an effect is referred to as a lock-in effect.

There have been several studies that have tried to determine whether assessment limitation programs have such a lock-in effect. O'Sullivan, Sexton, and Sheffrin (1995b) were the first to consider the effect of Proposition 13 on the length of tenure. Using simulation models, they estimate that the acquisition value assessment increases the time between moves by 12 percent,

or about a year on average for households who are the least mobile. For the most-mobile households, they find that the time between moves increases by only 1.2 percent.

Wasi and White (2005) also estimated the lock-in effect of Proposition 13. They used the Census public use micro sample (PUMS) for the four census years, 1970, 1980, 1990, and 2000 and compared housing turnover between Florida, Texas, and California. Thus, they are able to compare housing turnover post-Proposition 13 with turnover pre-Proposition 13 and with turnover in other states. They find that Proposition 13 reduced turnover, thereby increasing the average tenure by 0.66 years, or by about 6 percent. They also considered how tenure was affected by the size of the tax saving from the limitation and find that larger tax savings increases the length of tenure.

Nagy (1997) compared homeowner mobility rates across three California SMSAs pre- and post-Proposition 13. He finds that mobility declined significantly in the post-Proposition 13 period. However, it appears that mobility decreased in SMSAs in other state, so he cannot attribute the decrease in mobility necessarily to Proposition 13.

In 1986, California adopted Proposition 60, which made the current assessment portable for homeowners who were at least 55 years of age. Ferreira (2010) investigated how this provision affected the probability of moving to a new home and found that homeowners who were 55 years of age were about 25 percent more likely to move than homeowners who were 54 years of age.

Ihlanfeldt (2011) considered Florida's assessment limitation program and its Save Our Home Amendment. Florida's assessment limitation program capped annual increases in assessments to the lesser of 3 percent or inflation. In 2008, Florida passed Amendment One, which allowed homeowners to take the reduced assessed value on an existing home and transfer it to the owner's new home, that is, the reduced assessment became portable. Ihlanfeldt found that prior to Amendment One, the assessment limitation reduced the probability that a homeowner would sell his home; a reduced assessed value equal to $1/3^{rd}$ of the home value reduced the probability of moving by about 7 percent. He also found that after Amendment One was passed the reduced assessed value had no effect on the probability of selling, that is, portability eliminated the lock-in effect.

Stansel, Jackson, and Finch (2007) also studied the effect of Florida's assessment limitation on housing tenure in Florida. They compare the mean and median tenure in 20 Florida counties in 2002 to tenure in 2006. Despite large increases in the saving from the assessment limitation over that period, they find essentially no change in tenure, contrary to expectations. As they note, the effects could be due to other changes that occurred over that period such as changes in interest rates and housing prices.

Pandey and Sjoquist (2001) explored the effect of the assessment freeze in Muscogee County (Georgia) on the probability that a homeowner would move by estimating a probit regression for moves in 1997. The expectation is that the probability of moving would be negatively related to the difference between the market value and the capped values. They controlled for the number of years that the homeowner has occupied the house, as well as socio-economic characteristics of the census tract in which the home is located. They found no effect of the assessment freeze on the probability of moving.

VII. THE ECONOMIC EFFECTS OF THE DISTRICT OF COLUMBIA'S RPT CREDIT

A. Estimates of the Effect on the District's Property Tax Revenue

The Office of Revenue Analysis for the District of Columbia provided parcel level data for each year 2002 through 2011 for homesteaded properties. We used these data to calculate for each year 2003 through 2011 the tax liability under the assessment cap, which we refer to as the capped revenue, and what the property tax liability on homestead properties would have been if there had been no cap, which we refer to as non-capped revenue, given the existing property tax rate and homestead exemption for that year. (Tax liability is not the same as tax revenue since tax revenue reflects tax credits and other adjustments, as well as the collection rate. We do reduce the tax liability for the 50 percent reduction for the senior citizen property owner tax relief. Although we calculate tax liability, we refer to this as tax revenue.) The difference between the non-capped and capped revenues reflects the property tax revenue that was lost due to the assessment cap. (Appendix B provides the details for how the calculations were made.) Table 8 summarizes the results.

Table 8. Estimated Revenue Loss Due to Assessment Limitation

[1] Year	[2] Revenue Loss (in millions of $)	[3] Revenue Loss/ Non-Capped Revenue	[4] Percent With Tax Reduction
2003	$23.9	13.5%	55.1%
2004	49.4	21.2	74.9
2005	55.9	20.4	78.9
2006	84.1	28.1	82.5
2007	118.4	33.4	85.5
2008	118.0	31.2	81.4
2009	99.6	26.4	75.0
2010	59.8	17.1	65.4
2011	37.1	11.0	55.6

As can be seen in column 2 of Table 8, the revenue loss increased from $23.9 million in 2003 to $118.4 million in 2007. The revenue loss has since decreased to $37.1 million in 2011.[3] The

[3] The *District of Columbia Tax Expenditure Report* reports the estimated revenue property tax revenue loss due to the RPT Credit program. The estimated loss was $51.0 million for 2008, $151.1 million for 2010, and $28.4 million for 2012. These estimates differ from those shown in Table 8. We are unable to determine the reason for the differences.

explanation for this pattern is pretty obvious. Between 2003 and 2007 the cap rate decreased from 25 percent to 10 percent, meaning that a larger percentage of the increase in property values were eligible for the property tax cap, and thus not taxed. In addition, housing values were increasing at substantial rates. Since 2007, the increase in housing prices slowed and even decreased. Thus, the difference between the capped and non-capped values decreased (Table 3 provides an example showing the effect of small or decreasing assessed values.)

Figure 1 is the housing price index for the District of Columbia produced by the Federal Housing Finance Agency. As can be seen, housing prices were increasing at rates in excess of 15 percent until 2006. Between the end of 2007 and the end of 2009, the housing price index was negative, and since then the percentage increase has been less than 10 percent. The result was that few properties had increases in property values that exceeded the cap rate, resulting in a decrease in the ratio of capped value to net assessed value.

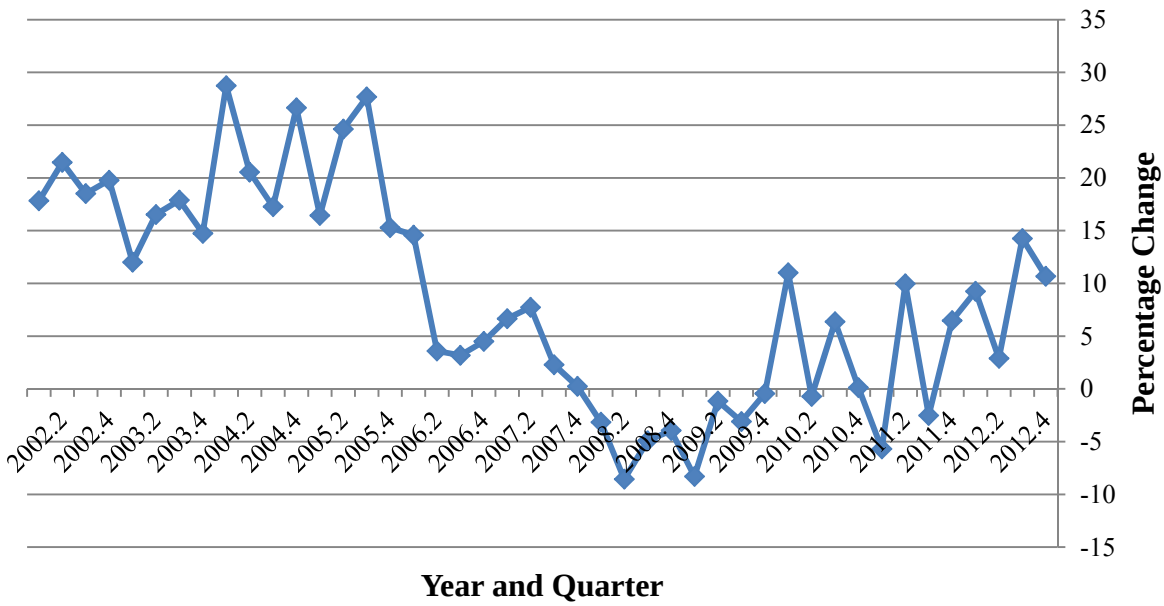
Column 3 of Table 8 is the revenue loss divided by the non-capped property tax revenue. These percentages reflect the percentage reduction in property tax liability for homeowners.[4] The pattern follows that of the revenue loss. For 2007, the property tax liability for homeowners was reduced by 33.4 percent. The percentage reduction has fallen since, and in 2011 the reduction was 11.0 percent.

Column 4 is the percentage of homesteaded properties that have ratios of capped value to net assessed value of less than one, that is, homes that benefit from reduced property taxes; again, this assumes that the property tax rate did not increase as a result of the assessment limitation. (A value of this ratio equal to one implies that the home is taxed on the basis of net assessed value.) The percentage in column 4 increases until 2007, when it reaches 85.5 percent. It has since decreased. In 2011, 55.6 percent of homes were taxed on values that are less than net assessed value.

For the near term, the revenue loss from the assessment limitation is likely to continue to decrease, but at a slower rate. However, as suggested by Figure 1, housing prices are beginning to increase, and are likely to increase at increasing rates in the future. The result will likely be increasing revenue loss in the future, perhaps beginning in 2015.

[4] In FY 2011, total gross property tax revenues were $1.681 billion.

Figure 1. Housing Price Index, District of Columbia



B. Equity of the RPT Credit Program

Assessment limitations create dispersions between assessed value and taxable value in the same way that the errors in the assessment process create variations across property in the ratio of assessed value to market value. In considering inequities in the assessment process and those created by assessment limitation it is assumed that property taxes should be based on fair market value, so that taxable values that differ from fair market value reflect inequities in property taxes. We adopt a similar assumption in measuring the inequities created by the assessment limitation. This section considers the extent of the inequities that arise because of the assessment limitation.

Using the data from the Office of Revenue Analysis we calculated the ratio of the capped value to net assessed value for each homestead. This ratio reflects the reduction in property taxes due to the assessment limitation, assuming that the property tax rate would be the same with and without the assessment limitation. We first consider how the value of this ratio varies across homesteads. We then consider, vertical equity, that is, how the ratio varies across property values, neighborhoods, and the age of home owners. We then consider horizontal equity, that is, how the ratio varies across properties of equivalent value.

Figures 2 and 3 show the distribution of the ratio of capped values to net assessed values for 2007 and 2011; we picked these two years since 2007 is the year in which the largest share of

homesteads have a ratio of less than one, and 2011 is the most recent year for which data were available. Both figures demonstrate the wide variation in the values of the ratios. The major difference in the two figures is that in 2011 a much larger percentage of homesteads have a ratio of one or almost one (note the spike on the right of the graph) and thus smaller percentages of homesteads with any value of the ratio less than one.

Figure 2. Distribution of Ratio of Capped Value to Net Assessed Value
2007

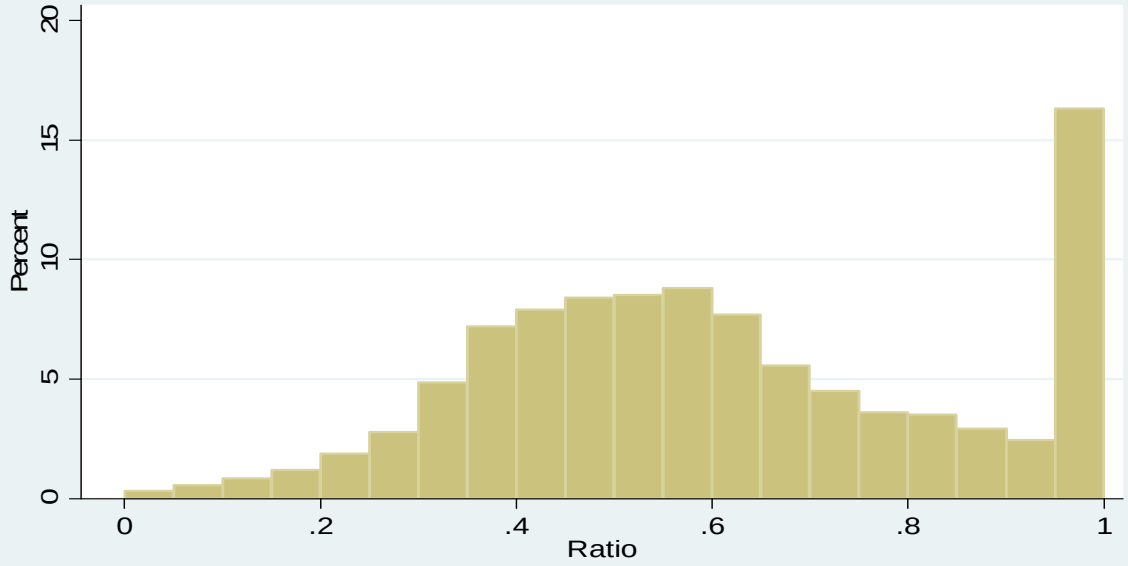
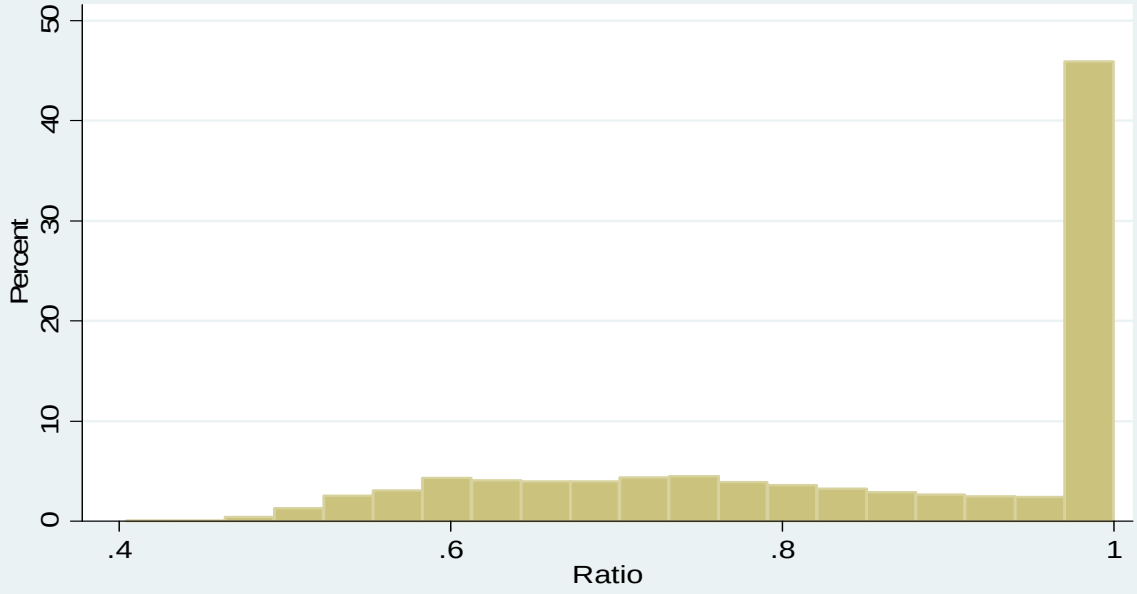


Figure 3. Distribution of Ratio of Capped Value to Net Assessed Value
2011



To summarize the variation in the ratio of capped value to net assessed value we can use two common measures of inequities that are used in the assessment process, namely the coefficient of dispersion (COD) and the price related differential (PRD). The COD is calculated as the average deviation of the ratio of capped value to net assessed value from the median ratio divided by the median ratio.[5] We used net assessed value rather than assessed value in order to eliminate the effect of the homestead exemption on measured inequities. Larger values of COD imply larger inequities, that is, a greater range of the ratios of capped value to net assessed values.

Table 9 shows the resulting COD for each year 2003 through 2011. Other than for 2003 and 2011, these COD values are high and reflect significant inequities brought about as a result of the assessment limitation. The International Association of Assessing Officers (IAAO) suggests that for property tax assessments of single-family residential properties acceptable value of the COD are between 5.0 percent and 15.0 percent. As a point of reference, the COD for the actual residential assessment in the District of Columbia for 2011 is 6 percent (Office of Tax and Revenue 2010). Between 2004 and 2011, the values of the COD reported in Table 9 ranged between 15 percent and 39 percent, with the COD in 5 of those 8 years being higher than 20 percent. These values are substantially larger than the IAAO standard and the actual COD value for residential assessments for the District.

A second measure of equity is the price related differential (PRD). The PRD measures the extent to which higher or lower valued properties are over or under assessed on average. For our purposes, the PRD is the ratio of the average of the ratios of capped value to net assessed value divided the ratio of the total capped value to the total net assessed value.[6] A value of 1 for PRD is the IAAO standard, and means that high and low valued property are equally likely to be over or under assessed.

As shown in Table 9, for most years the PRD is less than one. This implies that properties with higher net assessed values have higher ratios of capped values to net assessed value, which means that on average the percentage reduction in taxes due to the assessment limitation is smaller for higher valued property than for lower valued properties. This would occur, for example, if higher valued properties sold more frequently, and thus the capped values were reset to the assessed values more often, or if the percentage increase in assessed values was less, on average, for higher valued properties. The former is consistent with our regression results presented below in subsection C.

[5] The formula for the COD is: $(\Sigma|R\text{-}R_M|/N)/R_M$, where R is the ratio of capped value to net assessed value, N is the number of parcels, and R_M is the median of R.

[6] The formula for the PRD is: $[\sum(CV_j/AV_j)/N]/[\sum CV_j/\sum AV_j]$, where CV_j is the capped value for parcel j, AV_j is the assessed value of parcel j, and N is the number of parcels.

Table 9. Coefficient of Dispersion and Price Rated Differential

Year	COD	PRD
2003	7.5%	1.033
2004	18.6%	1.015
2005	19.1%	0.994
2006	26.9%	0.969
2007	34.2%	0.936
2008	38.9%	0.927
2009	36.8%	0.922
2010	23.8%	0.948
2011	15.2%	0.968

Tables 10 and 11 and Figures 4 and 5 explore the vertical equity of the assessment limitation, that is, they show how the ratio of capped values to net assessed values vary by net assessed value. We ranked homesteads by net assessed value and then created 20 approximately equal sized groups, each representing five percent of homesteads. For each group we calculated for 2007 and for 2011 the median and mean values of the ratio of capped value to net assessed value. We used 2011 since it is the most recent year for which data were available and reflects a year in which a small percent of homesteads have capped values that are less than net assessed value. We used 2007 since it reflect a year in which the largest share of homesteads have a ratio of capped value to net assessed value less than one. These two years reflects extremes in the level of inequity created by the assessment limitation.

The median value is the ratio of capped value to assessed value for the homestead that has median ratio; in other words, half of homes have ratios greater than that value and half have ratios that are less than that value. The mean is the sum of the capped values for that group divided by the sum of net assessed values for that group. The median is a good measure of the ratio for the "typical" homestead in the assessed value group, while the mean is a good summary measure of the ratio for all homes in the group. When the mean is larger than the median, it means that the distribution of ratios is skewed to the right, that is, higher assessed values are associated with larger ratios.

For 2007, the median and mean values of the ratio follow a somewhat similar pattern. The median increases continuously except for groups 5 through 7. The mean increases continuously from group 6 on, but varies more than the median for groups 1 through 5. This pattern is consistent with the PRD value for 2007 (Table 9), that is, that the higher valued properties have a smaller percentage reduction in taxable value. The pattern for 2011is similar to that for 2007, but the median and mean ratio values are larger in 2011, implying smaller reductions in property taxes. For groups 12 through

20 for 2011, the median values of the ratio of capped value to net assessed value equal one, meaning that more than 50 percent of the homes in those categories have ratios equal to one.

Table 10. Ratio of Capped Value to Net Assessed Value, 2007

Assessed Value Group	Median	Mean	% With Ratio = 1	% Benefiting
1	0.498	0.576	23.7%	76.3%
2	0.534	0.558	13.7%	86.3%
3	0.534	0.556	15.5%	84.5%
4	0.556	0.568	14.8%	85.2%
5	0.532	0.560	15.0%	85.0%
6	0.491	0.556	15.0%	85.0%
7	0.483	0.558	14.4%	85.6%
8	0.487	0.564	14.9%	85.1%
9	0.505	0.570	14.8%	85.2%
10	0.509	0.575	15.7%	84.3%
11	0.527	0.590	16.4%	83.6%
12	0.541	0.605	17.1%	82.9%
13	0.570	0.625	17.6%	82.4%
14	0.611	0.648	16.7%	83.3%
15	0.628	0.663	15.2%	84.8%
16	0.652	0.682	12.5%	87.5%
17	0.661	0.687	10.9%	89.1%
18	0.670	0.694	10.4%	89.6%
19	0.699	0.713	9.9%	90.1%
20	0.731	0.738	11.1%	88.9%

Tables 10 and 11 suggest significant vertical inequities, particularly for 2007. For example, for 2007 the mean value for group 20 is 28 percent larger than the mean value for group one, while for 2011 it is 6 percent larger. For 2007, this means that the reduction in taxable value is 28 percent larger for the lowest valued property as compared to the highest value property.

Tables 10 and 11 also report the percentage of homesteads that have ratios of capped value to net assessed value equal to one, that is, the percent of homes that do not benefit from the assessment limitation. The percentages are larger of 2011, but the pattern differs for the two years. For 2007, other than for the first group there is small variation in the percentage across the assessed value groups, while for 2011, the percentage increases as assessed value increases, from 32.5 percent to 59.6 percent. The patterns are easier to see in Figures 4 and 5. The last column is percent of homesteads that benefit from the assessment limitation, and is simply one minus the percent with a

ratio equal to one. In summary, Tables 10 and 11 demonstrate that the effect of the assessment limitation, on average, is to reduce the taxable value for lower valued homesteads by a larger percentage than higher valued homesteads.

Table 11. Ratio of Capped Value to Net Assessed Value, 2011

Assessed Value Group	Median	Mean	% With Ratio = 1	% Benefiting
1	0.848	0.878	32.5%	67.5%
2	0.759	0.813	23.9%	76.1%
3	0.735	0.810	29.8%	70.2%
4	0.783	0.810	30.6%	69.4%
5	0.818	0.820	33.4%	66.6%
6	0.808	0.813	35.1%	64.9%
7	0.816	0.813	37.9%	62.1%
8	0.837	0.814	39.4%	60.6%
9	0.881	0.824	42.5%	57.5%
10	0.948	0.837	47.2%	52.8%
11	0.908	0.827	45.0%	55.0%
12	0.993	0.843	49.5%	50.5%
13	1.00	0.859	51.0%	49.0%
14	1.00	0.866	53.0%	47.0%
15	1.00	0.889	53.5%	46.5%
16	1.00	0.901	54.6%	45.4%
17	1.00	0.915	56.1%	43.9%
18	1.00	0.916	54.2%	45.8%
19	1.00	0.922	55.1%	44.9%
20	1.00	0.932	59.6%	40.4%

Figure 4. Ratio of Capped Value to Net Assessed Value, 2007

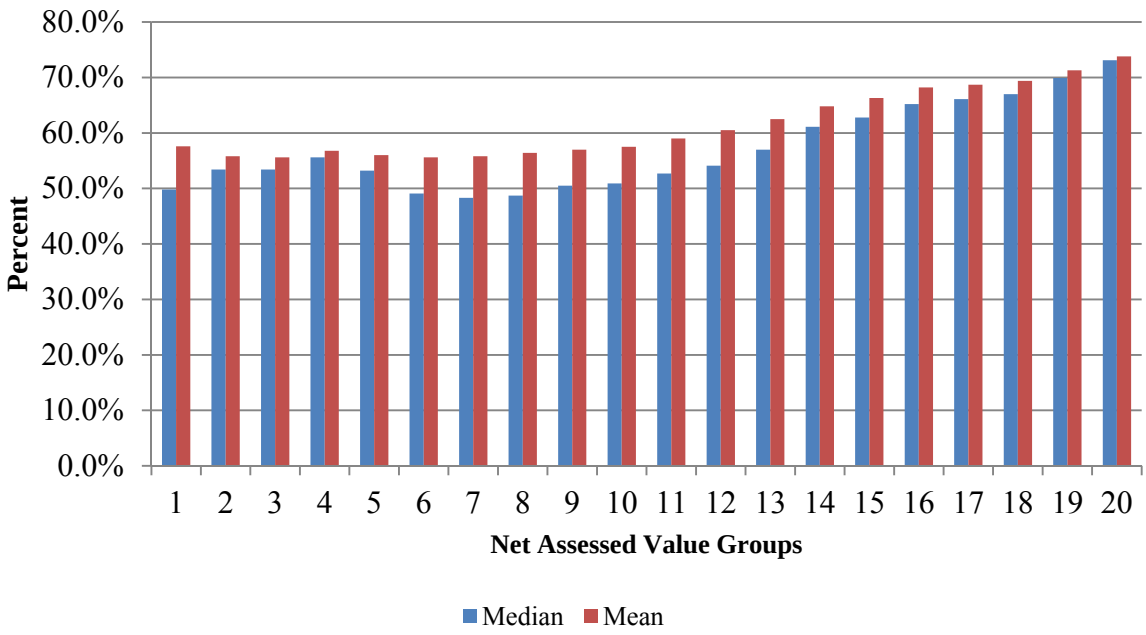
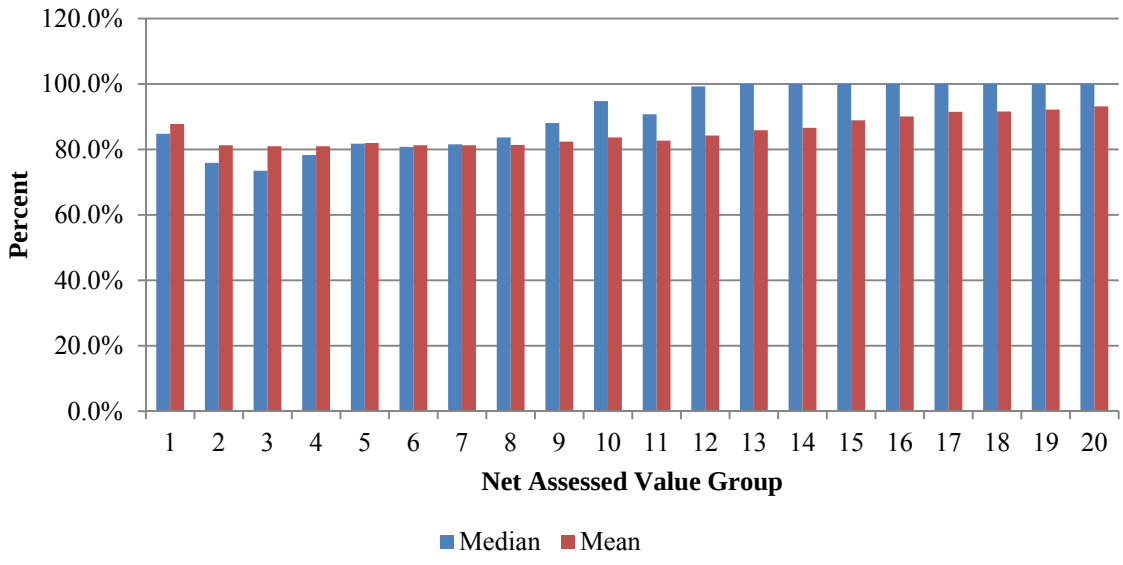


Figure 5. Ratio of Capped Value to Net Assessed Value, 2011



We can also measure inequity in the ratio of capped value to net assessed value by the year the property was last sold. In particular, we compare the ratio of capped value to net assessed value

for properties that have not sold since the assessment limitation started with properties that sold in the previous year. The former set of properties benefited from the assessment limitation continuously since it started, while the later set is taxed based on current net assessed value. For these two sets of properties we calculated the ratio of capped value to net assessed value. Dividing the ratio for the two groups yields the disparity ratios. We calculated these ratios as of 2007 and as of 2011. The disparity ratios are 1.70 for 2007 and 1.19 for 2011. The value of 1.70 for 2007 means that homesteads that sold in 2006 pay, on average, an effective tax rate that is 1.70 times the effective tax rate for the properties that did not sell since 2001. To better understand this, consider two homesteads of equal net assessed value, one which sold in 2006 and the other has not sold since the assessment limitation program was adopted. In 2007, the first property would pay an effective tax rate of 0.88 percent, that is, the actual property tax rate, while the other would pay an effective tax rate of 0.518 percent. (To make it clear, we assume that the ratio of capped value to net assessed value for this property in 2007 equals the mean value of the ratio for all homesteads that did not sell since 2001.) By 2011, the disparity ratio fell because property values did not increase as rapidly and in many cases even decreased in value. The result was that the cumulative effect of the assessment limitation over the entire period since its adoption had a much smaller effect on taxable assessment.

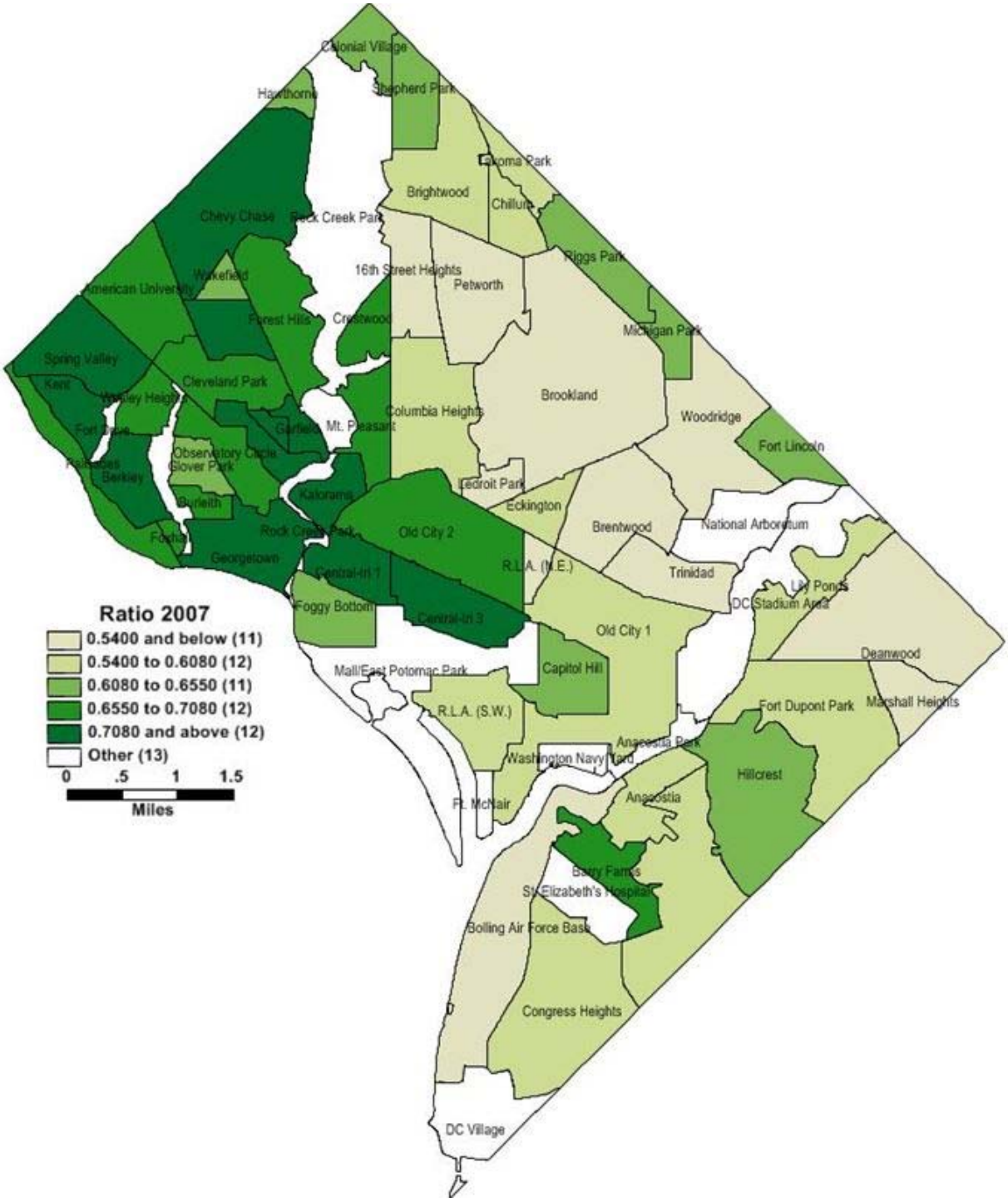
We are also interested in how the effect of the assessment limitation varies across the District. Table 12 presents for 2007 and 2011 for each of the District's neighborhoods the average value of the ratio of capped value to net assessed value and the percentage of homesteads benefiting from the cap. Maps 1 and 2 show the ratio of capped value to net assessed value by neighborhood for 2007 and 2011, respectively. There are substantial differences in the value of the ratio across neighborhoods; for 2007, the ratios range from 0.434 to 0.832, while for 2011 they range from 0.525 to 0.988. The correlation between the 2007 and 2011 ratios is 0.75, suggesting that there are similarities in the patterns between the two years. There is a positive relationship between the neighborhood's mean net assessed value and its mean ratio of capped value to net assessed values. For example, for 2007 the correlation coefficient is 0.738. This is consistent with the previous findings that higher valued homesteads have higher ratios of capped value to net assessed value.

Table 12. Ratio of Capped Value to Net Assessed Value

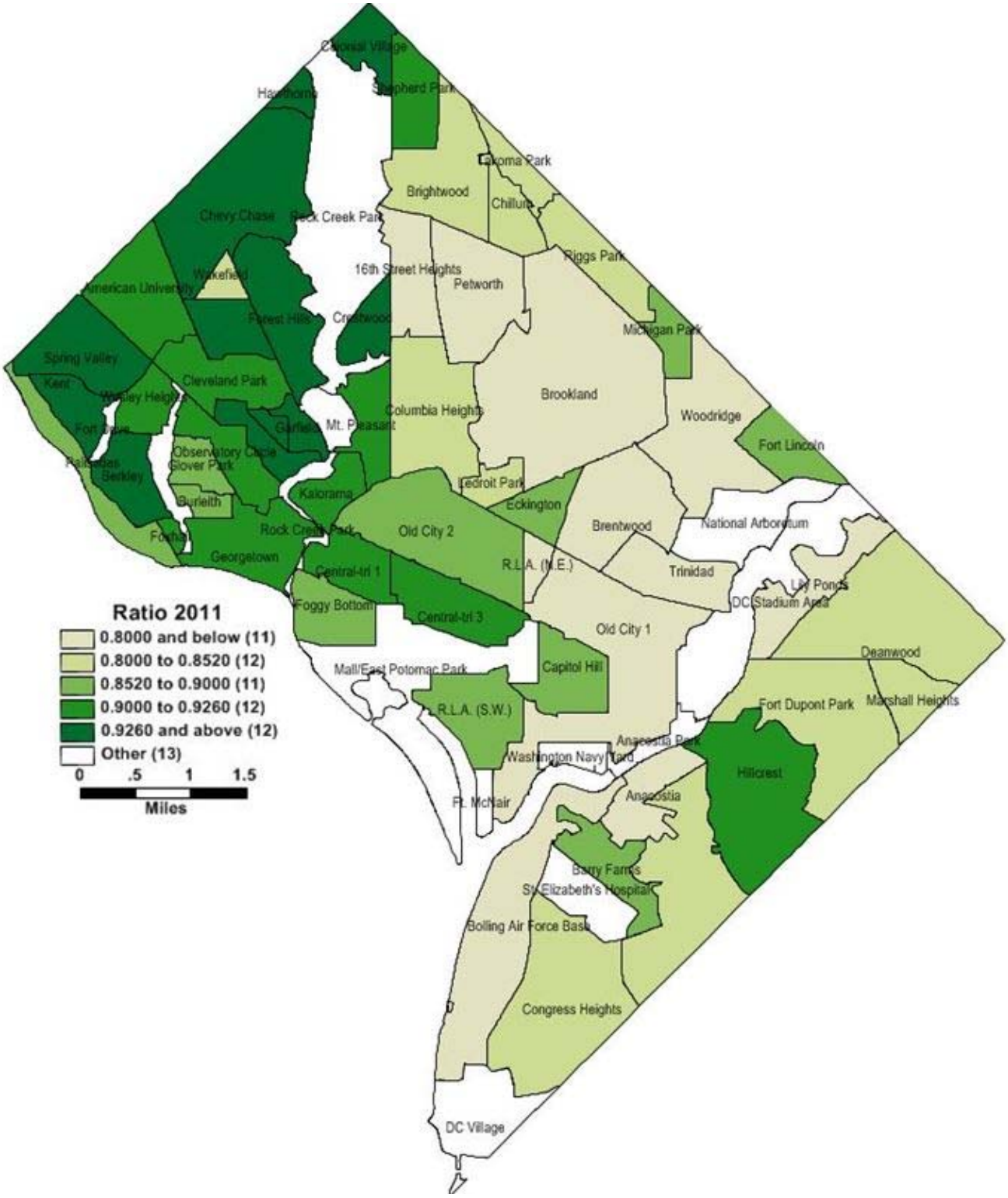
	Ratio of Capped Value to Net Assessed Value		% Benefiting	
Neighborhood	**2007**	**2011**	**2007**	**2011**
AMERICAN UNIV. PARK	0.696	0.919	87.4%	53.8%
ANACOSTIA	0.546	0.790	89.3%	81.0%
BARRY FARMS	0.656	0.881	75.7%	77.5%
BERKLEY	0.752	0.930	89.1%	46.6%
BRENTWOOD	0.499	0.767	88.6%	75.1%
BRIGHTWOOD	0.551	0.823	91.2%	69.6%
BROOKLAND	0.517	0.787	89.4%	70.7%
BURLEITH	0.697	0.895	90.2%	53.2%
CAPITOL HILL	0.621	0.868	88.6%	55.0%
CENTRAL	0.730	0.920	64.6%	31.5%
CHEVY CHASE	0.713	0.931	90.3%	45.1%
CHILLUM	0.595	0.826	89.9%	71.8%
CLEVELAND PARK	0.708	0.924	81.7%	40.8%
COLONIAL VILLAGE	0.642	0.935	94.2%	47.1%
COLUMBIA HEIGHTS	0.594	0.834	76.1%	51.1%
CONGRESS HEIGHTS	0.558	0.832	85.9%	79.7%
CRESTWOOD	0.668	0.967	93.9%	28.5%
DEANWOOD	0.521	0.833	88.0%	75.6%
ECKINGTON	0.589	0.877	83.7%	54.3%
FOGGY BOTTOM	0.626	0.865	79.8%	46.2%
FOREST HILLS	0.704	0.927	84.6%	32.7%
FORT DUPONT PARK	0.582	0.813	89.8%	79.8%
FOXHALL	0.696	0.913	87.3%	52.6%
GARFIELD	0.709	0.937	88.9%	27.3%
GEORGETOWN	0.726	0.916	83.9%	45.9%
GLOVER PARK	0.633	0.853	82.8%	50.8%
HAWTHORNE	0.635	0.931	94.0%	51.3%
HILLCREST	0.630	0.914	85.8%	52.0%
KALORAMA	0.709	0.915	83.7%	37.0%
KENT	0.766	0.935	91.6%	46.5%
LEDROIT PARK	0.532	0.829	86.9%	57.6%
LILY PONDS	0.550	0.792	93.2%	82.3%
MARSHALL HEIGHTS	0.522	0.810	86.0%	74.2%
MASS. AVE. HEIGHTS	0.781	0.964	88.6%	28.9%
MICHIGAN PARK	0.608	0.867	93.6%	74.0%

MOUNT PLEASANT	0.666	0.900	78.9%	41.9%
N. CLEVELAND PARK	0.726	0.930	92.4%	40.8%
OBSERVATORY CIRCLE	0.677	0.909	85.7%	40.7%
OLD CITY I	0.556	0.799	85.1%	55.9%
OLD CITY II	0.674	0.886	72.1%	35.1%
PALISADES	0.694	0.862	86.3%	55.8%
PETWORTH	0.489	0.761	90.4%	71.5%
RANDLE HEIGHTS	0.600	0.840	84.2%	70.0%
R.L.A. NE	0.460	0.525	86.0%	100.0%
R.L.A. SW	0.608	0.872	76.8%	45.3%
RIGGS PARK	0.626	0.840	93.8%	81.7%
SHEPHERD PARK	0.633	0.920	94.4%	57.7%
16TH ST. HEIGHTS	0.531	0.770	88.4%	66.6%
SPRING VALLEY	0.757	0.960	88.9%	31.7%
TAKOMA	0.561	0.808	92.6%	73.7%
TRINIDAD	0.434	0.752	87.6%	76.4%
WAKEFIELD	0.624	0.850	91.0%	54.6%
WESLEY HEIGHTS	0.697	0.920	87.9%	35.2%
WOODLEY	0.832	0.988	90.2%	9.4%
WOODRIDGE	0.490	0.777	91.4%	77.0%
FORT LINCOLN	0.653	0.868	89.6%	57.1%
BOLLING AFB & NAVAL RES	0.510	0.769	100.0%	100.0%

Map 1. Ratio of Capped Value to Net Assessed Value by Neighborhood, 2007



Map 2. Ratio of Capped Value to Net Assessed Value by Neighborhood, 2011



In addition to inequities by property value and neighborhood, we also consider how the benefits of the assessment limitation differ by age. We do not have age, but we know whether the home owner is eligible for a senior 50 percent property tax relief. We calculated the ratio of capped value to net assessed value for those eligible and not-eligible for the senior 50 percent tax relief. The average ratio of capped value to net assessed value was 0.777 for seniors and 0.874 for non-seniors for 2011 and 0.516 and 0.642 for 2007. Thus, seniors benefit more from the assessment limitation than non-seniors. This result could be due to the fact that seniors are less likely to move from one homesteaded property to another homesteaded property in the District, and thus there are fewer seniors with recently purchased home. In 2007, 22.1 percent of homesteads were owned by seniors, while in 2011 it was 19.3 percent.

We now turn to consideration of horizontal inequities, that is, how the benefits of the assessment limitation vary across homes of approximately equivalent value. Figures 6 and 7 illustrate the horizontal inequities. These figures are box and whisker graphs of the ratio of capped value to net assessed value for each of the 20 net assessed value groups created for Tables 10 and 11. The groups are represented by the numbers on the X-axis. To explain, the bars in the shaded boxes are the median value (that is, the 50th percentile) of the ratio of capped value to net assessed value. The lower and upper ends of the box represent the 25th and the 75th percentile. The lines running from the boxes reflect extreme values, and include ratio values between 1.5 times the difference between the 25th and 75th percentile value of the ratio. In constructing these graphs we excluded homesteads for which the ratio of capped value to net assessed value equals one since for 2011 the median value equals one for half of the assessed value groups. Note that in 2011 the upper extreme values are very close to one for all but 3 of the groups.

Figure 6. Distribution of Capped Value to Net Assessed Value, 2007

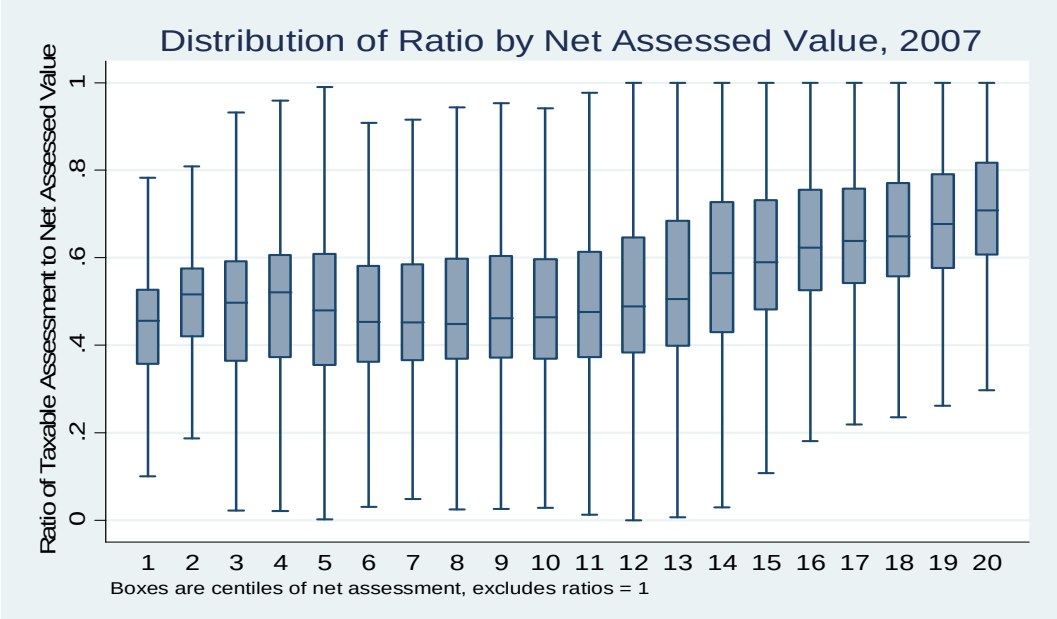
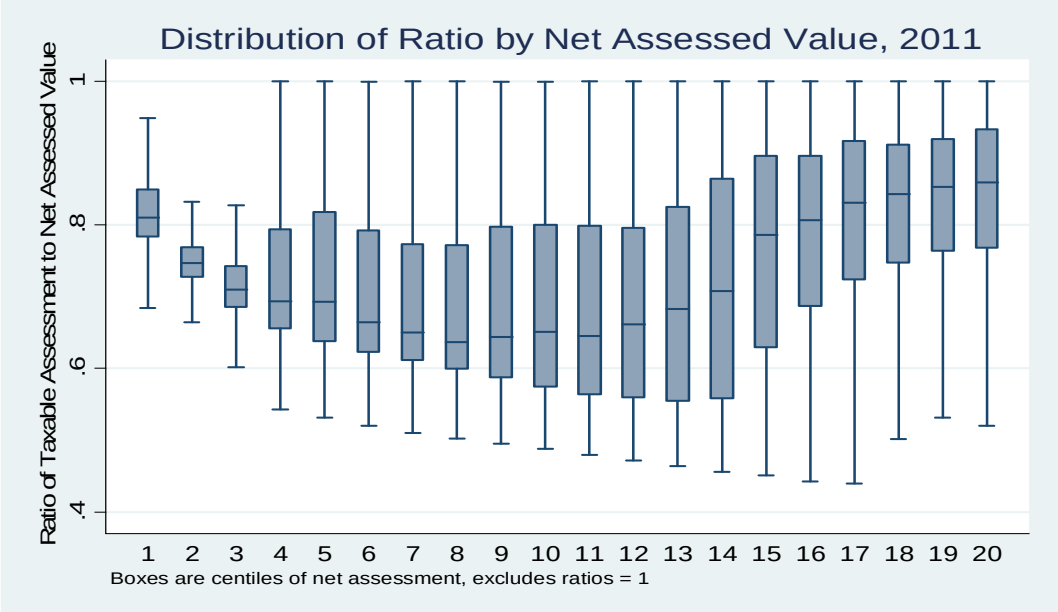


Figure 7. Distribution of Capped Value to Net Assessed Value, 2011



If there were little horizontal inequities, then the height of the boxes would be small since in that case the ratio of capped value to net assessed values at the 25th and 75th percentiles would be similar. The larger the box, the greater are the horizontal inequities. As can be seen in the two figures, there is substantial variation in the ratios within any group. This is especially true for 2011 for the middle-valued homes.

In the above analysis of equity we assumed the property tax rate would be the same whether the homestead was taxed on the capped value or net assessed value. Under this assumption the property tax benefit (that is, the reduction in taxable value and thus the reduction in property taxes) due to the assessment limitation would never be negative, since if the capped value was less than the net assessed value, property taxes would be reduced. However, it is also reasonable to assume that if the assessment limitation did not exist, the property tax rate would be lower so that the government would collect the same revenue with and without the assessment limitation program. Under this assumption, the benefit of the assessment limitation equals the taxes that would be paid using net assessed value but with a lower tax rate less the tax paid under the assessment limitation program with the current tax rate.

To illustrate, consider a property with a net assessed value of $200,000 but with a cap value of $190,000. Assuming the same property tax rate of 0.85 percent, the owner's property taxes are reduced by $85.00 due to the assessment limitation. However, assume that the tax rate can be reduced by 10 percent if the assessment limitation is eliminated, or to 0.765 percent. In this case the taxes under the assessment limitation are $1,615.00 (= $190,000 times 0.85 percent), while

without the assessment limitation the taxes are $1,530.00 (= $200,000 times 0.765 percent). Under the constant revenue assumption the owner actually pay $85 more in property taxes with the assessment limitation since the benefit of the reduced property tax rate more than offsets the advantage of a reduced tax base due to the assessment limitation.

We assume for this analysis that in the absence of the assessment limitation, the District would lower its tax rate in order to raise the same amount of revenue from residential property as they would with the limitation and the current property tax rate.[7] Residential property for this purpose includes units that are homesteaded as well as the non-homesteaded residential property. If the District were assumed to lower the tax rates on all properties, the reduction in the tax rate would be smaller, and a larger percentage of owners would benefit from the assessment limitation.

For 2007, 25.1 percent of homeowners would pay lower taxes without an assessment limitation, that is, if they were taxed at the lower tax rate on their net assessed value rather than being taxed at the existing 2007 tax rate of 0.88 percent on their capped value. In 2011, 48.7 percent of homeowner would pay lower taxes if they were taxed at the lower tax rate on their net assessed value than being taxed at the existing tax rate of 0.85 percent on their capped value. Thus, under the assumption of constant property tax revenue, a substantial percentage of homeowners are worse off under the assessment limitation.

C. Analysis of the Lock-In Effect of the RPT Credit

The third economic effect is whether the assessment limitation causes homeowners to move less frequently. The information we have available to determine whether the assessment limitation has an effect on the likelihood that a homestead will be sold is limited. Using the data available we find that the assessment limitation is negatively related to the probability that a home is sold. But, given the limitations with the data our results should be used with caution.

In addition to the data limitations, the analysis suffers from potential endogeneity issues. It is possible that unmeasured factors affect the number of years the owner occupies the home. It is expected that the longer the owner occupies the homestead, the larger will be the tax reduction from the tax limitation. In this case, the tax saving is caused by the length of time the owner lives in the house. In other words, it is the number of years the home is owned that causes the observed tax saving, rather than the tax saving causing the reduced probability of selling. While such econometric problems can be overcome, we do not have the data necessary to do that.

[7] To the extent that the assessment limitation results in higher property tax rates for all properties, then all non-homesteaded properties pay higher property taxes than they would in the absence of the assessment limitation.

To estimate the effect of assessment limitation (RPT Credit) on the probability of moving we estimated a linear probability regression model in which the dependent variable equals one if house *h* sold in year *t*. We only consider homesteads that sold between 2005 and 2011.

The principal explanatory variable is the estimated tax saving from the assessment limitation in year *t*, given the existing tax rate and homestead exemption in that year. We expect that the likelihood that the owner will move will depend on the size of the tax savings due to the assessment limitation, and in particular, we expect that larger tax benefits from the assessment limitation will reduce the probability of moving.

Because housing turnover likely differs by housing value, we include the net assessed value of the home. A statistical issue is that house value is correlated with the tax saving from the assessment limitation.

Other studies of the length of housing tenure find that the length of time the owner has occupied the home and the age of the owner are important determinates of whether the owner is likely to sell. The property tax data that we have available does not identify the year the current owner purchased the home if he purchased it prior to 2001. Thus, for the earlier years of our data, we do not have a very satisfactory measure of tenure duration. As an alternative we use a dummy variable equal to one if the person moved in prior to 2001. In addition, we include a variable that equals the number of years the owner has been in the house since 2001 or since the year the house was purchased if it was purchased after 2001. The lack of information on the length of time the current owner has lived in the house is a major limitation of this analysis. The results of the regression analysis need to be seen in light of this limitation.

We do not know the age of the owner. However, we do know if the owner received the senior citizen tax relief. We use this information to create a dummy variable that is equal to one if the owner is 65 years of age or over.

To control for socio-economic factors we include a set of neighborhood dummy variables. To the extent that the population of a neighborhood is homogenous these dummies reflect differences in the socio-economic characteristics of the owners. They also reflect differences in the housing market across the District. We included year dummies to reflect factors that change over time, such as the state of the economy.

Column 2 of Table 13 presents the results of the regression analysis. The coefficient on the tax benefit is negative and statistically significant. (The very high value of the t-statistics is due in part to the very large number of observations.) The result is consistent with the expectation that larger tax benefits from the assessment limitation will reduce the probability that the home will be sold. Evaluated at the means for the percentage of homes that sell each year and for the tax benefit, we find that the elasticity of the probability that the home will be sold with respect to the tax benefit is -0.226. This implies that a 10 percent increase in the tax saving reduces the probability of selling the homestead by 2.26 percent.

Because of the correlation between assessed value and the tax benefit, we also estimated the regression excluding the assessed value of the home (column 3 of Table 13). The coefficient on the tax benefit is still negative and statistically significant, but is somewhat smaller; the implied elasticity evaluated at the means is -0.173.

The coefficient on tax saving is not particularly sensitive to the exclusion of the control variables. We estimated the regressions for individual years and obtained similar results, although the coefficient is smaller for more recent years.

Table 13. Linear Probability Model of House Selling (t-statistics in parentheses)

[1]	[2]	[3]
Tax Saving (in 1000 of $)	-0.0172	-0.0133
	(-58.07)	(-58.28)
Net Assessed Value	2.28E-08	
	(20.47)	
Over 65	-0.0437	-0.0425
	(-56.24)	(-54.84)
Moved in Prior to 2002	0.0560	0.0564
	(89.73)	(90.41)
Years in Home	0.0101	0.0096
	(71.54)	(69.03)
Constant	0.0209	0.0309
	(10.19)	(15.52)
R^2	0.0339	0.0334
Number of Observations	664,806	664,806

Regressions include year and neighborhood dummies.

VIII. POLICY OPTIONS

There are several potential changes that the Commission could consider regarding the District's assessment limitation program. There are various, potentially conflicting, reasons (that is, potential policy goals) for making changes in the RPT Credit program. These reasons include:

- reduce the revenue loss to the District government;
- reduce the effect of property value appreciation on homeowner property taxes;
- reduce property tax inequities;
- reduce property taxes for various groups, such as the elderly or low-income households.

Among the possible alternative policies the Commission might consider are:

1. *Make no change.* This would be simplest thing to do. The principal consequences would be increased revenue loss as housing prices begin to increase again and increased tax inequities across homesteads.

2. *Eliminate the assessment limitation.* This option would eliminate the loss of revenue and the inequities that arise from the assessment limitation. The increased revenue could be used to reduce the property tax rates. On the other hand, it would eliminate the tax benefit that many homeowners enjoy as a result of the assessment limitation. A major difficulty in eliminating the PRT Credit program is that owners who have a small capped value relative to net assessed value would have a very large increase in their property taxes with a switch to net assessed value. Since the relative benefit of the assessment limitation is greater for lower valued homestead, eliminating the assessment limitation would likely have a relatively larger effect on low-income and more senior homeowners. (Note that the District does have a property tax circuit breaker program that provides an income tax credit for property taxes paid by lower income households whose property taxes are high relative to their household income.)

   The District does have a levy limit which caps the aggregate increase in the tax levy; the limits differ by property type. A levy limit combines an assessment limitation and a tax rate limitation, so it is more stringent than an assessment limitation. One option would be to eliminate the current assessment limitation and use the additional revenue to reduce the allowable increase in the property tax levy.

3. *Phase out the assessment limitation*. Rather than immediately shifting the basis of property taxes to net assessed value for all home owners, the change could be phased in. One way this could work would be to allow current owners to keep the current reduced (capped) value, but allow that capped value to increase by the dollar increase in net

assessed value going forward. New owners would not be eligible for the assessment limitation program, but would be taxed on the basis of net assessed value.

4. *Make the capped value portable*. The PRT Credit seems to discourage owners from selling their property. In response, some states have made the program portable. One way this could work is to allow a seller to take the difference between the net assessed value and the capped value and subtract that from the newly purchased home at the time of purchase. Such a provision would benefit home owners who want or need to move within the district. Since higher valued homesteads are more likely to sell, owners of higher valued homesteads are likely to benefit relatively more.

5. *Change the provision that restricts the capped value to no less than 40 percent of assessed value.* This provision puts a limit on the size of the tax benefit to the taxpayer (and on the tax revenue loss to the District). Currently, this provision does not affect many home owners. However, as property values increase again, it will have a greater effect. For example, in 2007, if this provision had been in place, 35 percent of homeowners would have been subject to the provision, but the increase in property tax revenue would have been only 3.8 percent of property taxes paid by home owners. The provision applies mainly to longer term residents. The 40 percent limit could be either increased or decreased. Reducing the limit, for example to 30 percent, would relax the provision and thus increase the revenue loss from the assessment limitation but increase the tax benefit to homeowners. On the other hand, raising the limit, for example to 50 percent, would have just the opposite effect.

6. *Change the cap rate*. Reducing the value of the cap rate, which is currently 10 percent, to say 5 percent, would increase the revenue loss to the District but further reduce the property taxes homeowners pay. There are three issues that should be considered regarding selecting the cap rate. First, what is the maximum increase in property taxes that an owner should bear in any given year? Second, how much revenue should the District forgo? If the District increases the tax rate to make up for the lost revenue, then, third, how large should be the increase in property taxes for non-homesteaded property?

7. *Convert the limitation to one that applies to the aggregate tax base.* A couple of states cap the increase in the aggregate property tax base and not the increase for individual parcels. Such a policy caps the increase in total property tax revenue, assuming that the tax rate does not increase, but allows the tax on each parcel to increase proportional to the increase in its value. For example, suppose that the total net assessed value for the District increased by 15 percent, but the allowable increase for property tax purposes is capped at a 10 percent increase. Thus, the allowable increase in taxable assessment for a particular parcel would be 2/3^{rds} of that parcel's increase in net assessed value. Such a

policy maintains equity among the properties subject to the assessment limitation since the capped value of each parcel increases in proportion to the various increases in the parcels' market values.

8. *Change how improvements affect capped value.* Currently, if an improvement is made to the homestead, such as an addition to the home, and it increases the property value by more than $100,000, the taxable value of the property reverts to net assessed value. Most states add the increase in market value due to an improvement to the capped value rather than eliminating the capped value.

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Appendix A. GLOSSARY

Assessed Value

The tax assessor's estimate of the fair market value of a property

Cap Rate

The maximum allowable increase in taxable assessment as specified by the RPT Credit Program. The rate is currently 10 percent.

Capped Value

This is the same as taxable assessment.

COD or Coefficient of Dispersion

In the context of assessment limitation it is a measure of the dispersion of the ratio of taxable assessment to net assessed value.

Disparity Ratio

The ratio of taxable value of a home that was recently sold relative to the taxable value of an equivalent home that was not sold in many years, typically since the assessment limitation started. It should the inequities created by the assessment limitation.

Homestead

A home that is owned and occupied by the same person.

Homestead Exemption

An allowable deduction from the assessed value for homesteaded property. As of 2011, it was $67,500.

Horizontal Equity

In the case of an assessment limitation, it refers to how differences in the reduction in taxable assessment vary across properties of similar value.

Lock-In Effect

Refers to the incentive to not sell property because of the loss of the tax reduction that results from the assessment limitation.

Net Assessed Value

Assessed value less the homestead exemption.

Owner-Occupied Housing

Same as a homestead

PRD or Price Related Differential

In the context of assessment limitation, it measures whether the ratios of taxable assessment to net assessed value are larger or smaller for high-value property relative to low-valued property

RPT Credit (Residential Property Tax Credit)

This is the District's assessment limitation program

Taxable Assessment

The taxable value under the assessment limitation program and reflects the cap on the annual increase in value subject to the property tax.

Tax Rate

The rate applied to the taxable value. It is currently set at 0.85 percent.

Vertical Equity

In the case of an assessment limitation, it refers to how differences in the reduction in taxable assessment vary across properties of different values.

Appendix B. CALCULATION OF TAX LIABILITY

We consider only property that is owner occupied.

We start with Assessed Value and subtract the Homestead Exemption to get Net Assessed Value. We multiply this by the property Tax Rate to get Non-Capped Revenue. If the Net Assessed Value is less than zero, the taxable value is set to zero. If the home owner is eligible for the Senior Tax Relief, we reduced the calculate property tax liability by 50 percent. The resulting values would be the tax in the absence of the assessment limitation.

For the tax liability under the assessment limitation we start with the Capped Value and multiply by the Tax Rate. But several adjustments have to be made, including:

- If Capped Value is zero, we assume that the tax is based on Net Assessed Value.

- If the home was purchased the previous year, we assume that the tax is based on Net Assessed Value.

- If the Net Assessed Value is less than the Capped Value, we assume that the tax is based on Net Assessed Value.

For 2011, the Capped Value cannot be less than 40 percent of the Assessed Value. We check for this and if it is, we set the Capped Value at 40 percent of the Assessed Value.

Our estimate of Capped Revenue is very close to the value of the reported tax obligation as reported in the data. The report tax obligation should be smaller since they reflect reductions for credits other than the Senior Tax Relief and payments for trash collection.