

**Income-Based Property Tax Relief:
Circuit Breaker Tax Expenditures**

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Abstract

This paper provides a guide to the policy analysis of income-based property tax relief programs. Income-based property tax relief mechanisms are often called circuit breakers in the tax policy world, as they provide tax relief when the taxpayer is overloaded. The concept of a circuit breaker draws on the electrical breaker analogy—to provide property tax relief to households who are overburdened by their property tax bill. In this paper we examine various circuit breaker mechanisms that provide property tax relief directly tied to the homeowner or renter property tax bill as a share of household income. The paper then illustrates policy analysis of the circuit breaker mechanism, including measurement and analysis of the foregone revenue involved. The purpose of this illustration is to assist policy analysts as they conduct tax expenditure studies. A specific case study is presented using data from the State of Idaho Property Tax Reduction Program.

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Income-Based Property Tax Relief: Circuit Breaker Tax Expenditures

Description of Circuit Breakers and their Implementation

Circuit breakers are a form of direct residential property tax relief provided to households based on income. Most states provide some form of income-based property tax relief, but most of those states do not use the term circuit breaker. Property tax credits, or refunds, are the more common names used. The basic concept of a circuit breaker draws on the electrical breaker analogy—to provide property tax relief to households who are overburdened by their property tax bill. The distinctive element in providing property tax relief via a circuit breaker, however, is that the property tax relief falls as income rises. Hence, more general property tax relief programs such as classified property tax, homestead exemptions provided to all home owners, or use-value assessment programs for agricultural land owners, are not considered circuit breakers because they are not directly linked to the property tax paid as a share of household income. In this paper we will examine various circuit breaker mechanisms that provide property tax relief directly tied to the homeowner or renter property tax bill as a share of household income.

The primary advantage of a circuit breaker approach to providing property tax relief is that state resources are targeted specifically to those who need the relief the most. A general property tax exemption would provide the same relief to all homeowners, whereas a circuit breaker can specifically target those whose property tax bills are high relative to their income. The result is that for a given amount of property tax relief provided by the state (\$100 million, say), more substantial relief for those who need it most can be provided using a circuit breaker. Alternatively, we can say that the circuit breaker is a less expensive way to provide property tax relief because it does not waste relief on those who do not need it. Of course, defining need is a central issue in the design of any circuit breaker mechanism.

Threshold-type circuit breakers define a level of property tax relative to income and then provide tax relief for all or a portion of the property taxes in excess of that threshold. Advocates of this type of circuit breaker promote the view that taxpayers should not have to pay more than a maximal amount of income in property tax. Above that level, relief is provided. Critics of this type of circuit breaker argue that homeowners with more expensive homes should pay more tax, even after the relief provided by the circuit breaker. Homeowners in communities that choose to provide high levels of public services, and consequently have high property taxes, should have to bear the burden of the higher tax rates and not be held harmless by a threshold type circuit breaker.

Sliding-scale type circuit breakers provide property tax relief based on the income of the taxpayer, with the amount of relief declining as income rises. This type of circuit breaker provides tax relief for low-income homeowners without leveling the net tax burden relative to income, thereby retaining (although muting) difference across communities due to voter choices regarding public services. Advocates of this form of tax relief argue that the differences in housing markets and public service levels are maintained with this mechanism, unlike the threshold-type circuit breakers.

Circuit breakers can be classified by type: threshold type (single, or multiple), sliding scale type, or hybrid and quasi type. Table 1 provides a taxonomy of circuit breakers describing each type. Langley (2009) reports that for elderly homeowners and renters in 2008 five states used a single threshold circuit breaker, 9 states used multiple thresholds, 10 used a sliding scale type of circuit breaker, 7 states applied quasi circuit breakers, and 3 states employed a hybrid form of circuit breaker. Each type of circuit breaker mechanism is described below.

Single Threshold Circuit Breaker Design

A simple single threshold type of circuit breaker usually takes the form of an income tax credit for which a taxpayer qualifies if her property tax liability exceeds a threshold share of her income. The credit is then a fraction of the amount by which the property tax exceeds the specified share of income. The extreme case is a single threshold credit that provides relief for all property taxes paid in excess of the threshold level. In that case, the circuit breaker levels property tax payments as a share of income.

Policymakers specify two parameters when they establish the circuit breaker mechanism. For example, policymakers could specify the credit as 50 percent of the property tax paid in excess of 5 percent of income. In that the credit can be written as, $C = .5(P - .05Y)$, where C is the credit P is the property tax bill and Y is income. The taxpayer qualifies for the credit if her property tax bill exceeds five percent of her income. In that circumstance, she then receives a credit of one-half of the amount by which her property tax exceeds five percent of her income.

Policymakers may make the credit more generous by (1) making the threshold easier to reach, or (2) by making the credit a larger share of the property tax in excess of the threshold. Both of these actions increase the property tax relief cost to the state, however. It should be recognized that both ways to make the credit more generous also have the effect of lowering the taxpayer net cost of an additional dollar of property tax, and do so for more taxpayers by the first method. This may have the unintended consequence of encouraging recipients to support additional increases in the property tax rate.¹

Multiple Threshold Circuit Breaker Design

Multiple threshold circuit breakers allow for more progressive tax relief. As income rises, the size of the property tax credit is scaled down and eventually disappears. With this type of circuit breaker, the higher the property tax burden relative to income, the greater the share of property tax relief that can be provided. For example, a state could specify property tax relief at increasing levels for taxpayers whose property tax bills are at least 3, 5, or 7 percent of income.

Sliding Scale Circuit Breaker Design

With a sliding scale circuit breaker, income brackets are specified with all households in the group eligible for tax relief (e.g., elderly owners, owners of all ages). In each bracket tax relief is a given percentage reduction in property taxes, regardless of the size of their property tax bill.

¹ Bell and Bowman, 1987 document such an effect in Minnesota.

Housing expenditures generally rise with family income, but not proportionately. Consequently, we expect that low income families will pay a larger share of family income on housing and therefore on property taxes in comparison with high income families. The sliding scale form of circuit breaker provides property tax relief based on income with the explicit intention of leaving remaining differences across taxpayers in place. Those differences may be due to individual choices regarding the amount of housing to consume, or may be due to differences in voter preferences for public services.

Hybrid or Quasi Circuit Breakers

Hybrid forms of circuit breakers combine elements of threshold and sliding scale mechanisms. Quasi circuit breakers typically use multiple income brackets to provide benefits that decline as income rises. But, in this case the benefits are generally not related to actual property tax liabilities.

Consider, for example, the recently implemented New York State School Tax Relief Program (STAR). Under this program homeowners may qualify for one of two types of partial property tax exemption. Homeowners with incomes less than \$500,000 who occupy their own homes may be eligible for the basic STAR exemption from school taxes on the first \$30,000 of full home value. The Enhanced STAR program, available to seniors, exempts the first \$62,200 of full value from school taxes (for 2012–13 school taxes). These exemptions apply to school district taxes, not property taxes for other local government units. (Source: <http://www.tax.ny.gov/pit/property/star/index.htm>)

This type of quasi circuit breaker is income-based, but not in a way that effectively targets property tax relief. The income limitation of \$500,000 makes the program available to the vast majority of homeowners in the state. Furthermore, the partial exemption of \$30,000 of home value for general taxpayers or \$62,200 for seniors does not link directly to the homeowner's property tax burden.

Another way to characterize circuit breakers is to identify who pays for the property tax relief. Circuit breaker mechanisms can be either state funded or locally funded. With state-funded circuit breakers the state government pays for the property tax relief provided. In the case of a circuit breaker administered as an income tax credit, for example, the property owner first pays the full property tax bill to the local government units levying a property tax and then receives a credit from the state government providing property tax relief. With this mechanism the local governments receive the full amount of property tax due and the state pays the cost of tax relief independently of the local units. Administratively, this is a clean mechanism. One problem with this mechanism, however, is that the property owner must pay the full tax bill and only later receive tax relief. This is a back-loaded mechanism in terms of providing tax relief. Various mechanisms for frontloading the tax relief are possible, although they are administratively more difficult. Some states provide a credit against the next year's property tax bill, for example. With a locally funded circuit breaker, the local government units that levy the property tax provide direct relief to qualifying homeowners or renters. But, in this case, they do not receive any payment from the state government to make them whole. The loss of property tax revenue due to the circuit breaker mechanism must be made up in some other way. Generally speaking, the local

government units are most likely to spread the property tax burden over the remaining property taxpayers by raising property tax rates, thereby shifting the tax burden to them.

Design of a circuit breaker mechanism first requires a decision on whether to level the property tax share of income for recipients, in which case the threshold-type program is appropriate, or to leave property tax differences in place and simply provide relief for the low income homeowners, in which case a sliding-scale program is appropriate. The second step in circuit breaker program design is to make a decision regarding what it means to be over-burdened by the property tax. In what follows we will emphasize the threshold-type circuit breaker program for illustrative purposes, although we will also comment on sliding scale programs where appropriate.

With a threshold-type circuit breaker the key issue is to specify a threshold share of household income spent on property taxes, beyond which the taxpayer is considered overburdened by the tax. Hence, property tax relief is provided to only those taxpayers whose property tax bill exceeds a specified percentage of their income. For this purpose, the definition of income should be very broad in order to make the circuit breaker as fair as possible. For example, if a narrow definition of income were used that included only wage and salary income, as is used for the payroll tax, then very wealthy taxpayers whose primary source of income is interest income or dividends could qualify for property tax relief when such taxpayers do not really need that relief. States using an income tax credit to administer their circuit breaker should use the broadest measure of income reported on the state income tax form (e.g. adjusted gross income, AGI, from the federal tax return) and should also require taxpayers add other income sources as well. For example, tax-exempt municipal bond interest should be included. This is critical to assuring equity in the program, treating equals (in regards to income levels regardless of income sources) equally.

In addition, the size of the credit, refund, or direct tax property tax reduction must be specified. Policymakers must determine how much of the property tax paid in excess of the threshold level of income should be refunded. While it might be tempting refund all of the excess, there are several considerations to examine. First, the higher the share of the excess refunded the more expensive is the circuit breaker program. The state must pay for the property tax relief and the more generous the circuit breaker formula, the more expensive is the program. Second, it is important to consider how the circuit breaker mechanism may affect incentives. The more generous the circuit breaker, the lower the cost of additional local public services. Taxpayers qualifying for the circuit breaker tax relief may therefore have an incentive to vote in favor of additional local property taxes because their tax price is being reduced. In addition, a more generous program may lower the tax price of public services for a larger share of the electorate. While the demand for local public services may not be highly responsive to the tax price, it is nevertheless important to be cautious about making the tax price of additional services low via a circuit breaker.

With a sliding-scale type of circuit breaker program, it is necessary to determine the income levels at which homeowners will receive relief and how that relief will decline and taper off at higher income levels. The income levels, number of income brackets, and the phase-out mechanism are critical design issues to be determined.

Other Circuit Breaker Design Issues

Non-Elderly Coverage: States must consider whether they want to provide property tax relief only for elderly households, or to include low income non-elderly households in their circuit breaker program. There is often a presumption that elderly households are living on fixed incomes and therefore need some form of property tax relief. That generalization is not fully accurate, however, as there are wealthy elderly households as well. A political decision to provide relief for all elderly households may therefore include non-deserving wealthy households. Furthermore, states sometimes include disabled, blind, veteran, and other categories of non-elderly households in their circuit breaker coverage due to policy concerns.

Renter Coverage: Another policy issue to consider is how to include renters in the property tax relief program. While the landlord technically pays the property tax to the local government units, the effective burden of the property tax is often passed on to the renters. Hence, many state circuit breakers include renters who are able to count a certain percentage of their annual rent as property tax paid. States use percentages from 15 to 35 percent as their assumed proportion of rent paid that is effectively property tax paid by the renters. Bowman et al (2009) suggest that these percentages are probably too high, overstating the extent to which renters are actually paying property taxes.

Credit Cap: In order to limit the cost of a circuit breaker program, the state may wish to cap the size of credit that any individual taxpayer may receive. Furthermore, a credit cap limits relief to any one claimant and avoids the problem of giving too much tax relief to owners of very large or very valuable homes.

Refundable Credit: If the circuit breaker tax relief is provided via state income tax credit that is fully refundable, a taxpayer who has zero income tax liability can still receive the full amount of the property tax credit. That makes the income tax more progressive than it would be otherwise. In fact, for states with a flat rate income tax, the presence of a circuit breaker can make the tax progressive (in addition to other income tax features such as its personal exemptions and standard deduction). Some states choose to keep the circuit breaker tax relief distinct from the state income tax, avoiding potential confusion on the part of taxpayers.

Capitalization: To the extent that a circuit breaker mechanism lowers property tax burdens generally in a local government jurisdiction, we can expect that the tax relief will be capitalized into higher property values. That provides a one-time increase in wealth for current property owners who benefit from the tax relief. Subsequent buyers of homes pay prices that presumably take the property tax relief into account so there is no effect for them. If the tax relief is more highly targeted to individual homeowners in need of relief, however, there is little likelihood of a capitalization effect.

Circuit Breakers in the United States

The majority of circuit breaker programs in the United States are focused on providing relief to elderly homeowners and renters. Table 2 lists the state funded circuit breakers by type of coverage. Twenty-one states provide relief to the elderly only. Beyond coverage for the elderly, another thirteen states provide relief to homeowners and renters of all ages. There are seventeen states without any form of state-funded circuit breaker property tax relief. Some states, notably Virginia, permit local governments to implement and fund their own circuit breakers. These circuit breakers are not included in Table 2. Table 3 lists the primary type of state-funded circuit breaker used by states for both elderly and non-elderly homeowners.

There are three mechanisms used by states in administering their circuit breaker programs: direct rebate checks, income tax credits, and property tax exemptions or credits. The upper panel of Table 4 illustrates the states using each approach and summarizes some of the policy concerns associated with each approach. The lower panel of Table 4 lists some administrative objectives for each of the methods used to deliver income-based property tax relief.

A direct rebate check is provided by seventeen states. This mechanism requires an independent mechanism (separate from the state income tax) by which taxpayers document their income and property tax bills. This mechanism may be administered at either the state or local level, but requires taxpayers to submit tax return information and property tax bill information. While any circuit breaker mechanism requires both income tax and property tax data for implementation, mechanisms of delivery other than a state income tax credit require this information and an independent administration system. In the case of a rebate, the state must create an independent rebate administration mechanism. Notably, the states without a broad based personal income tax (New Hampshire, Nevada, South Dakota, and Wyoming) administer their property tax relief in this way.

Configuring the property tax relief as an income tax credit, as is done by eleven states and the District of Columbia, eliminates the need for an independent mechanism, but that advantage is counterbalanced by the experience that such a mechanism results in poor awareness among taxpayers that the state is providing local property tax relief. Also, an income tax credit mechanism provides back-loaded relief, requiring the taxpayer to first pay the entire property tax bill and only later receive an income tax credit. Methods of front loading the credit are possible but require more complex administrative processes.

With this and other circuit breaker mechanism designs, taxpayers may or may not recognize that they are receiving property tax relief. Of course, policymakers want taxpayers to know that their property taxes are being reduced. Hence, mechanisms that make that clear to taxpayers are generally preferred. The only potential problem with that recognition, however, is that there may be an incentive for recipients to vote in favor of higher local property taxes as they realize the marginal tax prices of public services is being reduced.

Finally, a property tax exemption or credit mechanism is provided by ten states. This mechanism requires that taxpayers document their income to the local assessor or other administrative officer. The advantages of this approach include the fact that the local government unit already

has the property tax information and delivery of the property tax relief in this form may make it more apparent to the taxpayer that relief is being provided. If the mechanism is state funded, it also requires that the state have in place or create a mechanism by which it can reimburse local government units for the lost property tax revenue.

Regardless of the mechanism used, with a state-funded mechanism the state is placing itself in the role of providing a degree of local property tax relief. Consequently, policy decisions regarding the circuit breaker mechanism should be made taking into account the larger context of the state's method of distributing other forms of aid to local governments. Grants to local governments, revenue sharing formulas, and state aid distribution mechanisms are other methods by which the state provides assistance to local government units. These mechanisms alter the local governments' needs for tax revenue, including property tax revenue. In the case of a state-funded circuit breaker, the state is also stepping in to alter the local property tax burden, if only for a select number of program recipients. Hence, a wider view of the entire array of intergovernmental transfers may be useful.

Benefits, Costs, and Distributional Consequences of Circuit Breakers

A tax expenditure report should provide the basic facts regarding a state's circuit breaker program and analysis of the foregone tax revenue. Since the ultimate purpose of a tax expenditure report is to make transparent expenditures that occur indirectly through the tax system, it is essential that such a report provide a complete explanation of the tax feature and its fiscal implications. At a minimum, a tax expenditure report for a state circuit breaker program should provide the following:

- Explanation of the circuit breaker program, with references to enabling statutes
- Estimates of the cost of the program in terms of foregone revenues over the past several fiscal years
- Analysis of who the program recipients are, by income level, age, household characteristics, geographic location, and other factors relevant to the program.

In the simplest analysis of circuit breaker programs, the naive assumption is that the amount of property tax relief provided to homeowners is a measure of both the benefit and the cost of the program.

Many states produce an annual tax expenditure report that includes the above information for a number of years and then produce an occasional policy report that examines the tax expenditure report in more depth. A more complete analysis, as might be conducted for an in-depth policy report, would also include insights regarding the benefits of the program and an assessment of whether the program benefits justify its costs:

- Distributional analysis of program benefit incidence and cost incidence (by income level)
- Differential incidence analysis that examines program net benefits compared to the replacement revenue required
- Policy analysis of whether the stated policy goal of the tax expenditure is being accomplished effectively and efficiently

Benefits

The direct benefits provided by a circuit breaker mechanism are measured in terms of the amount of property tax relief given to needy recipients. With circuit breakers, the benefit is simply the reduction in property taxes for low income households, reducing their tax burden. That may enable homeowners to remain in their homes when otherwise they would have been forced out due to high property tax burdens relative to their incomes. For renters qualifying for a credit, their after-tax income rises, enabling them to afford other necessities.

Since the tax relief is typically state-funded, the state government bears the burden of providing local property tax relief. Local government units are held harmless in the sense that they derive the full amount of property tax that their local rates would generate given the tax base. The state either provides the tax relief to needy homeowners and renters independently of the local tax administration mechanism (as with a credit applied via the state income tax) or reimburses the local government units if the relief is administered locally.

Indirect benefits may also be recognized, beyond the value of the direct property tax relief provided, but they are difficult to measure and quantify. For example, the benefit of enabling an elderly homeowner to stay in her home and afford her property tax payment is a very real benefit. Yet, it is difficult to know exactly how many recipients are able to stay in their homes due to the circuit breaker relief provided. We cannot assume that this is the case for all recipients. Glaeser and Shapiro (2003) find, for example, that there are externalities associated with homeownership that may justify subsidies. They find that homeownership is associated with political activism, social connection, increased home maintenance and gardening, among other factors. Evidence of the economic effect of homeownership on others is captured in their finding that a 10% increase in homeownership is associated with a 1.5% increase in home prices. That is, people seem to be willing to pay more to locate near homeowners. If homeownership creates these positive benefits for others in a community (besides the private benefits provided to the homeowner directly), and if a circuit breaker mechanism to provide property tax relief helps people become or remain homeowners, then there are indirect benefits to recognize.

Of course, there are other mechanisms available for homeowners to be able to stay in their homes despite the need to pay property taxes when their incomes are low. Many elderly homeowners have substantial home equity built into their portfolios, which they can draw upon to pay living expenses including property taxes. Reverse mortgages allow homeowners to extract a portion of their wealth tied up in their homes without having to sell or move. Until recent years the reverse mortgage market was not very active, but in the past several years it has seen a substantial increase in activity (Shan 2011).

Costs

The direct cost of a circuit breaker mechanism is foregone state income or local property tax revenue. In addition, there is also the cost of administering the circuit breaker program. No matter what the delivery mechanism, any income-based method of providing property tax relief has an administrative cost. The size of that administrative cost depends on the delivery mechanism. Furthermore, the answer to the question of who bears that cost depends on the mechanism used. State-funded relief provided by way of an income tax credit, for example, increases the cost of administering the state income tax system. That additional cost is borne by the state tax administration. On the other hand, a local government method of delivering non-state funded property tax relief imposes additional costs on the local government units (typically municipalities and counties) that administer the program. In addition, the circuit breaker claimants bear a compliance burden.

Indirect costs also arise with a circuit breaker mechanism. To the extent that the property tax burden is partially shifted to other tax bases and therefore to other taxpayers, the higher tax rates that result bring with them additional excess burdens. The excess burden of a tax is the efficiency cost of the tax, in terms of how much it distorts economic decisions, over and above the revenue it raises. The marginal excess burdens created due to higher alternative tax rates necessary to raise revenue is a very real cost for the economy, but it is difficult to precisely identify and measure this cost.

Distributional Consequences

Because circuit breakers provide tax relief that is tied to household income, the usual presumption is that the distribution of benefits is progressive. That is, the circuit breaker provides proportionally more tax relief to low income households than to high income households. But, the actual distribution depends crucially on the definition of income used in the circuit breaker program. If adjusted gross income (AGI) or taxable income (TI) are used from the taxpayer's federal income tax form, important sources of income are likely to be missing resulting in a narrow income measurement and thereby less assurance that the program is benefitting truly low income households. Furthermore, the extent to which the circuit breaker has a progressive impact on the overall tax structure of a state depends on whether the circuit breaker is state funded or locally funded. It also depends on the replacement revenue used to fund local public goods and services (so the differential incidence matters). Policymakers designing circuit breakers must take these distributional considerations into account. In this section we briefly discuss these issues.

Table 5 illustrates Langley's (2009) simulated single threshold circuit breaker and its distributional properties. As you move up the income distribution from the first decile (bottom ten percent) to the top decile (top ten percent), the percentage of households that are eligible to receive circuit breaker benefits falls from about 80% to about 9%. Median benefits provided by the circuit breaker vary as you move up the income distribution. The median amount is \$860 in the first decile, falls to a low of \$645 in the third decile, and then rises to a maximum of \$3,117 in the top decile. This distributional pattern is due to the way that housing expenditures, and

thereby property taxes, vary with income. It should be noted, however, that the benefit *as a share of income* generally falls as you move up the income distribution (from the fourth decile up).

One feature to note in Table 5 is the distinction between owners and renters. At lower income levels, a larger share of renters is eligible for the circuit breaker. Owners typically receive larger benefits, however. Of course, this pattern depends crucially on Langley's circuit breaker design. His simulated mechanism provides a benefit of 100% of the property tax paid in excess of 5 percent of household income. In terms of the single threshold mechanism design the credit provided is $C = P - .05Y$. He also simulates a multiple threshold mechanism, a sliding scale program, and a fixed homestead exemption. Each form of property tax relief has a distinct set of distributional characteristics depending on the parameters of the mechanism. In general, however, we can say that a multiple threshold circuit breaker can be made to be more progressive than a single threshold mechanism. By defining multiple thresholds and allowing the parameters to vary with each threshold, policy makers can build more progressivity into the circuit breaker mechanism. In this way, a given amount of state funding for property tax relief can be more specifically targeted to households needing that relief. Similarly, a sliding scale mechanism can be made highly progressive. The least progressive tax relief mechanism (not a circuit breaker) is a simple homestead exemption of a fixed amount of property value.

A crucial factor to consider in a more in-depth policy analysis is the replacement, or non-replacement of lost revenue. If a circuit breaker is not state funded, the local government units must replace the lost revenue with other local own-source revenue. In the State of Indiana, for example, local income and sales taxes are permitted precisely to fund property tax relief. The remaining property owners bear the burden of locally provided property tax relief, so there is a resulting tax redistribution occurring that needs to be considered and estimated. All remaining property owners bear the cost of the program through higher rates than they would otherwise have to pay. The extent of that redistribution depends on the generosity of the circuit breaker program and the precise means by which the replacement revenue is defined. If the replacement revenue comes solely from residential property owners, for example, the distributional impact will be different than if the replacement revenue comes from all property owners, including agricultural, industrial and commercial property owners. Redistribution of tax burden across classes of property creates great difficulty in estimating the distributional impact of a circuit breaker program.

The ultimate distributional consequence of a state-funded circuit breaker program depends on the source of replacement revenue used. If the replacement revenue comes from the state's general fund sources, then the distributional impact will be linked to the state's major general fund revenue sources. Those sources are most often the state income tax and/or state sales tax. In most cases the state sales tax is less progressive (or more regressive) than the state income tax.

Methodology Used for Analyzing the Cost of Circuit Breakers

As explained in Poterba (2011) and Altshuler and Dietz (2011), the first step in estimating tax expenditures is to define what is normal in a tax system. With the property tax system, in particular, it is necessary to define what is normal in order to estimate the foregone revenue

arising from deviations away from normal. If we begin with the widest possible definition of the tax base, we would include all property value in a state. Any exemptions would be the first form of tax expenditure, whether the exempt property is owned by the federal government, state government, other government units, or other tax exempt entities (e.g. churches, private universities, etc.) Partial exemptions such as homestead exemptions would also be considered tax expenditures. Beyond that, any property classification providing lower rates or reduced measures of value would be considered tax expenditures. Finally, circuit breakers or other forms of reduced property taxes would be considered tax expenditures.

Unfortunately, the estimation of tax expenditures is fraught with complexity and subject to substantial uncertainty. This is due to both the fundamental question of tax system definition (i.e., what is normal) and the inherent problem of estimation of taxes not collected. Nowhere is this truer than in the realm of property taxation.

Bowman et al (2009) report that in 2008 there were 14 states that provided easily accessible data on circuit breaker tax expenditures. Based on that data, Table 6 provides an overview of the cost of state circuit breakers for a selected set of states. The largest circuit breaker, in terms of the number of homeowners and renters covered, is that of Michigan which provides tax relief to nearly 1.5 million. The most generous circuit breaker programs, in terms of the average benefit, are those of Maryland (all ages) at \$851 and Vermont at \$712. The most expensive program, in terms of the aggregate amount of tax relief provided, is that of New Jersey which spends approximately one billion. Even the most generous circuit breakers, however, provide tax relief that is a relatively small fraction of the total property tax collected in the state. Michigan's program has a cost that is 6.27 percent of the total property tax collected in that state while New Jersey's program costs 5.20 percent. The other states listed in Table 6 have program costs that are in the general range of one to three percent of the property tax collected in the states.

The appropriate estimation method depends upon the administrative form of a state's circuit breaker program. For each of the major ways of providing income-based tax relief typically used by state and local governments, we summarize the methods used to estimate the foregone revenue in the following sections.

Direct Rebate Check

For states administering their property tax relief using a direct rebate check, the method of estimating the tax expenditure will depend on the precise mechanism employed to document a taxpayer's property tax bill and income. For example, the State of New Hampshire, which lacks a state income tax, administers its "Low and Moderate Income Homeowners Property Tax Relief" (LMIHPTR) program through the New Hampshire Department of Revenue Administration. Applicants must complete form DP-8, a four-page tax form, and submit the form to the Department for review and approval. The form requires homeowners to report both the federal adjusted gross income (AGI) (line 10(b)) and their property's assessed value (line 12(b)). This requirement illustrates the importance of taxpayer compliance costs as well as agency administrative costs in considering a circuit breaker program. Auditing claims for LMIHPTR for fraud may be difficult in such a case. While claimants are required to submit a copy of their federal tax return, the State of New Hampshire may not have the full advantage of using IRS data

for New Hampshire residents to audit claims because the IRS data exchange agreement with states specifically provides that only federal income tax data necessary to administer the state's tax laws can be shared.

Income Tax Credit

In states that administer their circuit breaker tax relief through a state income tax credit, the estimation process is relatively straightforward. The revenue department compiles income tax data on the credit claimants and sums the total of the credits provided to obtain a tax expenditure estimate. This is the way it is done in Michigan, for example, where in CY2007 there were a total of 1,482,900 recipients (general plus seniors) receiving \$844.2 million in credits (Source: Executive Budget, FY2010). The ease and accuracy with which the tax expenditure can be estimated in this way is a major advantage of this administrative form of implementation. No estimation is required. The actual credits can be summed for an accurate total. Beyond certain knowledge of the total, distributional information can also be generated to illustrate the tax benefit and its incidence across the income distribution or across geographic areas of the state. Careful policy analysis can be conducted using such data to determine whether the circuit breaker is effectively achieving its policy objectives.

Property Tax Exemption or Credit

Income-based exemptions or credits must typically be administered locally because the property tax is administered locally. Consequently, it is usually the local assessor (county or municipal) who is required to administer an income-based property tax exemption or credit program. A simple (fixed amount for all taxpayers in a specific class) exemption would be easy to administer, but when that exemption or credit is tied to an income qualification the program is much more difficult to administer locally. An income qualification requires the local property tax administrator to collect information on income, which is not normally a part of administering the property tax system. Beyond collecting income information, the local property tax administrator must be able to audit and verify income information. That may pose a substantial difficulty unless there is an agreement for the state to share income data with local governments.

In order to estimate the tax expenditure of an income-based exemption or credit program, the local tax administrators must report the number of exemptions or credits and the amounts of each to a central government authority that collects the information, aggregates the data, and conducts an analysis of the total cost of the program. The central government authority must also provide consistency checks to assure that reporting practices of local administrators are uniform. This role can be provided by the state department of revenue, treasury, or other such unit.

Case Study of the Idaho Property Tax Relief Program

In this section I demonstrate the computation of circuit breaker cost and distributional consequences for the State of Idaho. The purpose of this analysis is to demonstrate the ways in which benefits can be shown to accrue to program recipients. In this way, the cost of the program, in terms of foregone property tax revenue, can be viewed and analyzed. Policymakers

can use such analysis to see whether the program's policy objectives are being met effectively and efficiently.

The Idaho Property Tax Reduction Program (circuit breaker) began in 1974, growing out of a pre-existing widow's exemption. Benefits are provided for the elderly, disabled, and widowed homeowners in the state, with the lost revenue to local governments being reimbursed by the state. Hence, the program is state funded and has been since 1987, with a few years' exceptions when the state funding has been less than 100 percent. The State of Idaho (2011) tax expenditure report makes no mention of this program and includes no estimate of the tax expenditure involved. The Property Tax Policy Supervisor in the Property Tax Division of the State of Idaho does collect detailed data on the program, however, and made that data available for this analysis.

Table 7 provides a chronology over time of the number of claimants receiving benefits and the total cost of the program from 1974 through 2011. That table illustrates that the program has grown from approximately 16,000 households receiving \$1.9 million in benefits in 1974 to 28,000 households receiving \$16 million in benefits in 2011. Changes in the program over time broadened the base of potential recipients and the amount of property tax relief provided. The right-most columns of the table provide information on income eligibility rules of the program over time. Idaho homeowners who are elderly, widowed, blind, former prisoners of war, veterans, or disabled may receive property tax relief (up to \$1,320 in 2012) on their principal residence and up to one acre of land if their income is less than the maximum allowable income (\$28,000 in 2012). The measurement of income used in the Idaho program is discussed below. The property tax reduction income brackets are shown in Table 8. As income rises, the maximum benefit eligibility is reduced and is finally phased down to zero at the top income category ending at \$28,000. Figure 1 illustrates the growth in the total benefits paid over time.

The Idaho property tax relief program is linked to income for qualification purposes, but the property tax relief provided is not tied directly to the homeowner's property tax as a share of income. Hence, the Idaho program is considered a quasi-circuit breaker by the Bowman et al (2009) taxonomy. There are eight brackets of income within which qualified recipients may fall with the first bracket ranging from zero dollars of income up to \$11,270. Qualification ends at the upper limit of the eighth bracket at \$28,000. The program paid 59.15 percent of recipients' property taxes in 2011. For program qualification, the following sources of income must be included:

- Wages
- Interest and dividends
- Capital gains
- Business, farm, and rental net income
- Social Security and SSI
- Railroad Retirement
- Unemployment and workers compensation
- Pensions, annuities, and IRAs
- Military retirement benefits

- Department of Health and Welfare payments (Aid to Families with Dependent Children and housing assistance)
- Child support and alimony
- “Loss of earnings” compensation
- Disability income from all sources

Deductions from income are permitted for the following expenses:

- Medical/dental and related expenses not reimbursed by insurance or other reimbursement
- Medical insurance premiums
- Payment or prepayment of funeral expenses
- Farm, rental and/or business losses (You must submit a copy of the appropriate federal schedule.)
- Early withdrawal penalties
- Alimony paid

It should be noted that the Idaho program definition of income and allowance of deductions requires a sophisticated audit mechanism. Because the definition of income for program qualification purposes includes forms of income not a standard part of the state or federal income tax returns, the state must have a way to audit reported income on program claims. In addition, the program permits a number of deductions for specific expenses that are not listed on tax returns or other readily available sources. Hence, an audit mechanism must be able to verify those claimed deductions from income independently of tax return data. Non-conformity to state and federal income tax returns adds to the cost of administering a circuit breaker program and also makes audit and enforcement more difficult and expensive. The payoff to this non-conformity, however, is that the state is better able to meet the policy objective of the circuit breaker program.

Table 8 lists the Idaho program’s 36 income brackets and the maximum benefit that may be claimed by households in each bracket. Table 9 lists Idaho program recipients by income class in 2011. In this table, the 36 income brackets listed in Table 8 have been aggregated into 8 brackets. Some 27 percent of recipients were in the first income category, earning less than \$11,270. More than half of the total number of recipients earned income of less than \$16,060. Table 10 lists Idaho program claims by type of eligibility. Over 83 percent of the claims are for elderly homeowners. The remaining claims are primarily from younger widows and the disabled.

Table 11 provides information regarding audits of program claims. The table lists the number of total claims filed, claims changed in the process of audit, and claims denied. Overall in 2011, 98.51 percent of program claims were approved (numerator computed as total claims minus claims disapproved, with denominator total claims). The approval percentage ranged from a high of 100 percent in several counties to a low of approximately 97 percent in several counties.

Table 12 provides a listing of the Idaho program claims by income bracket and county. The property tax reduction varies across counties, from a low of 25.13 percent in Custer County to a high of 76.96 percent in Nez Perce County. Furthermore, there is substantial variation in the distribution of claims by income category across the counties.

Taken as a whole, Tables 7 through 12, along with a narrative explaining the Idaho quasi circuit breaker program could form the basis of a very solid entry in a state tax expenditure report. The statistical analysis reported here, based on excellent quality and comprehensive data collected in Idaho, is exemplary. Such data could also be used for an occasional policy report to analyze whether the state's property tax relief program is meeting the stated policy goals. Policymakers could then consider whether this mechanism is effectively delivering property tax relief to the intended recipients effectively and efficiently. Furthermore, they could benefit from analysis based on simulated alternative mechanisms that might improve program performance.

Tables & Figures

Table 1: Circuit Breaker Taxonomy

Type of circuit breaker	Comments
Threshold type	This is the classic type of circuit breaker, providing relief when the property tax burden exceeds a threshold level, relative to household income
Single threshold	When property tax relative to income rises above the threshold, the circuit breaker trips and property tax relief is provided
Multiple threshold	Adds progressivity to the circuit breaker mechanism as the threshold level rises with income level
Sliding scale type	Income brackets are specified with all qualifying households in each bracket eligible for a given percentage reduction in property taxes, regardless of the size of their property tax bill
Hybrid and quasi type	Hybrids combine elements of threshold and sliding scale mechanisms. Quasi circuit breakers typically use multiple income brackets to provide benefits that decline as income rises. But, benefits are generally not related to actual property tax liabilities.

Source: Adapted from Bowman et al (2009)

Table 2: State-Funded Circuit Breakers in the United States

Type of Coverage	States
Elderly only (21)	Arizona, California ^a , Colorado, Connecticut, Idaho, Illinois, Iowa, Kansas, Massachusetts, Missouri, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Pennsylvania, South Dakota, Washington, Wyoming, Utah
All ages (13)	District of Columbia, Maine, Maryland, Michigan, Minnesota, Montana, New Hampshire, New Jersey, New York, Rhode Island, Vermont, West Virginia, Wisconsin
No circuit breaker (17)	Alabama, Alaska, Arkansas, Delaware, Florida, Georgia, Hawaii, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, Ohio, South Carolina, Tennessee, Texas, Virginia

Notes: (a) California suspended funding for its circuit breaker in 2008. (b) Some states permit local governments to implement and fund their own circuit breakers, as in the case of Virginia.

Source: Bowman et al (2009) supplemented by data in Significant Features of the Property Tax 2009.

Table 3: Types of State-Funded Circuit Breakers used by States

Type of circuit breaker	States using this type of circuit breaker for elderly homeowners	States using this type of circuit breaker for non-elderly homeowners
Threshold type		
Single threshold	(5) Illinois, Maine, Massachusetts, Oklahoma, West Virginia	(3) Maine, Michigan, West Virginia
Multiple threshold	(9) Delaware, District of Columbia, Maryland, Michigan, Missouri, New Mexico, Rhode Island, Wisconsin, Vermont	(5) Delaware, District of Columbia, Rhode Island, Vermont, Wisconsin
Sliding scale type	(10) Connecticut, Iowa, Kansas, Nebraska, Nevada, New Hampshire, New Jersey, North Dakota, South Dakota, Washington	(3) Montana, New Hampshire, New Jersey
Hybrid and quasi type	(7 quasi) Arizona, California, Colorado, Idaho, Pennsylvania, Utah, Wyoming (3 hybrid) Minnesota, New York, Oregon	(0 quasi) (2 hybrid) Minnesota, New York

Source: Bowman et al (2009) supplemented by data in Significant Features of the Property Tax 2009.

Table 4: Administrative Mechanisms used for Income-based Property Tax Relief

	Direct rebate check	Income tax credit	Property tax exemption or credit
States using this approach	California, Colorado, Connecticut (R), Illinois, Iowa (R), Kansas, Maine, Maryland (R), Minnesota, New Hampshire*, New Jersey, Nevada*, Oregon, Pennsylvania, South Dakota*, Vermont (R), Wyoming*	Arizona, District of Columbia, Massachusetts, Michigan, Missouri, Montana (E), New Mexico, New York, Oklahoma, Rhode Island, Wisconsin, West Virginia	Connecticut (O), Idaho, Iowa (O), Maryland (O), Montana (D), Nebraska, North Dakota, Utah, Vermont (O), Washington*
Administrative concerns about this approach	<ul style="list-style-type: none"> • Requires an independent mechanism by which taxpayers document their income and property tax bills • State must create an independent rebate administration mechanism 	<ul style="list-style-type: none"> • Awareness among taxpayers that the state is providing property tax relief tends to be low • Cannot be used by states with no income tax • Back loaded tax relief 	<ul style="list-style-type: none"> • Taxpayers must document their income to local assessor or other administrative officer • State must create mechanism by which to reimburse local government units for lost property tax revenue

Notes: R indicates program applies to renters, O indicates program applies to owners, D indicates program applies to under 62 and disabled veterans. * indicates that the state has no broad based personal income tax.

Sources: Lyons et al (2007), Significant Features of the Property Tax (2011), and Bowman et al (2009) Tables 6.1 and 6.2.

Table 5: Simulated Eligibility Rates and Median Benefits by Income Decile for a Single-Threshold Circuit Breaker

Income Decile	Income Range (\$)	Percent of Households Eligible for Benefits (%)			Median Benefit (\$)		
		Owners	Renters	Total	Owners	Renters	Total
1	Up to 11,900	68.6	86.3	79.5	955	832	860
2	11,901 to 20,190	51.8	79.8	66.0	905	590	672
3	20,191 to 29,160	41.8	61.6	50.4	945	484	645
4	29,161 to 38,000	34.6	41.5	37.3	975	452	680
5	38,001 to 48,100	28.1	26.0	27.4	1,010	515	830
6	48,101 to 60,000	23.7	17.3	21.9	1,095	580	945
7	60,001 to 74,100	18.7	11.3	17.1	1,200	575	1,050
8	74,101 to 94,000	15.9	7.5	14.5	1,425	730	1,330
9	94,001 to 130,000	14.5	4.7	13.3	1,525	795	1,500
10	Over 130,001	9.6	1.1	8.9	3,225	660	3,117
Total		26.6	49.2	33.7	1,100	625	820

Source: Langley (2009) Table A.1.

Notes: (a) the income measure used in the Langley (2009) study is that contained in the American Community Survey (ACS). Survey respondents are asked to report wages, salary, commissions, bonuses, or tips from all jobs. In addition, they are asked to report self-employment income, interest, dividends, net rental income, royalty income, income from estates and trusts, social security or railroad retirement income, supplemental security income payments, public assistance or welfare payments, retirement, survivor or disability pensions, and other income. (b) Langley (2009) used the 2006 ACS data.

Table 6: Reported Cost of State-Funded Circuit Breakers, Selected States

State	Year	Eligibility	Number of Beneficiaries	Estimated Average Benefit (\$)	Cost of Total Program (\$ million)	Program Cost as a Percent of Total Property Tax Collected
MA	2006	65+			29.8	0.28
MD	2006	All ages/60+	56,818	851/265	42.5	0.71
ME	2006	All ages	92,000	443	42.8	1.94
MI	2010	All ages	1,488,757	544	809.4	6.27
MN	2006	All ages	301,406	630	190.0	3.56
MT	2005	62+	24,424	474	11.6	1.16
NJ	2006	All ages	1,106,871	966	1,069.0	5.20
NM	2005	65+	20,228	193	3.9	0.45

NY	2005	All ages	275,000	109	30.0	0.09
OK	2006	65+			0.1	0.004
PA	2007	65+	417,052	489	203.8	1.43
RI	2007	All ages	50,964	277	14.1	0.75
VT	2005	All ages	34,534	712	30.3	2.87
WI	2006	All ages	239,546	509	121.9	1.52

Source: Bowman et al (2009) p. 20.

Table 7: Idaho Quasi Circuit Breaker Program Characteristics, 1974–2011

Program Claims			Program Benefits				Program Eligibility	
Year	Number of claims	Change in number of claims (%)	Average benefit per claimant (\$)	Change in average benefit per claimant (%)	Total benefits paid (\$ mil)	Change in total benefits paid (%)	Maximum Income (\$)	Maximum Benefit (\$)
1974	15,924		117.43		1.87		5,000	200
1975	13,912	-12.60%	116.45	-0.80%	1.62	-13.40%	5,000	200
1976	14,336	3.00%	117.19	0.60%	1.68	3.70%	5,500	200
1977	13,322	-7.10%	119.35	1.80%	1.59	-5.40%	5,500	200
1978	15,786	18.50%	184.34	54.50%	2.91	83.00%	7,500	400
1979	15,467	-2.00%	185.56	0.70%	2.87	-1.40%	7,500	400
1980	15,650	1.20%	174.44	-6.00%	2.73	-4.90%	8,750	400
1981	17,160	9.60%	174.83	0.20%	3.00	9.90%	10,000	400
1982	17,633	2.80%	182.61	4.50%	3.22	7.30%	11,100	400
1983	17,649	0.10%	177.35	-2.90%	3.13	-2.80%	11,900	400
1984	17,417	-1.30%	181.43	2.30%	3.16	1.00%	11,900	400
1985	17,347	-0.40%	188.51	3.90%	3.27	3.50%	12,300	400
1986	17,605	1.50%	199.94	6.10%	3.52	7.60%	12,730	400
1987	18,757	6.50%	206.32	3.20%	3.87	9.90%	13,120	400
1988	19,725	5.20%	210.90	2.20%	4.16	7.50%	13,320	400
1989	20,073	1.80%	214.22	1.60%	4.30	3.40%	13,860	400
1990	20,777	3.50%	216.10	0.90%	4.49	4.40%	14,410	400
1991	21,026	1.20%	218.30	1.00%	4.59	2.20%	15,100	400
1992	21,222	0.90%	284.14	30.20%	6.03	31.40%	15,920	600
1993	22,324	5.20%	336.04	18.30%	7.50	24.40%	16,510	800
1994	23,012	3.10%	358.13	6.60%	8.24	9.90%	16,990	800
1995	24,254	5.40%	363.04	1.40%	8.81	6.80%	17,430	800
1996	24,185	-0.30%	397.27	9.40%	9.61	9.10%	17,910	900

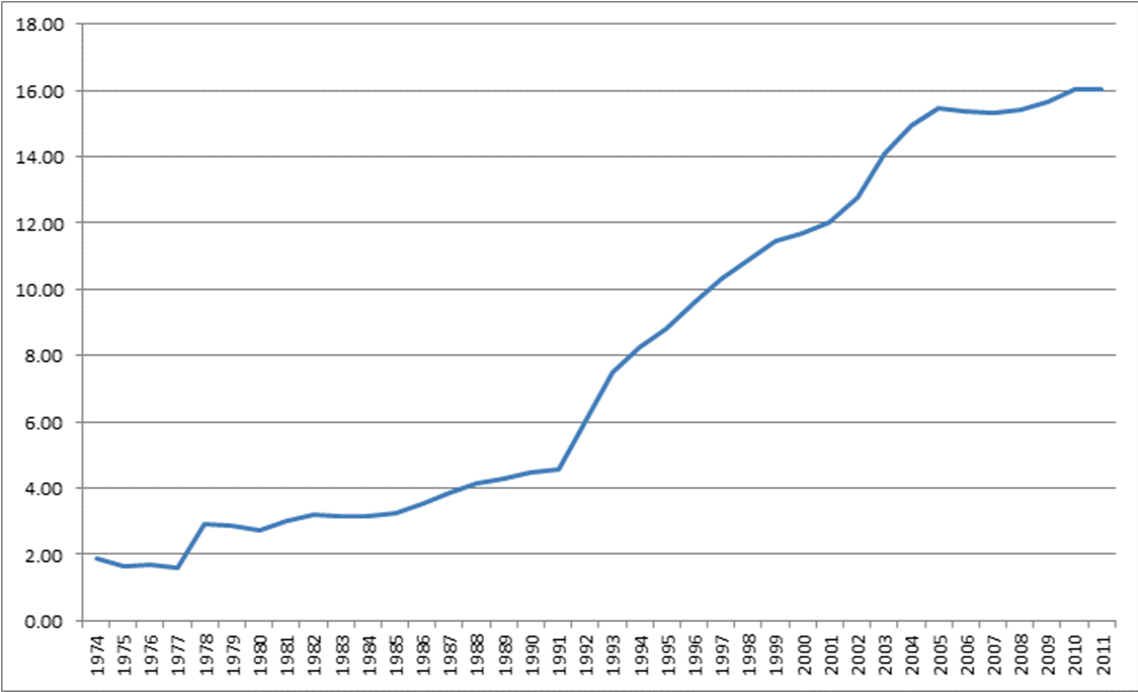
1997	24,629	1.80%	419.29	5.50%	10.33	7.50%	18,380	1,000
1998	24,431	-0.80%	445.75	6.30%	10.89	5.50%	18,920	1,100
1999	24,331	-0.40%	471.42	5.80%	11.47	5.30%	19,310	1,200
2000	24,209	-0.50%	483.29	2.50%	11.70	2.00%	19,570	1,200
2001	24,175	-0.10%	496.38	2.70%	12.00	2.60%	20,050	1,200
2002	24,684	2.10%	517.34	4.20%	12.77	6.40%	20,750	1,200
2003	26,031	5.50%	540.78	4.50%	14.08	10.30%	21,290	1,200
2004	26,493	1.80%	564.93	4.50%	14.97	6.30%	21,580	1,200
2005	26,656	0.60%	579.46	2.60%	15.45	3.20%	22,040	1,200
2006	28,737	7.80%	534.09	-7.80%	15.35	-0.60%	28,000	1,320
2007	28,202	-1.90%	543.12	1.70%	15.32	-0.20%	28,000	1,320
2008	27,831	-1.30%	554.43	2.10%	15.43	0.70%	28,000	1,320
2009	27,920	0.30%	561.40	1.30%	15.67	1.60%	28,000	1,320
2010	28,399	1.70%	565.21	0.70%	16.05	2.40%	28,000	1,320
2011	28,479	0.30%	562.54	-0.50%	16.02	-0.20%	28,000	1,320

**Table 8: Idaho Quasi Circuit Breaker Program
Income Brackets and Maximum Benefits, 2012**

Lower Bracket Amount (\$)	Upper Bracket Amount (\$)	Maximum Benefit Eligibility (\$)
0	11270	1320
11271	11750	1290
11751	12220	1250
12221	12690	1220
12691	13190	1190
13191	13630	1160
13631	14140	1120
14141	14600	1090
14601	15080	1060
15081	15550	1020
15551	16060	990
16061	16540	960
16541	17000	920
17001	17470	890
17471	17950	860
17951	18450	820
18451	18900	790
18901	19390	760
19391	19860	720
19861	20360	690

20361	20840	660
20841	21280	620
21281	21780	590
21781	22260	560
22261	22730	520
22731	23210	490
23211	23710	450
23711	24180	420
24181	24640	390
24641	25110	350
25111	25610	320
25611	26080	290
26081	26550	250
26551	27020	220
27021	27490	190
27491	28000	150

**Figure 1: Idaho Quasi Circuit Breaker Program
Total Benefits Paid, 1974–2011 (\$ millions)**



**Table 9: Idaho Quasi Circuit Breaker Program
Claims by Income Bracket, 2011**

Income brackets		Number of claims	Percent of claims	Cumulative % of claims
At least:	Up to:			
	11,270	7,694	27.00%	27.00%
11,271	13,630	4,070	14.30%	41.30%
13,631	16,060	3,798	13.30%	54.60%
16,061	18,450	3,488	12.20%	66.90%
18,451	20,840	3,040	10.70%	77.60%
20,841	23,210	2,549	9.00%	86.50%
23,211	25,610	2,248	7.90%	94.40%
25,611	28,000	1,592	5.60%	100.00%
Total:	28,479	100.00%		

**Table 10: Idaho Quasi Circuit Breaker Program
Claims by Type of Eligibility, 2011**

Claimant status	Number of Claims	% of Claims
Over age 65	23,687	83.20%
Younger Widows	905	3.20%
Younger Widowers	60	0.20%
10 + SC VA Disabled	239	0.80%
Non-SC VA Disabled	30	0.10%
Social Security Disabled	2,920	10.30%
Other & Multiple	638	2.20%
Total	28,479	100.00%

**Table 11: Idaho Quasi Circuit Breaker Program
Claims, Audits, and Benefits by County, 2011**

County	Number of claims	Number of claims changed	Number of claims disapproved	Number of claims approved	Percent of claims approved	Benefits Paid (\$)
Ada	3,840	263	67	3,773	98.26	2,522,916.46
Adams	199	10	4	195	97.99	74,199.76
Bannock	1,447	109	13	1,434	99.10	909,590.64
Bear Lake	215	9	3	212	98.60	72,826.02
Benewah	383	26	5	378	98.69	136,448.98
Bingham	809	63	25	784	96.91	435,448.04
Blaine	115	8	0	115	100.00	85,209.00

Boise	163	10	3	160	98.16	76,111.54
Bonner	1,146	87	23	1,123	97.99	508,390.28
Bonneville	1,589	106	25	1,564	98.43	987,026.14
Boundary	390	19	2	388	99.49	170,873.00
Butte	96	4	2	94	97.92	36,344.74
Camas	20	5	1	19	95.00	10,442.68
Canyon	3,355	184	39	3,316	98.84	2,008,264.68
Caribou	144	5	2	142	98.61	73,071.98
Cassia	519	66	22	497	95.76	190,849.02
Clark	11	1	0	11	100.00	2,240.68
Clearwater	374	17	5	369	98.66	155,639.18
Custer	117	9	1	116	99.15	27,709.44
Elmore	451	38	7	444	98.45	224,918.88
Franklin	268	29	4	264	98.51	147,477.88
Fremont	374	58	11	363	97.06	162,969.42
Gem	667	61	10	657	98.50	280,459.92
Gooding	405	31	4	401	99.01	212,102.32
Idaho	689	58	10	679	98.55	240,173.44
Jefferson	435	25	4	431	99.08	248,533.10
Jerome	508	68	15	493	97.05	316,199.78
Kootenai	2,898	175	51	2,847	98.24	1,624,506.51
Latah	405	59	8	397	98.02	246,552.28
Lemhi	367	32	3	364	99.18	134,780.88
Lewis	170	27	3	167	98.24	87,085.14
Lincoln	101	8	0	101	100.00	46,881.18
Madison	291	28	6	285	97.94	181,409.42
Minidoka	674	17	6	668	99.11	290,507.54
Nez Perce	1,033	100	8	1,025	99.23	737,986.26
Oneida	123	16	1	122	99.19	59,380.28
Owyhee	274	44	2	272	99.27	89,611.76
Payette	768	52	10	758	98.70	401,882.62
Power	168	16	0	168	100.00	100,214.78
Shoshone	711	60	7	704	99.02	360,060.74
Teton	51	6	1	50	98.04	24,696.68
Twin Falls	1,553	56	10	1,543	99.36	1,015,130.02
Valley	167	10	4	163	97.60	80,388.34
Washington	428	22	5	423	98.83	223,182.50
Totals:	28,911	2,097	432	28,479	98.51	16,020,693.93

**Table 12: Idaho Quasi Circuit Breaker Program
Claims by Income and County, 2011**

County	\$11,270 or less	\$11,271 – 13,630	\$13,631- 16,060	\$16,061 – 18,450	\$18,451 – 20,840	\$20,841 – 23,210	\$23,211 – 25,610	\$25,611 – 28,000	Claims approved	Property tax reduction (%)
Ada	849	540	514	487	410	375	376	222	3,773	72.99
Adams	59	30	20	21	19	21	16	9	195	39.48
Bannock	320	199	213	177	182	149	128	66	1,434	68.56
Bear Lake	64	27	26	19	19	32	14	11	212	36.19
Benewah	95	48	51	57	39	22	34	32	378	39.06
Bingham	191	133	102	106	72	71	58	51	784	58.68
Blaine	50	14	9	12	13	7	2	8	115	71.51
Boise	36	28	27	27	17	9	7	9	160	48.70
Bonner	314	169	134	124	130	92	80	80	1,123	47.66
Bonneville	364	232	230	206	149	143	143	97	1,564	67.87
Boundary	121	64	54	46	37	28	25	13	388	43.72
Butte	25	8	11	19	8	8	11	4	94	41.94
Camas	5	0	3	2	2	4	2	1	19	64.44
Canyon	889	500	451	400	365	290	245	176	3,316	63.23
Caribou	51	20	26	19	10	8	5	3	142	48.58
Cassia	115	78	59	84	53	46	37	25	497	40.78
Clark	1	3	0	1	2	1	0	3	11	26.22
Clearwater	104	34	51	53	42	27	37	21	369	45.22
Custer	32	12	19	14	15	9	10	5	116	25.13
Elmore	112	61	58	62	44	42	37	28	444	54.26
Franklin	89	33	25	25	26	25	26	15	264	58.40
Fremont	120	47	46	26	35	37	29	23	363	46.60
Gem	167	87	82	87	69	61	53	51	657	46.25
Gooding	132	49	62	50	40	29	18	21	401	52.92
Idaho	220	96	75	90	68	51	46	33	679	35.86
Jefferson	127	71	43	57	45	30	31	27	431	59.49
Jerome	151	63	70	50	66	34	31	28	493	65.93
Kootenai	767	380	386	347	310	251	221	185	2,847	60.54
Latah	105	59	49	53	43	35	26	27	397	65.53
Lemhi	128	47	43	40	32	31	24	19	364	37.31
Lewis	49	20	23	26	20	15	10	4	167	53.06
Lincoln	36	13	9	16	8	9	9	1	101	46.12
Madison	88	39	43	40	22	28	18	7	285	63.69
Minidoka	193	94	88	84	57	56	51	45	668	45.44
Nez Perce	268	135	128	127	121	104	92	50	1,025	76.96
Oneida	46	16	9	12	15	12	8	4	122	48.68

Owyhee	78	40	41	25	34	24	24	6	272	33.69
Payette	226	101	102	75	80	78	55	41	758	55.22
Power	49	25	21	12	18	23	10	10	168	62.64
Shoshone	178	111	109	77	77	54	58	40	704	53.64
Teton	21	8	5	3	6	3	1	3	50	47.03
Twin Falls	458	242	211	177	155	129	105	66	1,543	66.79
Valley	49	28	19	12	20	15	16	4	163	50.39
Washington	152	66	51	41	45	31	19	18	423	51.56
Totals:	7,694	4,070	3,798	3,488	3,040	2,549	2,248	1,592	28,479	59.15
% of Approved Claims	27.02%	14.29%	13.34%	12.25%	10.67%	8.95%	7.89%	5.59%	100.00%	

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Appendix

This appendix provides technical detail on the way that circuit breaker formulas work, with example simulations of several variants.

Single Threshold Circuit Breaker Design

A simple single threshold type of circuit breaker takes the form of an income tax credit C for which a taxpayer qualifies if her property tax liability P exceeds a threshold share b of her income Y . The credit is then a fraction a of the amount by which the property tax exceeds the specified share of income bY . The credit can be written as,

$$C = a[P - bY], \text{ if } P > bY$$
$$C = 0, \text{ otherwise}$$

Multiple Threshold Circuit Breaker Design

Multiple threshold circuit breakers allow for more progressive delivery of tax relief than the single threshold circuit breaker. As income rises, the size of the property tax credit is scaled down and eventually disappears. A multiple threshold circuit breaker with three distinct thresholds ($b_1 < b_2 < b_3$) can be written as,

$$C = a_1[P - b_1Y], \text{ if } b_1Y \leq P < b_2Y$$
$$C = a_2[P - b_2Y], \text{ if } b_2Y \leq P < b_3Y$$
$$C = a_3[P - b_3Y], \text{ if } P > b_3Y$$
$$C = 0, \text{ otherwise}$$

With this type of circuit breaker, the higher the property tax burden relative to income, the greater the share of property tax relief that can be provided ($a_1 < a_2 < a_3$). For example, a state could specify property tax relief at increasing levels for taxpayers whose property tax bills are at least 3, 5, or 7 percent of income ($b_1 = .03$, $b_2 = .05$, $b_3 = .07$).

Sliding Scale Circuit Breaker Design

With a sliding scale circuit breaker, income brackets are specified with all households in each bracket eligible to qualify for a given percentage reduction in property taxes, regardless of the size of their property tax bill. Housing expenditures generally rise with family income, but not proportionately. Consequently, we expect that low income families will pay a larger share of family income on housing and therefore on property taxes in comparison with high income families. The sliding scale form of circuit breaker provides property tax relief based on income with the explicit intention of leaving differences across taxpayers in place.

For example, here is how a sliding scale circuit breaker with three brackets would work. The credit C provided is a fraction (a) of the property tax P paid, where the fraction depends on income Y . As income rises from zero up through Y_3 , the fraction of property tax refunded declines, with $a_1 > a_2 > a_3$. Taxpayers with income in excess of Y_3 receive no credit.

$$C = a_1P, \text{ if } 0 \leq Y \leq Y_1$$

$$C = a_2P, \text{ if } Y_1 < Y \leq Y_2$$

$$C = a_3P, \text{ if } Y_2 < Y \leq Y_3$$

$$C = 0, \text{ otherwise}$$

Table A1 provides several examples of a single threshold circuit breaker with alternative specifications. The first set of alternatives assumes that the property tax paid depends on income. In particular, we assume that the property tax paid is 10% of income and we simulate a circuit breaker credit for families at three different income levels (low, moderate, and middle). The property tax paid is assumed to be \$1,000 for the low income family, \$2,000 for the moderate income family, and \$4,000 for the middle income family. The first alternative credit mechanism refunds all of the property tax paid in excess of five percent of income: $C = (P - .05Y)$. In this case the credit is \$500 for the low income family, \$1,000 for the moderate income family, and \$2,000 for the middle income family. Net of the tax credit, $P - C$, the property tax liabilities are then \$500, \$1,000, and \$2,000 for the three families. The net tax liability as a share of income, $(P - C)/Y$ is then 5% for all three families. Notice that the credit mechanism has cut the net tax liability from 10% of income to 5% of income for families at all three income levels.

The second alternative illustrated provides a credit of one-half of the property tax in excess of 5% of income: $C = .5(P - .05Y)$. This cuts the credit levels in half, as compared to alternative 1, and results in net property tax burdens of 7.5% of income for families at all three income levels.

The lower half of the table illustrates the same two alternative circuit breaker mechanisms, this time applied to the situation where we assume that property tax payments are not dependent on income. Families at all three income levels are assumed to pay the same property tax liability of \$2,500. That liability is 25% of the low income family's income, 12.5% of the moderate income family's income, and 6.25% of the middle income family's income. This situation accords with our general expectation that as income rises, housing expenditures and therefore property taxes, fall. The first alternative circuit breaker, which provides a credit for all property tax paid in excess of 5% of income, gives credits of \$500, \$1,000, and \$2,000 to the three families. The result is a net property tax liability relative to income of 5% for all three families. The second alternative circuit breaker cuts the credits in half and results in net tax burdens of 15%, 8.8%, and 5.6%.

Table A1: Example Designs of a Single Threshold Circuit Breaker

	Low income	Moderate income	Middle income
<i>Property tax liability depends on income</i>			
Income level	10,000	20,000	40,000
property tax (10% of income)	1,000	2,000	4,000
Single threshold circuit breaker—alternative 1			
$C = (T - .05Y)$	500	1,000	2,000
$T - C$	500	1,000	2,000
$(T - C)/Y$	0.050	0.050	0.050
Single threshold circuit breaker—alternative 2			
$C = .5(T - .05Y)$	250	500	1,000
$T - C$	750	1,500	3,000
$(T - C)/Y$	0.075	0.075	0.075
<i>Fixed property tax liability, regardless of income</i>			
property tax (flat \$2,500)	2,500	2,500	2,500
Single threshold circuit breaker—alternative 1			
$C = (T - .05Y)$	2,000	1,500	500
$T - C$	500	1,000	2,000
$(T - C)/Y$	0.050	0.050	0.050
Single threshold circuit breaker—alternative 2			
$C = .5(T - .05Y)$	1,000	750	250
$T - C$	1,500	1,750	2,250
$(T - C)/Y$	0.150	0.088	0.056