Trading Green:
Do Tax Credit Markets Improve Land Conservation?

Annalise Helm
Dominic Parker
Garrett Shost

University of Wisconsin-Madison[*]

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Abstract: Governments traditionally use top-down regulations to mandate conservation on private land but voluntary, incentive-based Payments for Environmental Services (PES) are an emerging alternative. Critics worry that PES programs subsidize wealthy landowners who would have conserved absent compensation and fail to target lands with high conservation value.

We ask how conservation incentives can be made more effective in the context of the United States' dominant PES system—conservation easements, covering 38 million acres and funded primarily by tax breaks. We hypothesize that markets for transferable tax credits will expand participation among low-income landowners while also improving conservation outcomes. Using a calculator of federal and state tax codes from 1990–2025 and policy changes in five states allowing transferability, we find that before markets, high-income donors faced a much lower after-tax cost of conservation than low and medium-income donors. Markets shrunk this gap and the donation responses across income levels leading to a greater proportion of easements over farmland under conversion pressure relative to non-working lands hosting second-homes. Markets also increased measures of ecological value and agricultural soil quality across easements. These results demonstrate how decentralized trade in tax credits can improve conservation targeting without subsidy expansion or new ecological mandates.

Keywords: environmental markets; payments for environmental services (PES); land conservation; conservation easements; tax policy; transferable tax credits

1. Introduction

Governments have traditionally used top-down regulations to mandate conservation on private lands (see Glaeser and Kahn 2004, Turner et al. 2014). But less centralized, incentive-based approaches are becoming more common across the world (Anderson and Libecap 2014). Some governments now compensate landowners who voluntarily conserve through Payments for Environmental Services (PES) programs (Salzman et al. 2018, Jack et al. 2008).

PES programs face three challenges that limit their success. One relates to additionality. How can programs avoid paying landowners who would have conserved absent compensation? Another relates to quality. How can programs target lands that, if remaining undeveloped, will deliver large environmental benefits? And a third relates to balancing equity-efficiency tradeoffs. Can programs engage participation from lower-income land holders while also delivering valuable conservation? As Alix-Garcia et al. (2016, 1) put it, can programs deliver more than "one tree from each seed" in this regard?

We study a payment mechanism for jointly addressing these challenges in the context of the United States' dominant PES system—conservation easements – which are mainly funded through federal and state tax breaks. Easements are agreements between private landowners who give up rights to subdivide, build, mine, and clearcut, and nonprofit land trusts or government agencies who monitor the land use. Easements can provide public benefits by limiting development on environmentally and culturally important lands. And because donations are voluntary, they have proven to be an attractive alternative to land-use regulations. Their use has surged, growing from approximately one million acres in 1990 to 38 million today.[1]

Studying the U.S. system of easements is important because it represents a leading example of decentralized PES. In it, the government's main role is to set tax incentives and then let landowners and land trusts, under limited regulation, determine the quantity and patterns of conservation. This system is at times lauded for its respect for bottom-up conservation and at times derided as wasteful for its lack of oversight and centralized guidance. Some commentators worry that decentralization leads to the wrong lands being conserved, because land trusts may respond to *ad hoc* acquisition opportunities rather than adhering to planning processes, whereas other commentators view local opportunism as the system's key strength (see Merenlender et al. 2004,

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[1] https://www.conservationeasement.us/

Pidot 2005, Eagle 2011, Wolf 2012). Supporters view tax incentives as necessary for protecting valuable resources, but skeptics wonder if tax preference merely subsidizes wealthy landowners rather than inducing quality conservation (see Bray 2010, Looney 2017).

We contribute to this debate by theorizing how the specific design of tax incentives can promote or inhibit effective conservation and by utilizing variation in tax policy across U.S. states to assess our reasoning. Although there are many differences in policies, we focus on the effects of offering easement donors a tax credit (rather than a charitable deduction) that can be transferred (i.e. sold for cash) to a buyer with a larger tax liability. The goal is to assess if, when, and how transferability has yielded higher quality, more additional easements, over land owned by lower-income donors. The findings inform tax policy design to better ensure that land   best suited for long-term conservation is targeted for easements.[2]

We describe theoretical conditions under which allowing markets for transferable tax credits will broaden participation among landowners across income levels while simultaneously improving conservation outcomes. To study these claims, we apply a calculator that integrates federal and state tax codes from 1990 to 2025 to quantify tax subsidy rates across income groups over time and across states. We then analyze policy changes in eleven states that introduced tax credits for easements between 2000 and 2025, five of which later added transferability.

Calculator simulations show that in states lacking credit programs, high-income donors faced an average donation price two-thirds of that faced by low-income donors making the same sized easement donation. On average, introducing a non-transferable credit further reduced the price by 16% for high-income donors while having no impact for low-income donors. Adding transferability, however, reduced the average price for low-income donors by 30% but only by 13% for high-income donors. Empirically, we estimate that introducing non-transferable credits increased the annual quantity of easements in a state by an average of 34% among high-income donors but had no impact among low-income donors. Adding transferability boosted the response from low-income donors to within 15 percentage points of high-income donors.

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[2] We emphasize that tax policy is more consequential for easements when compared to other forms of charitable deductions. Most donations – e.g. of stocks, cash, or fee-simple land – are liquid, or can be made liquid, meaning their value is not place specific. By contrast, the public value of land conservation is place specific due to the requirement that easements be held in perpetuity (see Section 2) (McLaughlin 2005). Therefore, even temporary tax incentives may permanently affect the spatial portfolio of conserved land.

Consistent with this pattern, transferability increased the proportion of easements over productive farm and ranch lands and it also reduced the average distance between properties under easement and owner address. Both findings suggest that transferability increased the likelihood that conserved land remain occupied by local farmers rather than second-home owners. We also find that transferable tax credits are associated with easements on agricultural lands with about 7% higher soil quality relative to easements acquired under non-transferable credit programs. We also find evidence that transferability increased a measure of the average ecological value of easements by 4%, and the probability of easements being within one-mile of conserved public land by 11%.

We also consider the effects of transferability on the 'additionality' of easements (e.g., their effectiveness in preventing near-term land conversion) by evaluating the conversion pressure of lands put under easements using an index (CPI) developed by Oakleaf et al. (2024). First, we compare a histogram of the CPI across lands covered by easements with a histogram of all U.S. lands and find that easements tend to target lands that are otherwise more likely to be converted. Across most easement purposes (e.g., forest conservation, recreational access, environmental and historical preservation) transferability is associated with neither an increase nor a decrease in the CPI of lands under easement. Within the subset of easements for aimed at farm and ranchland conservation, however, transferability is associated with targeting lands under 7% higher conversion pressure.

Overall, the findings suggest that making tax credits transferable has improved equity, quality, and additionality in conservation easements. We theorize that transferability improves conservation by increasing the pool of prospective donors, encouraging easement holders to be more selective in choosing which lands to prioritize. Consistent with this logic, we find evidence that transferability increased the likelihood that easement holders are accredited by the Land Trust Alliance as adhering to high standards of targeting and stewardship.

In theory, the observed improvements could be generated by fiscally neutral allowances of transferability because the mechanism we hypothesize requires no expansion in the aggregate cap on available credits but in practice aggregate caps have not always been held constant.[3] The implications run counter to common criticisms of conservation easement policy. While some commentators worry that easement performance has been hampered by too much decentralization, our analysis suggests the opposite. Allowing market trading of tax credits conveys more individual

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[3] See Appendix 1.

autonomy and local control – i.e., further decentralization – and this appears to have improved easements.

This study contributes to literatures on the allocation of land use through environmental markets, on the design of PES programs, and on the successes and shortcomings of conservation easements. With respect to environmental markets, our study complements Aronoff and Rafey (2025) who find that offset trading for wetland conservation generated billions in Florida by improving the selection of lands covered with restrictions. Whereas their study focuses on how market trading discovered lands with low opportunity costs of conservation, our study shows how tax credit trading discovered higher quality lands to conserve.

Our study also contributes to the large literature on the economics of conservation planning and on the effectiveness of voluntary conservation programs. A strand focuses on strategies for optimizing the use of limited budgets via dynamic planning for a network of conservation projects (see Costello and Polasky 2004, Newburn et al. 2006, Wilson et al. 2006, Assuncão et al. 2023). Our findings contribute to this literature by providing evidence on the effectiveness of decentralized decision making, which is an alternative to top-down planning. Much of the literature on voluntary conservation and PES emphasizes how landowners with the least interest in changing land use tend be the most willing to participate, creating a challenge of enrolling land that is "additional" (e.g., Alix-Garcia et al. 2012, Jack and Jayachandran 2019). A further subset highlights challenges PES programs face in spreading payments to low-income landholders while also securing additional, high-quality conservation (see Alix-Garcia et al. 2016). We contribute by showing how a bottom-up tax financing mechanism can ameliorate some of the challenges.

Most specifically, our study contributes to literature on the effectiveness of conservation easements, which are common in the U.S., Canada, Australia, and parts of Europe. Empirical studies have in general found that easements are effective in preventing near-term land conversion, making them "additional" (see, e.g., Liu and Lynch 2011, Malakoff and Nolte 2023, and Nolte et al. 2019).[4] While research finds that easement growth is responsive to changes in federal and state tax incentives (Soppelsa 2017, Parker and Thurman 2018), some authors raise concerns that large tax breaks can subsidize wealthy donors while failing to target lands of high conservation quality (e.g., Vercammen 2019). For example, Suter et al. (2014) report a positive correlation between the earnings of the top percentile in a county and the proportion of land donated, as well as a decreased

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[4] Hagen et al. (2024), however, finds no evidence that easements have thus far led to avoided development.

likelihood of land trusts maintaining clear conservation plans in states with tax credits. Larson (2025) provides evidence that, in the state of Virginia, the expansion of tax credits is associated with lower quality conservation in the state. While these findings contribute to the critique that generous tax incentives may lead to less intentional and strategic conservation, none of this research focuses on transferability as a key design feature of tax credit programs. We contribute by focusing on this feature, by simulating a tax calculator to quantify tax incentives across all 50 states, by utilizing new metrics for comparison of conservation quality and additionality, and by estimating how tax credit markets change the flow of donations from landowners across an income spectrum.[5]

2. Background: About Conservation Easements

A classic analogy is useful for describing a conservation easement. Think of land as a bundle of sticks. Each stick represents a right to use land, or exclude others from using land, in a particular manner. A conservation easement amounts to a landowner ceding some sticks from his or her bundle for a specified duration, generally in perpetuity.[6]

A conservation easement may preclude landowners from activities such as developing, subdividing, strip mining, or erecting billboards. There is an array of possibilities because easements are negotiated on a case-by-case basis.

Conservation easements are property rights, as opposed to contractual rights, because the terms conveyed in them "run with the land." This means that successor landowners are bound to the terms agreed upon by the original parties. If a granter of an easement agrees to relinquish his right to subdivide and allow public access, all future owners of the land must abide by these provisions.

Decades of bi-partisan support for easements help explain why public dollars continue to be invested in their acquisition. All levels of government offer grants for their purchase ranging from USDA programs operating across the country, to state and local programs such as Great

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[5] Our paper also contributes to literature on tax incentives for charitable giving, which has estimated after-tax prices of giving and elasticities of donation responses (see e.g., Bakija and Heim 2011; Parker and Thurman 2018; Bakija 2024). It complements Grant and Langpap (2025) who study the effectiveness of charitable tax incentives in generating donations of high public value.

[6] Through its support of easements, state statutes encourage "dead hand control" of land because they require restrictions to be permanent and, unless amended, not subject to reversal (Mahoney 2002; McLaughlin 2005).

Outdoors Colorado. Bi-partisan support also helps explain why Congress has allowed and strengthened federal tax deductions for easement donors since the 1970s, and why several states now offer them generous tax credits rather than simple deductions. The majority (approximately 80%) of U.S. easement acreage has been donated rather than purchased. Federal tax benefits have been available to easement donors since 1976 with major expansions occurring in 1997 and 2006.

To be eligible for federal tax benefits – and for benefits in most states – the Internal Revenue Service requires that a donated easement be perpetual and preserve land for one of the following purposes: outdoor recreation, wildlife habitat, scenic enjoyment, agricultural use, or historical importance. Whether donated or purchased, conservation easements are appraised as the estimated difference between the full market value of land without restrictions and the encumbered value of land with permanent restrictions.

Easements have quickly become prominent in American landscapes growing from less than one million acres in 1990 to approximately 38 million acres today (see Parker and Thurman 2019, NCED 2025). This growth has dominated growth from any other form of land conservation including public land acquisitions (e.g., for parks and forest reserves) and outright ownership by private organizations (e.g., for nature conservancies). Some easements are held by federal, state, and local agencies (usually acquired through purchase) but many conservation easements, especially donated easements, are held by one of over 1,000 nonprofit organizations known as land trusts. Although a handful of large trusts, such as The Nature Conservancy, are national in scope, most operate at local, state, or regional levels. In our view, land trusts are most usefully viewed as providers of environmental service flows, not just passive holders and enforcers of easement provisions, because they often attempt to coordinate landscape-level conservation (see Fairfax and Guenzler 2001, Parker 2004, Parker and Thurman 2019).

3. **Tax Policy Overview**

   A. Timeline

Tax incentives have been a primary contributor to the growth in conservation easements and to controversy surrounding their use (Parker and Thurman 2019). Figure 1 gives a timeline of

federal incentives and related events.[7] Federal income tax incentives strengthened in 2006 when Congress increased the deduction limit from 30% to 100% of adjusted gross income for qualified farmers and foresters.[8] The 2006 tax law change also increased the number of years a qualified donor could carryforward unused deduction, from 5 years to 15 years. The 2006 incentive enhancement occurred in spite of 2004 scrutiny over alleged tax abuses of easements as prominently represented in an expose on "Uses and Abuses of Conservation Easements" in the *Washington Post* (Stephens and Ottaway 2004).

Figure 1: Timeline of Tax Incentives and Related Events
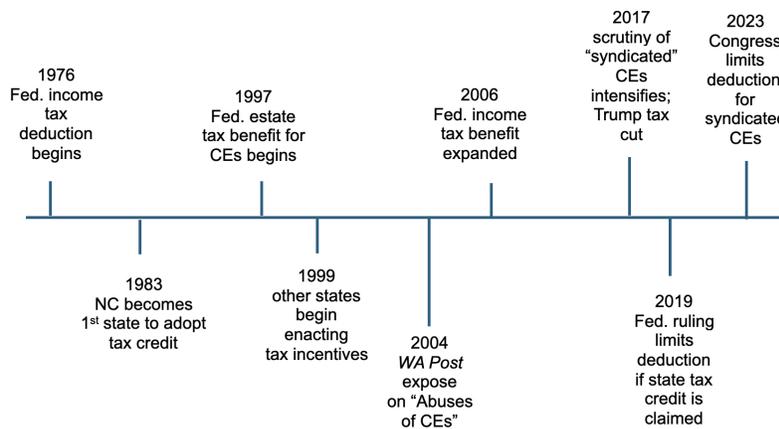
The most recent wave of public scrutiny over easements concerned the use of so-called syndicated easements starting around 2012 (see Elkind 2017, Looney 2017). These deals involved a group of investors forming partnerships that buy land with the intent of donating easements for financial gain. The partnerships purchased land they thought would be eligible for easement donation tax benefits, sought appraisers to inflate the values on easement restrictions, and used land trusts willing to hold the syndicated easements. In 2016, syndicated easements comprised approximately $6 billion in claimed deductions, which exceeded claimed deductions from traditional (non-syndicated) easements that year.

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[7] In addition to the incentives here, landowners may realize property tax reductions after encumbering their land. Some state statutes require assessors to reduce their assessment when an easement is present. Other states explicitly prohibit any such reduction, and some states allow for local assessor discretion.

[8] The deduction increased to 50% for all other landowners.

Because undefendable appraisals were typically 10 to 20 times the value paid for the property, the IRS believed syndicated transactions constituted serious tax abuse. The U.S. government has since took three steps to render syndicates less attractive. In 2017, the IRS gave notice that syndicated conservation easements were a listed transaction that had to be reported to the IRS. In 2019, a Treasury Department ruling eliminated the ability of an easement donor to claim a state tax credit and a federal deduction over the same conservation easement. And Congress took action in 2023, passing a new rule that syndicated easements appraised at more than 2.5 times the land's purchase price are deemed ineligible for federal tax deductions. These policies have effectively eliminated the use of syndicated easements.

B. *Effects of Federal Tax Incentives on Donation Prices*

Table 1 isolates the estimated effects of the federal income tax code on the incentive to donate a conservation easement in 2025 by considering a potential donor in Wyoming, which is a state lacking an income tax. The estimates are generated from a tax calculator introduced by Parker and Thurman (2018) and updated for this paper (see Appendix 1).[9] The calculator assumes a potential easement donor is married, filing a joint return. He would take the standard deduction if he chooses not to donate the easement. If he donates, the calculator assumes he deducts the full value in as few years as possible, which is consistent with our understanding of legal requirements under tax law.

Table 1 highlights the importance of landowner income for the federal incentive to donate. All scenarios assume an easement donation value of $700,000.[10] A "low-income" donor (with adjusted annual gross income (AGI) of $25,000) would recover nothing in tax savings in year 1 of the deduction compared to $180,126 for a high-income donor (with AGI of $750,000). This is mainly because the high-income donor pays higher annual taxes and because he is taxed at a higher marginal rate. This manifests in a lower present value of lifetime tax savings for the low versus high income donor - $0 versus $180,126. Assuming the donors are qualified farmers or foresters

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[9] Parker and Thurman (2018) develop a conceptual measure of the price of conservation and an empirical measure (pg. 340-42). In this paper we update and utilize the empirical measure.

[10] This donation value is comparable to the $500,000 scenario of focus in Parker and Thurman (2018), after adjusting for inflation.

means they can stretch the deduction over 15 years. The low-income donor nevertheless fails to utilize the full tax savings, and these savings are discounted at an annual rate of 5%.

Table 1: Federal Income Tax Benefits to Donors in States without Income Taxes (2025)

| Income:	Low	Medium	High
Adjusted Gross Income	$25,000	$150,000	$750,000
Qualified Charitable Donation	$700,000	$700,000	$700,000
Highest Federal Marginal Tax Rate	12%	22%	35%
First Year Tax Savings	$0	$16,055	$180,126
Present Value of Lifetime Tax Savings	$0	$66,472	$180,126
Price of Conservation	1.000	0.903	0.738

We can use the information in the table to calculate what Parker and Thurman (2018) labeled the "price of conservation." It is $1 - \frac{PV\ of\ lifetime\ tax\ savings}{charitable\ donation}$. For the low-income donor this is 1, it is 0.903 for the middle-income donor, and it is 0.738 for the high-income donor in states lacking a state income tax.

Figure 2 shows the price of conservation for the same three donors in Wyoming over time, from 1990 to 2025. It highlights how changes in federal tax law have affected the federal tax incentive to donate. First, the George W. Bush and Donald J. Trump tax cuts raised the price for most income types. Second, the 2006 tax law changes for qualified donors of easements (depicted here) strengthened the incentive for low- and medium-income donors, but it actually weakened the incentive for high income donors.[11]

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[11] This counterintuitive result is due to the assumption that the taxpayer deducts the easement value as soon as possible rather than spreading it across years to optimize on savings from income exposed to the higher marginal tax rates. By allowing 100% of AGI to be deducted each year, the new tax law caused the taxpayer to shelter less of his income from higher marginal tax rates. We believe this assumption is consistent with the following of IRS rules on the required use of carryforward deductions.

**Figure 2: Price of Conservation in States Lacking Income Taxes**

State = WY. Donation = $700k. AGI = $25k, $500k and $750k
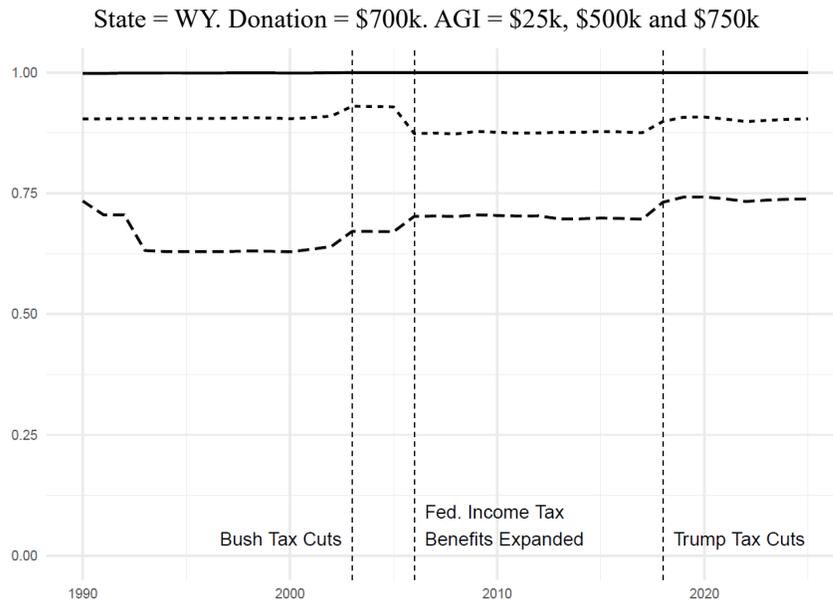
C. State Tax Incentives

Individual states offer a variety of income tax incentives to easement donors that are, generally, additional to federal income tax incentives. Figure 3 illustrates the five tax regimes governing conservation easement donations in states. In 17 states, the income tax incentive is limited or non-existent (Regimes 1 and 2). This is because 9 states lack an income tax, and 8 states do not allow itemized deductions such as charitable donations of conservation easements.[12] In 21 states, donors of easements can claim the charitable contribution as a deduction against their state tax liability (Regime 3). The strength of this incentive depends on the state income tax rates, which vary significantly. In 2025, the top marginal income tax rates range from a high of 13.9% (Hawaii) to a low of 2.5% (Arizona).

The remaining 12 states offer income tax credits (Regimes 4 and 5). These programs were enacted over 1983 through 2025 and, within states, have been amended and changed many times. Appendix 2 provides a detailed description of each of the 12 programs. They differ in terms of their generosity towards individual donors (e.g., the proportion of an easement donation eligible for a credit and individual limits on donations). The credit programs also have different aggregate caps on how much public funding the state will annually allocate to easement credits.

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[12] Tennessee and New Hampshire tax income from interest earnings but do not tax wage earnings.

Figure 3: State Tax Regimes
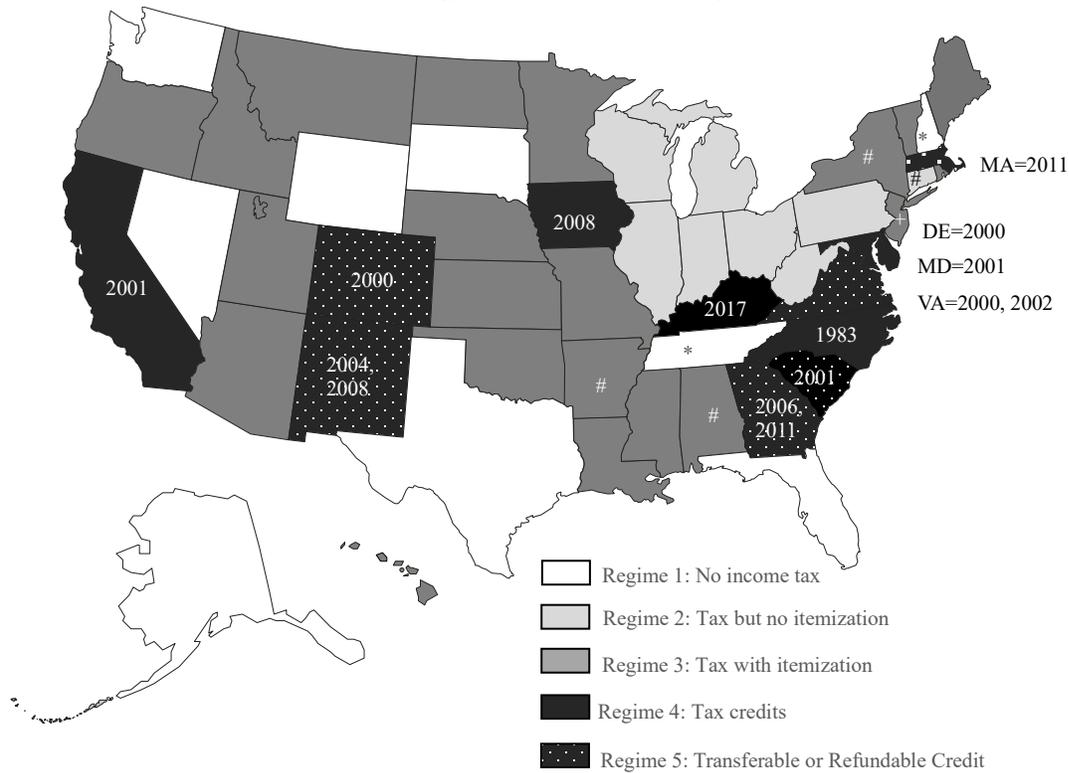
Notes: Dates indicate when the initial tax credit legislation was first in force. # indicates that states have conservation easement specific tax incentives, but ones that are relatively weak and not based on income taxes. * indicates the state only taxes dividend and investment income but not wage income. + New Jersey does not in general allow itemized deductions but began to allow itemization of conservation easements in 2000. When a state has multiple years, the first indicates initiation of a tax credit and the second indicates initiation of transferability. Massachusetts program is refundable but not transferable. California's program has operated intermittently since 2001. North Carolina repealed its credit program in 2013 and re-instated it in 2025.

In six states the tax credits are transferable or refundable (Regime 5). They are refundable only in Massachusetts, meaning a donor in that state receives a cash payment if the value of eligible credit exceeds the donor's state income tax liability. Transferability means an easement donor with a lower state tax liability than the amount of credits granted through an easement donation can sell her tax credits to a buyer with sufficient tax liability. Tax credit sales are executed through brokered markets by private firms who connect willing sellers with buyers. In cases we have surveyed the brokerage fee is about \$0.15 per dollar so that the seller receives an upfront payment of about 0.85 x Eligible Easement Value.[13] In Colorado, for example, 90% of the easement's appraised value is eligible. This means that credits from a conservation easement donation valued at \$1 million would

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[13] The typical brokerage fee is 5%. The purchase price for current year credits is about 90%, with the seller netting about 85% and the discount to the buyer of 10%.

sell for about $1 million x 0.90 x 0.85 = $765,000.[14] Section 4 employs our custom calculator to simulate the effects of transferability on the price of conservation across all states.

D. Donor Income and Easement Valuations

Noncash charitable contributions like conservation easements are reported to the IRS for tax benefits, but most aspects of the data are confidential and not available to us for analysis. Still, two features of the data are obvious. First, conservation easements in the United States dwarf in value every other form of charitable giving: art, real estate, and money. Second, the average income of easement donors far exceeds the average income of U.S. landowners and the average income of donors of other charitable contributions. These baseline features highlight how the primary federal funding vehicle for easements – non-transferable income tax incentives -- has generally induced high-monetary-value donations from high-income donors.

Figure 4: IRS Data on Real Estate Donor Incomes and Values

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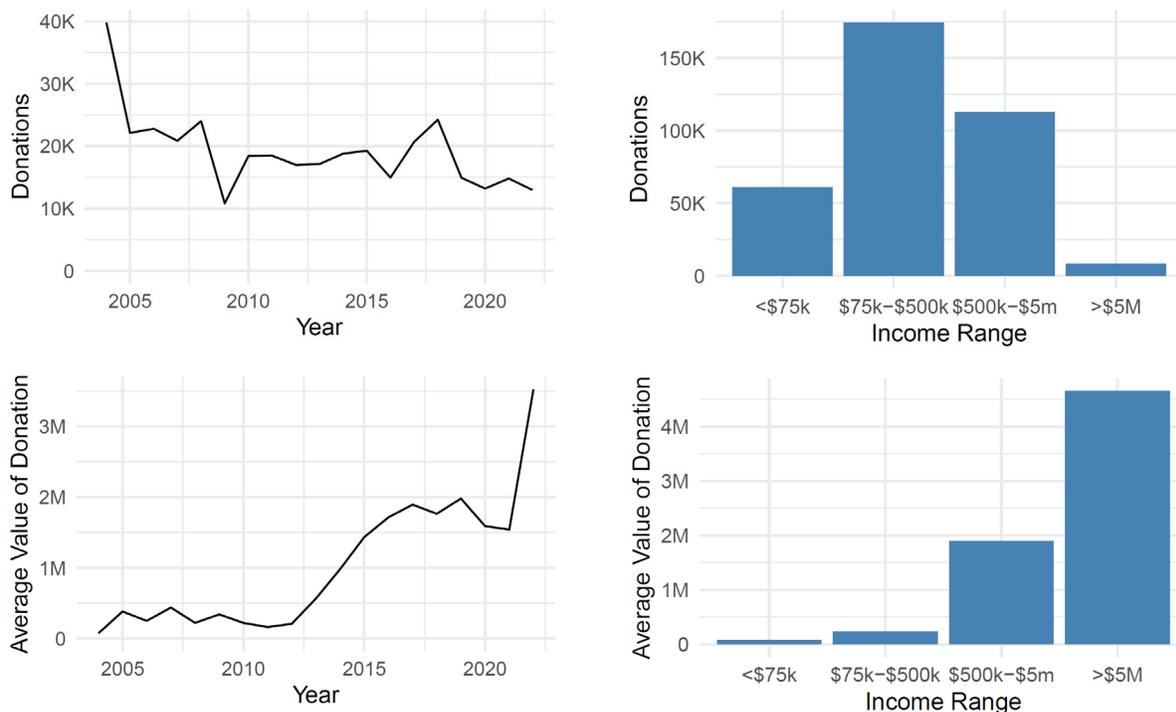
[14] A $1 million easement value would yield a $900,000 tax credit, which would sell for about $810,000 given a 10% buyer discount. The net to seller would be about $765,000, after accounting for the 5% brokerage fee.

Figure 4 shows donation information by year and income group over 2002-2022, adjusted for inflation.[15] While total donations trended downward over 2004 to 2022, there has been a large increase in the total monetary value of donations. High income households comprise the majority of easements donated and especially their monetary value. We note that monetary value indicates foregone development rights but may not be indicative of the environmental value – e.g., the ecological value, soil quality, or recreation value - of donated land.

4. Effects of Transferability on the After-Tax Price of Conservation

Our study focuses on states with tax credit programs (Regime 4 in Figure 3) and, especially, states with refundable or transferable tax credits (Colorado, Georgia, Massachusetts, New Mexico, South Carolina and Virginia). We have generated a series of simulations from the tax calculator to estimate how transferability has affected the price of conservation in each state. The calculations incorporate salient details of each state's program (see Appendix 2) such as the percentage of donation eligible and number of years unused value can be carried forward. More generally, all simulations account for federal and state tax codes (e.g., tax brackets, tax rates, rules on charitable deductions, etc.) and interactions between federal and state tax liabilities (see Appendix 1).

For a detailed case study, Table 2 shows calculator output that compares savings in Colorado with and without transferability while holding other aspects of that state's tax credit program constant. It highlights the substantial effect of transferability in lowering the price of conservation for the low- and medium-income donors. Without transferability, the low-income donor recovers only $5,923 of the donation whereas the medium-income donor recovers $73,078 and high-income donor recovers $292,918 (not counting potential property tax and estate tax savings). With transferability the low-income donor actually recovers the most - $434,155 – compared to $408,481 for the medium income donor and $364,544 for the high-income donor. This is because the low-income donor pays lower income taxes on the sales value of the tax credit. Notice the major effect of transferability on the price of conservation for the low- and medium-

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[15] The data are based on a sample donations from IRS Form 8283s. The published data breaks down contributions by type; however the most specific data on donations of conservation easements also include other real estate and land donations. A published report from 2019 finds that conservation easements make up about 54 percent of these donations and 52 percent of value donated.

income donor, respectively from 0.99 to 0.38 and from 0.89 to 0.41, compared to modest change from 0.58 to 0.48 for the high-income donor.

Table 2: Federal and State Income Tax Benefits to Donors in Colorado (2025)

Income:	Low	Medium	High
Adjusted Gross Income	$25,000	$150,000	$750,000
Qualified Charitable Donation	$700,000	$700,000	$700,000
Highest Federal Marginal Tax Rate	12%	22%	35%
Highest State Marginal Tax Rate	4.4%	4.4%	4.4%
Present Value of Lifetime Tax Savings			
- Transferable Credit	$434,155	$408,481	$364,544
- Nontransferable Credit (90%)	$5,923	$73,078	$292,918
- Nontransferable Credit (50%)	$5,923	$101,589	$296,416
- No Credit	$5,007	$92,048	$208,730
First Year Tax Savings			
- Transferable Credit	$434,155	$408,481	$364,544
- Nontransferable Credit (90%)	$440	$15,338	$44,886
- Nontransferable Credit (50%)	$440	$20,861	$136,986
- No Credit	$440	$20,861	$208,730
Price of Conservation			
- Transferable Credit	0.380	0.416	0.479
- Nontransferable Credit (90%)	0.992	0.896	0.582
- Nontransferable Credit (50%)	0.992	0.855	0.577
- No Credit	0.993	0.869	0.702

Note: All values are for 2025 tax year. The transferable credit program is the one currently in place for Colorado, which gives a transferable credit for 90% of the donation's value up to $1.5M with a 20 year carryover. The recipient is assumed to sell the credit in the first year at 85% of it's value. Marginal tax rates increase in some scenarios due to the additional income from selling the credit. The discount rate is 5%.

Figures 5 and 6 show how credit programs and transferability affected the price of conservation in 11 states.[16] The price tends to drop precipitously with the initiation of a tax credit and, especially, if the credit is transferable. This is apparent in states with generous programs. Transferability has the most noteworthy effect in lowering the price for low-income donors, as is especially apparent in Colorado, Georgia, New Mexico, and Virginia. As a result, transferability shrinks the price gap between and high and low income donors.

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[16] California is excluded because its credit program has been small and intermittingly provided.

Figure 5: Price of Conservation in Tax Credit States, Colorado – Massachusetts

Qualified Donation = $700k. AGI = $25k, $500k, and $750k

Colorado

Delaware

Georgia

Iowa

Kentucky

Massachusetts
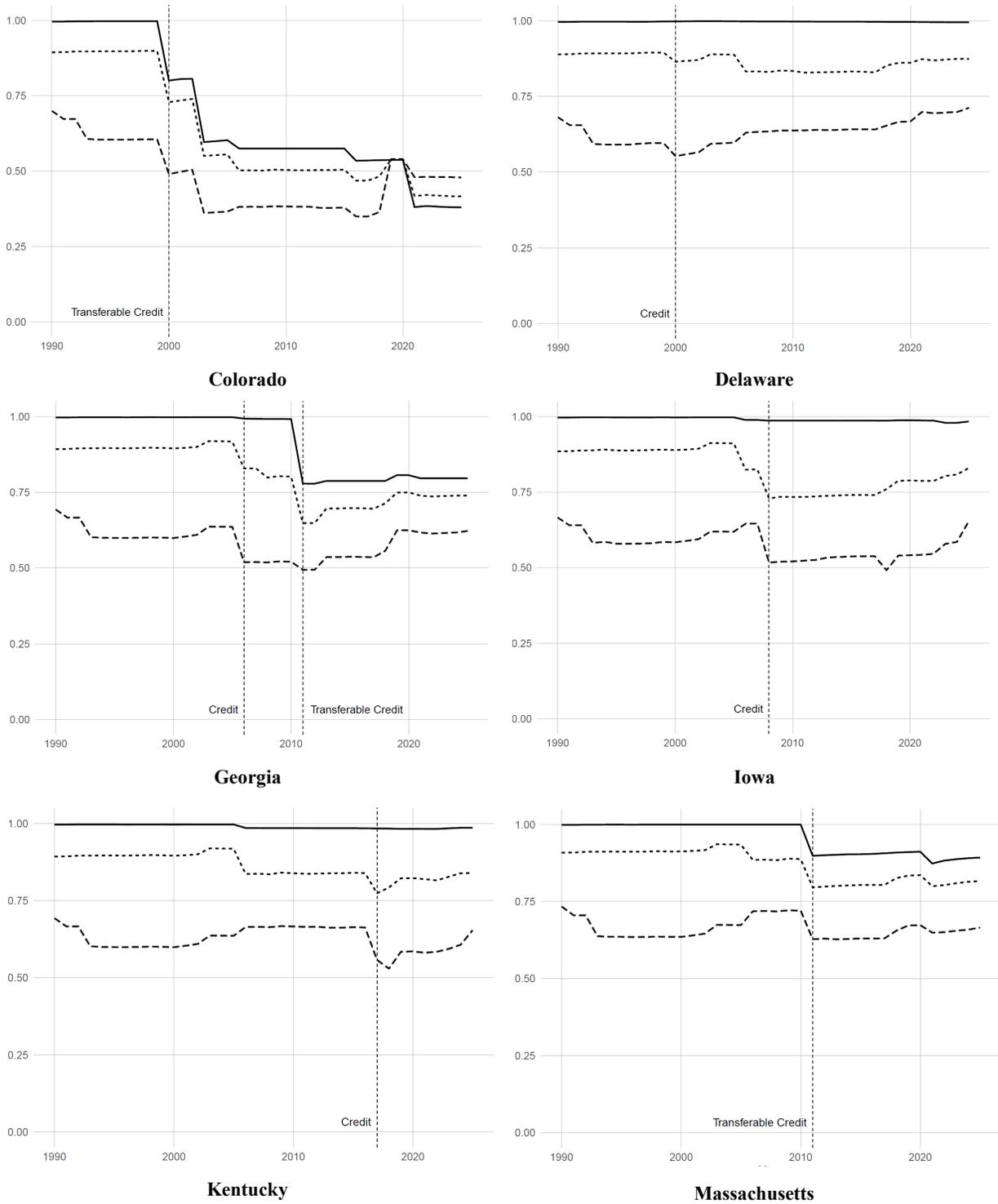
Figure 6: Price of Conservation in Tax Credit States, Maryland - Virginia

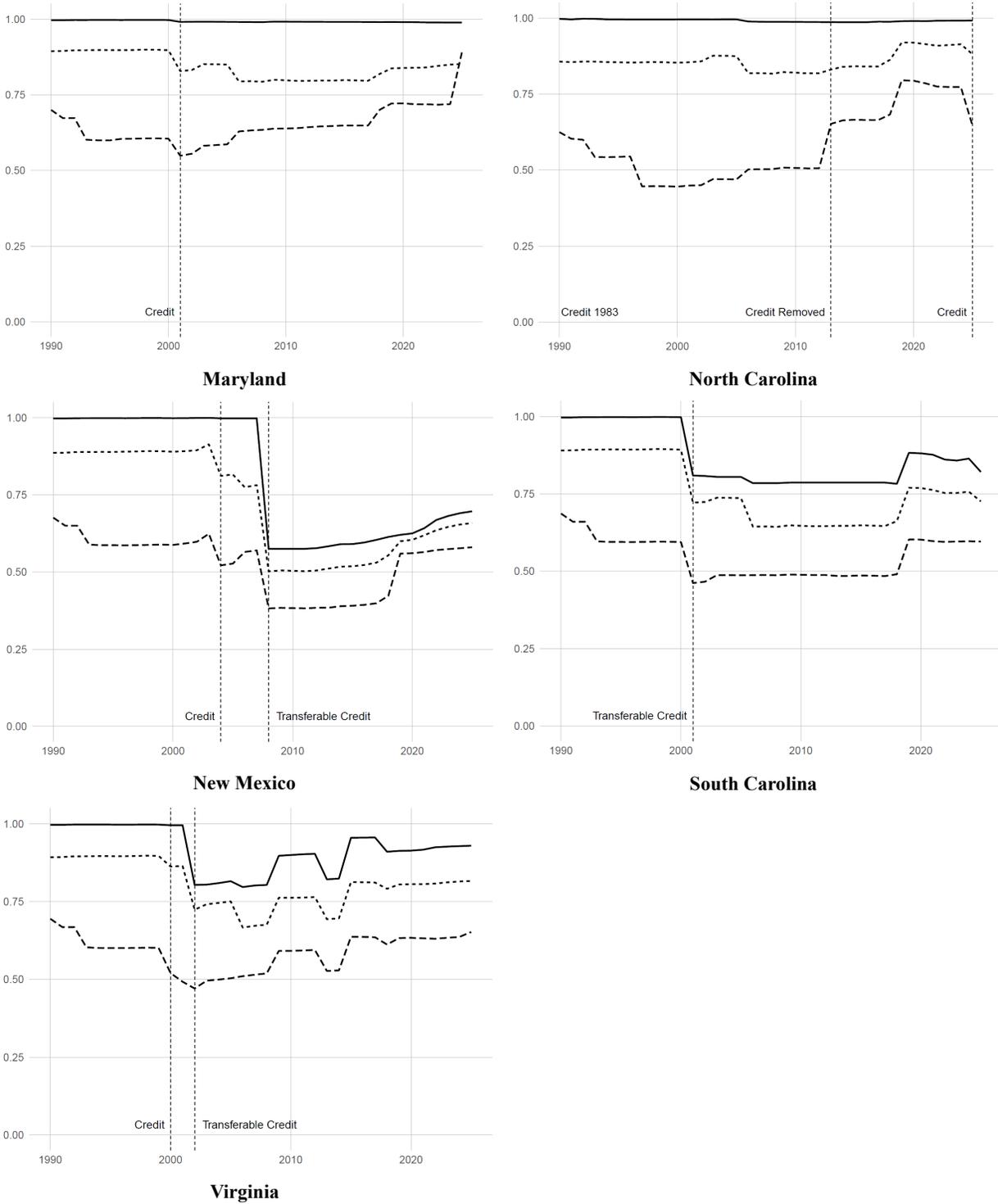Qualified Donation = $700k. AGI = $25k, $500k, and $750k

Table 3 quantifies the average effect of tax credit programs on the after-tax price of conservation depicted across states in Figure 6. It does so by estimating a regression equation,

$$(1)\ \ln(P_{it}) = \alpha + \delta taxcredit_{it} + \gamma transferable_{it} + \varepsilon_{it}$$

in which each observation is a state-year combination from 1992 to 2022 yielding 50 x 31 = 1,550 observations.[17] The dependent variable is the log of the price of conservation for low, medium, and high-income donors. The right-hand side variables are indicators for the presence of a tax credit program, and whether the credit is transferable (or refundable).

Table 3: Average Effect of Tax Credits on the Price of Conservation

Dependent Variable:		$ln(P_{it})$	
Income:	Low	Medium	High
Variables			
Constant	-0.0029*	-0.1177***	-0.4061***
	(0.0014)	(0.0016)	(0.0029)
Credit	-0.0052	-0.0820***	-0.1579***
	(0.0047)	(0.0063)	(0.0114)
Transferability	-0.2981***	-0.2289***	-0.1271***
	(0.0074)	(0.0085)	(0.0153)
Fit Statistics			
Observations	1,550	1,550	1,550
R^2	0.678	0.632	0.348

Notes: Classic OLS standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, * 0.1

Because the dependent variable is logged, the coefficients can be interpreted as average percentage changes. For example, the column 1 coefficient on Credit means the introduction of a (non-transferable) credit program has an insignificant effect on the price for the low-income donor. By comparison, it has decreased the price for the high-income donor by 16%. The coefficient on Transferability means that adding transferability has on average decreased the low-income donor

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[17] We focus on 1992-2022 here to match data availability on conservation easements and other covariates used later in this analysis.

price by 30% whereas transferability decreased the price for high income donors by an additional 13%.[18]

5. Effects of Transferability on the Quantity of Easement Donations

Because it lowers the price of conservation more for low-income landowners than for high-income landowners, we expect transferability to induce a greater increase in offers to land trusts and government agencies from low-income landowners than from high-income landowners. As long as these easement holders accept the same or a higher proportion of donations from low-income donors, the effect of transferability will be to balance the proportion of easements from donors across income levels.

As discussed above, data on individual landowner and easement donor incomes are private and unavailable. This means we cannot directly test the effect of income on donation probabilities, or how that changes with changes in tax policy. Instead, we estimate the elasticity of state-level donation responses to changes in the price of conservation for different landowner income-donation scenarios. Our approach extends from Parker and Thurman's (2018) estimates of tax price elasticities over 1992 to 2012. Here we use data for 1992 to 2022 and estimate donation responses separately for low, medium, and high-income donor scenarios.

We use data from the National Conservation Easement Database (NCED) to measure easement numbers and acres over 1992 to 2022.[19] This dataset includes information on the location of easements held by most land trusts and government agencies, the year of acquisition, and the primary purpose of the easement (e.g., farm conservation, recreation, forest conservation).

The NCED data have two weaknesses for our purposes. First, although we know that the vast majority of easements land trusts hold were donated, the data set does not indicate which easements were acquired through purchase. The estimated effects likely understate the effect of tax policies on donation flows because some of the easements were purchased. Because easements held by government agencies have more often been purchased, our analysis in this section focuses on easements acquired by land trusts.

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[18] Transferability in state tax credits did not further eliminate the difference in prices across donor income groups because prices also reflect the federal tax code, which does not offer transferable deductions or credits.

[19] We end the analysis in 2022 because NCED data has not been updated to cover 2022-2025.

The second weakness is that the NCED data coverage of easements is incomplete. Some land trusts did not send spatial GIS files to the NCED and others did not include the date of establishment. Despite these shortcomings, the NCED data is the most comprehensive source available and discussions with its developers suggest that its coverage has grown over time in successive updates such that it is now mostly complete. Appendix Table A3.1 shows state-level summary statistics for the NCED data.

We estimate the following equation, which is a simplified version of the estimating equation in Parker and Thurman (2018):

$$(2)\ Ihs(easements)_{it} = \alpha_i + \mu_t + \beta lnP_{it} + \pi X_{it} + \varepsilon_{it}$$

Subscripts i and t refer to state and year, Ihs refers to the inverse hyperbolic sine transformation of either the number of easements, or the acreage of easements.[20] Variable P is the "price of conservation". Here it will represent the low, medium, and high-income scenarios, with a $700,000 donation, described above. We allow each state to have its own time-variant intercept (α_i) to control for geographic, cultural, and institutional differences across states. We do not control for state-specific time trends here but include those results in Appendix Table A3.2. The variables in X include the state-year level controls for a land price index, population, farm income, forest income, total per capita income, and government acquisitions of easements through purchasing programs. Table A3.1 also shows summary statistics, definitions and data sources for covariates that we include in the estimates.[21]

Table 4 shows the estimates. In Columns 1-3, there is a precise and negative relationship between the price and the count of easements acquired. For example, the Column 1 estimates for medium-income donors means that a 10% decrease in the price is associated with a 18% annual increase in easements held by land trusts. The elasticity estimates are close in magnitude to Parker and Thurman's (2018) estimate of -2.1 based on 1992 – 2012 data and a price simulation similar to the medium-income scenario here. The acreage elasticities in Columns 4-6 are slightly larger but less precisely estimated. This is not surprising because there is more state-year variance in acreage than in counts, and the acreage data contain significant outliers.

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[20] There are several state-year combinations for which the outcome variables are zero.

[21] These are the same controls used in Parker and Thurman (2018).

Table 4: Easement Count and Acreage Elasticity Estimates

Dependent Variable:	*Ihs*(Easements)			*Ihs*(Acres)		
Income:	Low	Medium	High	Low	Medium	High
ln(P_it)	-1.573**	-1.811**	-2.152***	-2.040	-2.417	-2.069
	(0.629)	(0.691)	(0.622)	(1.273)	(1.485)	(1.342)
Controls						
Log Farm Revenue	x	x	x	x	x	x
Log Forest Revenue	x	x	x	x	x	x
Log Per Capita Income	x	x	x	x	x	x
Log Population	x	x	x	x	x	x
Government Easement Acres	x	x	x	x	x	x
Fixed Effects						
State	x	x	x	x	x	x
Year	x	x	x	x	x	x
Fit Statistics						
Observations	1,550	1,550	1,550	1,550	1,550	1,550
R²	0.735	0.736	0.739	0.616	0.616	0.616
Adjusted R²	0.020	0.022	0.034	0.008	0.009	0.009

Notes: Clustered (by state) standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, * 0.1.

There are small but not inconsequential differences in the point estimates across price scenarios. For both easement counts and acres, the donation response to price changes is least sensitive to the low-income donor scenario. This may imply that low-income donors require larger changes in incentives to commit to permanent restrictions on land that likely constitutes the majority of their wealth.

The elasticity estimates imply that tax credit programs will significantly increase easement donations because they decrease the price of conservation. Table 5 combines results from Table 3 and Table 4 to estimate the average effects of the eleven state tax credit programs on the flow of donated easements. This is accomplished by multiplying the average price change induced by a tax credit program (see Table 3), with the elasticity estimates in Table 4. Specifically, the results in Table 5 are calculated by:

$$(3)\ \epsilon_{credit} = \beta \times \delta, \text{ and } \epsilon_{transferable} = \beta \times \gamma$$

where δ and γ are estimated from equation 1 and β is estimated from equation 2. Standard errors are calculated for each estimate using the delta method.

Table 5: Estimated Effects of Credit Programs on the Quantity of Easements

Dependent Variable:	*Ihs*(Easements)			*Ihs*(Acres)		
Income:	Low	Medium	High	Low	Medium	High
Tax Regime						
Credit	0.008	0.149*	0.340***	0.011	0.198	0.327
	(0.009)	(0.058)	(0.101)	(0.013)	(0.123)	(0.213)
Transferability	0.469*	0.415**	0.273**	0.608	0.5553	0.263
	(0.188)	(0.159)	(0.086)	(0.380)	(0.340)	(0.174)

Notes: Standard errors calculated using the delta method. Signif. Codes *** = 0.01, ** 0.05, * 0.1.

The estimates in Table 5 suggest transferable tax credits have proven effective in generating easement donations from low and medium-income landowners. The column 1 estimates suggest the average non-transferable tax credit program does not significantly affect donations from low-income donors. Making the tax credit transferable has, on average, increased annual easements from low-income donors by an additional 47%. The estimates for high-income donors are respectively 34% for the introduction of a tax credit program and 27% for making the program transferable. Adding the numbers together suggests the average tax credit program allowing transferability increased easement donations from low-income donors by 47%, by 56% for medium income donors, and by 61% for high-income donors. The punchline is simple. Transferability induced relatively more donations from low and medium-income donors when compared to high-income donors.

6. Effects of Transferability on Farm Conservation

We now turn to data of individual parcels under easements to assess whether transferability has funneled conservation easements to productive farm and ranch land ("working lands") owned and occupied by local residents. To do so we again utilize the NCED data set which, as noted above, provides geo-coordinates and shapefiles of conservation easements along with information on date of acquisition, easement's primary purpose, and easement holder type. Primary purposes

include conservation of farm or ranchland, forest amenities, recreation, general environmental preservation, and historical amenities.[22]

To measure variation in the inherent productivity of agricultural lands, we match the NCED shapefiles with a measure of soil quality. The measure is from the gridded Soil Survey Geographic Database (gSSURGO) data from the USDA with a Soil Productivity Index from Schaetzl et al. (2012). The index quantifies productivity from 0 (low) to 190 (high). It aims to be independent of short-term management practices and instead reflects time-invariant properties of soil such as erodibility and aridity. Figure 7 shows the histogram of soil productivity scores across all U.S. easements with shape files included in the NCED database.

Figure 7: Soil Productivity Index Score Across NCED Easements
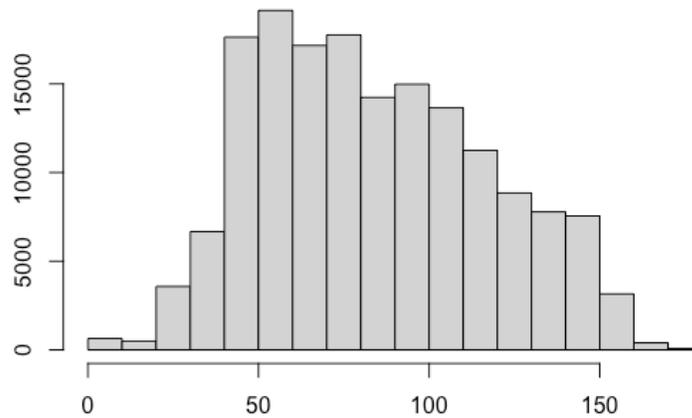
We use variation in the data just described – over time and across geographies – to estimate the effect of introducing a tax credit that is non-transferable or transferable. Each outcome Y_{it} is measured for each easement i, acquired in year t, and the following model is estimated for each outcome.

$$(4)\ Y_{ict} = \pi credit_{it} + \beta transferable_{it} + \delta X_{ict} + \alpha_c + \mu_t + \varepsilon_{ict}$$

Table 6 reports results. In columns 1-4 the dependent variable is an indicator for whether the easement's primary purpose is farm or ranchland conservation. We limit the sample to

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[22] Another easement purpose given in NCED is "Miscellaneous". We drop easements with this purpose from the analysis of working land conservation because an unknown proportion in this category include working lands.

easements acquired since 1990. There are approximately 76,000 observations in our sample having a purpose other than "Miscellaneous". In columns 5-6 the dependent variable is the soil quality index. Here we utilize approximately 14,000 observations of easements having the purpose of working lands conservation. All specifications are estimated using a linear probability model with standard errors clustered at the same level as the fixed effects. Appendix Table A.3.2 gives summary statistics, data definitions, and sources for the NCED data used in this section. And Panel A of Appendix 4 Figures A4.2 and A4.3 show trends in outcomes over time.

Table 6: Effects of Credits and Transferability on Easement Purpose

Dependent Variable	Farm or Ranchland	Farm or Ranchland	Farm or Ranchland	Farm or Ranchland	Soil Quality	Soil Quality
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Regime						
Credit	-0.1680***	-0.2111**	-0.1642***	-0.2058**	-1.240	-3.442***
	(0.0437)	(0.0810)	(0.0440)	(0.0808)	(1.560)	(0.5391)
Transferability	0.1515***	0.1833**	0.1423***	0.1709**	0.7108	5.046***
	(0.0400)	(0.0765)	(0.0403)	(0.0767)	(7.332)	(1.825)
Holder						
NGO			0.0587***	0.1193	0.1959	3.892
			(0.0189)	(0.0748)	(1.676)	(2.385)
State			0.1479***	0.1491*	-0.7717	0.8945
			(0.0200)	(0.0751)	(1.517)	(1.940)
Unknown			0.0193	0.0620	-1.721	4.729**
			(0.0623)	(0.0831)	(1.710)	(1.846)
Fixed Effects						
Time	Year	Year	Year	Year	Year	Year
Space	County	State	County	State	County	State
Fit Statistics						
Observations	75,753	76,083	75,753	76,083	13,772	14,043
Sample	All	All	All	All	F&R	F&R
R2	0.69424	0.53773	0.70011	0.54802	0.75533	0.53483
Dep. Var. Mean	0.18471	0.18457	0.18471	0.18457	73.415	73.801
Cluster Level	County	State	County	State	County	State

Notes: Clustered (county level) standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, * 0.1. The "All" sample includes all NCED easements acquired in 1990 or later with information on year of acquisition and shapefile and a purpose other than "miscellaneous". The F&R is a subsample of easements for working lands conservation. The number of observations is smaller with county fixed effects because counties with only a single observation are dropped from the analysis in the R estimating package. All regressions exclude easements in Massachusetts because it is not easily classified as transferable or non-transferable credit state.

All regression estimates include fixed effects for year (μ_t). Our preferred estimates include county fixed effects (α_c) but we also include specifications with only state fixed effects. Using county fixed effects means the comparisons are within counties, allowing us to control for local factors beyond tax credit characteristics that could influence easement purpose (e.g., historical concentration of the agricultural industry or differential property tax treatment of agricultural land at the county level). The regressions also control for easement holder type (e.g., private land trust, state government or federal government) to account for different propensities of holder types to acquire easements for particular purposes. The omitted holder is "federal government". The key variables of interest are "tax credit", which indicates if the easement was acquired during a state-year when tax credits were available, and "transferable", which indicates if the easement was acquired during a state-year when tax credits were transferable.

The column 1-4 results in Table 6 suggest that easements acquired in state-years with (non-transferable) tax credits are less likely to promote working land conservation. Allowing transferability has an offsetting effect, however, leading to more easements targeting working lands. In terms of magnitude, the column 3 farm and ranchland coefficient suggests that adding a transferable tax credit increases the probability of an easement focused on working land conservation by 0.14 percentage points. Overall, this result indicates that transferability encourages greater participation in easements among farmers and ranchers, at least when compared to tax credits that are not transferable.

The column 6 results on soil quality suggest transferability leads to the selection of working land easements on lands with higher average inherent productivity. In terms of magnitude, the coefficient of 5.046 is a $5.046/73.8 = 6.8\%$ increase relative to the mean of soil quality. Comparing column 6 with column 5, we note the effect of soil quality effect is present with the inclusion of county but not state fixed effects. We put more stock in the column 5 estimate because there are many factors across an entire state, beyond transferability, that could influence the acquisition of working land easements.[23]

We also match the NCED easement data with shapefiles of individual parcels (acquired through local tax assessor offices and the company ReportAll) to determine the mailing address of the land's owner (or addresses if there are multiple owners). We use the information on mailing

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[23] The result could also imply that transferability improves the selection on soil quality within counties but not across counties.

addresses to determine the distance of the closest owner to the property under easement. This is our attempt to measure the extent to which easements cover land owned by locals, rather than non-residents of second homes.

Table A3.4 in Appendix 3 assesses whether transferability encourages easements on land owned by locals rather than second-home owners who are likely more affluent. We do so by estimating the same model as in equation (4) but changing the dependent variable to measure non-localness of landowners in 2022. The first measure is an indicator for whether the closest owner lives in the same county as the easement. The second measure is the logged distance, in miles, from the centroid of the easement property to the centroid of the zip code of the mailing address reported by property's landowner.[24] The larger the distance, the less local the landowner. The estimates suggest that transferability affects localness in two ways. First, it increases the proportion of working land easements; easements with this purpose are more likely to be occupied by local landowners when compared to easements for most other purposes. Second, even after controlling for easement purpose, the estimates with county fixed effects suggest that easements acquired under transferable tax regimes have landowners who live 32% closer to the land, conditional on living outside the county.

Overall, the estimates in this section suggest transferability leads to more easements over inherently productive working lands occupied by local residents. These findings are consistent with simulations from the tax calculator demonstrating how transferability lowers the after-tax donation price for low and middle income donors, relative to high-income donors.

7. Effects of Transferability on Ecological Value

The next objective is to evaluate how introducing transferability into a tax incentive system will affect the targeting of ecologically valuable lands. We begin with theoretical framing before proceeding to the empirical tests.

A. Theoretical Framing

The basic theoretical ideas are as follows. First, transferability stimulates interest in donating easements among a broader set of landowners because it reduces the after-tax price of

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[24] In cases where there are multiple landowners, we use the address of the landowner reporting the closest distance to the easement property.

doing so for landowners across the distribution of income, from low to high. Second, transferability will therefore theoretically broaden the match of lands over which a landowner has strong incentives to donate, and a land trust or government agency will consider to be high priority. That is, by increasing the number and range of easements offered to land trusts, transferability will increase the likelihood that the bundle of offerings will include easements desired by choosy land trusts focused on practices like conserving critical wildlife habitats and watersheds. Third, having a larger portfolio of donated easements to choose from, land trusts and government agencies will be more selective, choosing easements of higher average quality under transferability. Fourth, as long as land "quality" is sufficiently present among the landholdings of lower and medium-income donors, the resulting portfolio of easements under transferability will include more high-quality donations when compared to easements without transferability.

B. *Empirical Estimates*

We measure ecological and environmental value with three variables. The first is simply the size (acreage) of the easement. Size is a measure of ecological and environmental value because successful land conservation for wildlife habitat, water quality, and recreational amenities often requires large, contiguous areas. This is because marginal recreational and ecological benefits tend to increase in the amount of contiguous land conserved (Loomis 2002, McDonald et al. 2007).[25]

Our second measure is of ecological value. It comes from a composite map provided by Belote et al. (2017). Their map was compiled using measures of ecological integrity (Theobald 2013), connectivity (Belote et al. 2016), ecosystem representation priority (Aycrigg et al. 2013), and biodiversity priority (Jenkins et al. 2015). It is a pixel level index of conservation value for the United States, and it allows us to identify variation both within a state and across states. Figure 8 shows the map. The light areas are high conservation value, the dark areas are low value. The brown/orange areas are conservation easements from NCED.

Due to economies of scale and scope in conservation, a key component of conservation value is an easement's connectivity to other conserved lands.[26] Hence, our third measure of

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[25] Additionally, farm and ranching also face economies of scale meaning the conservation of large easements may improve the success of working lands conservation.

[26] U.S. Geological Survey (USGS) Gap Analysis Project (GAP), 2024, Protected Areas Database of the United States (PAD-US) 4.1: U.S. Geological Survey data release.

ecological and environmental value is whether an easement is within one mile of public or privately conserved lands. We generate the measure from spatially connecting easements in NCED with shape files of federal, state, and locally conserved land holdings provided by the US Geological Survey Protected Areas Database. This dataset contains publicly (federal, state, local) conserved land as well as privately conserved land. For our analysis we have excluded conservation easements (NCED covers these) and land held by the Department of Defense.

Figure 8: Conservation Value and Conservation Easements
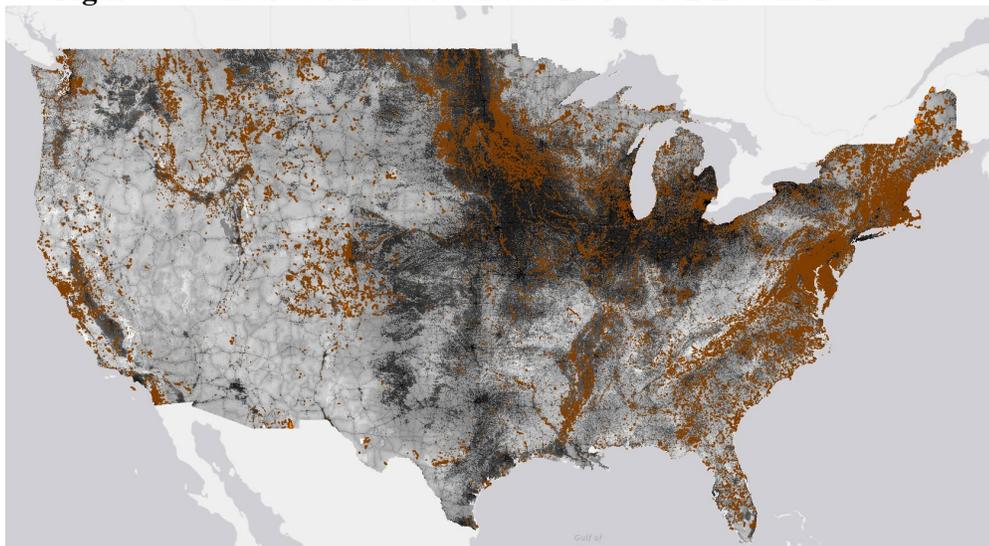
Appendix 3 Table A.3.3 gives summary statistics for the variables just described and Appendix 4 Figures A.4.2 and A.4.3 show trends in them over time. Using those data, we estimate regression models as laid out in equation (4).

Table 7 reports results for the three dependent variables: (1) easement acres (logged), (2) ecological value, (3) whether the easement is within one-mile of conserved land. All regression estimates control for county (α_c) and year (μ_t) fixed effects, the purpose of the easement (e.g., recreational, farmland, forest etc), and the characteristics of the easement holder (e.g., private land trust, state government etc.). As above, the omitted purpose is "environmental amenities" and the omitted holder is "federal government".

Table 7: Effects of Transferable Credits on Easement Quality and Size

Dependent Variable:	ln(Acres)	ln(Acres)	EV	EV	Near PADUS	Near PADUS
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Tax Regime						
Credit	-0.5736***	-0.9312***	-0.0163	-0.0347	-0.0645***	-0.0931**
	(0.1014)	(0.1807)	(0.0218)	(0.0352)	(0.0172)	(0.0376)
Transferability	0.6475***	0.9995***	0.0630**	0.1139*	0.0557***	0.0538
	(0.1180)	(0.1728)	(0.0289)	(0.0569)	(0.0181)	(0.0343)
Purpose						
Farmland	1.771***	2.187***	-0.1775***	-0.1316*	0.1142***	0.1550**
	(0.1600)	(0.5779)	(0.0223)	(0.0732)	(0.0199)	(0.0610)
Forest	0.0026	0.3400	0.0122	0.3375	0.0188	0.1069
	(0.1797)	(0.7896)	(0.0207)	(0.2296)	(0.0251)	(0.1242)
Historical	-1.698***	-2.047***	-0.3478***	-0.4368***	-0.0676	-0.0079
	(0.1974)	(0.3282)	(0.0359)	(0.1066)	(0.0477)	(0.0673)
Miscellaneous	0.4088***	0.3096	-0.0103	0.0882	0.0522***	0.0721
	(0.0945)	(0.4614)	(0.0127)	(0.0731)	(0.0131)	(0.0471)
Ranchland	0.9341***	1.290***	-0.0314	0.0994	0.0332*	0.0367
	(0.1022)	(0.1818)	(0.0239)	(0.0917)	(0.0193)	(0.0392)
Recreation	-1.120***	-1.477***	-0.1279***	-0.1706***	-0.1341***	-0.1771**
	(0.2753)	(0.4635)	(0.0322)	(0.0632)	(0.0410)	(0.0698)
Holder						
NGO	-0.4384***	-0.4939***	0.1416***	0.1912***	-0.0048	0.0365
	(0.0703)	(0.1738)	(0.0151)	(0.0485)	(0.0130)	(0.0260)
State	-0.8709***	-1.456***	0.0706***	0.0109	-0.0666***	-0.0979***
	(0.0881)	(0.3964)	(0.0163)	(0.0746)	(0.0135)	(0.0361)
Unknown	-1.064***	-1.652**	0.1775**	0.0428	-0.0785*	-0.0589
	(0.2530)	(0.6387)	(0.0700)	(0.1389)	(0.0469)	(0.0763)
Fixed Effects						
Time	Year	Year	Year	Year	Year	Year
Space	County	State	County	State	County	State
Fit Statistics						
Observations	104,889	105,170	102,221	102,505	104,889	105,170
R Squared	0.58145	0.43244	0.62753	0.39164	0.29352	0.15536
Dep. Var. Mean	3.0767	3.0814	1.5364	1.5372	0.49620	0.49622
Cluster Level	County	State	County	State	County	State

Notes: Standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, * 0.1. The sample includes all NCED easements acquired in 1990 or later with information on year of acquisition and a shapefile. The number of observations is smaller with county fixed effects because counties with only a single observation are dropped from the analysis in the R estimating package. All regressions exclude easements in Massachusetts because it is not easily classified as transferable or non-transferable credit state.

The results suggest transferability leads to the selection of easements that are on average larger, and that have higher ecological and environmental value. In terms of magnitudes, the coefficients on Credit and Transferability offset one another for Acres and Near Public Land, meaning that easements under transferable credits perform better in these dimensions when compared to non-transferable credits but are not statistically different than easements in states lacking tax credits. However, the coefficients on Ecological Value suggest easements improve ecological targeting by 0.063/1.53 = 4% relative to all other states, whether they lack a tax credit program or have one that is non-transferable.

Two findings across Table 7 and Table 6 are worth highlighting. First, tax credit programs that are not transferable are associated with smaller easements that are further from publicly conserved lands and with agricultural easements that have low agricultural soil quality.[27] Second, the coefficients on easement purpose make sense and suggest the overall econometric model is appropriate. For example, easements for historical purposes are smaller and occupy lands with lower ecological value as we expect. As Appendix 3 Table A3.4 shows, however, the results are robust to excluding the controls for purpose and holder type.

8. Effects of Transferability on Targeting of Lands under Conversion Pressure

Next, we evaluate how adding transferability has affected the targeting of land likely to be developed absent a conservation easement. In the jargon of literature on PES, easements are "additional" if they prevent near-term conversion. Additionality is more likely when easements cover lands that are otherwise under high conversion pressure.

We measure conversion pressure using an index (CPI) from Oakleaf (2024). This is a 1-km resolution map of land conversion pressure from multiple sources. It combines past maps of actual conversion with suitability maps for future expansion based on the predicted trajectory of land development. The index ranges from 0 to 1 with 1 representing extremely high conversion pressure.

Figure 9 compares a histogram of the CPI (measured at 1-km^2) across all lands in the continental U.S. with a histogram of the CPI for 1-km^2 containing NCED easements. The mean

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[27] These estimates on non-transferable tax credits are consistent with other studies raising concerns that more generous tax credits could reduce easement quality (see e.g., Suter 2014, Vercammen 2019 and Larson 2025). As noted in the introduction, these studies do not focus on transferability in theory or in empirical design.

CPI for the U.S. is 0.51 compared to 0.61 for the NCED easements.[28] Overall, the histogram comparison is encouraging in that it shows that conservation easements have tended to concentrate on lands otherwise under higher conversion pressure.

Figure 9: Histograms of the CPI for the US Land and NCED Easements
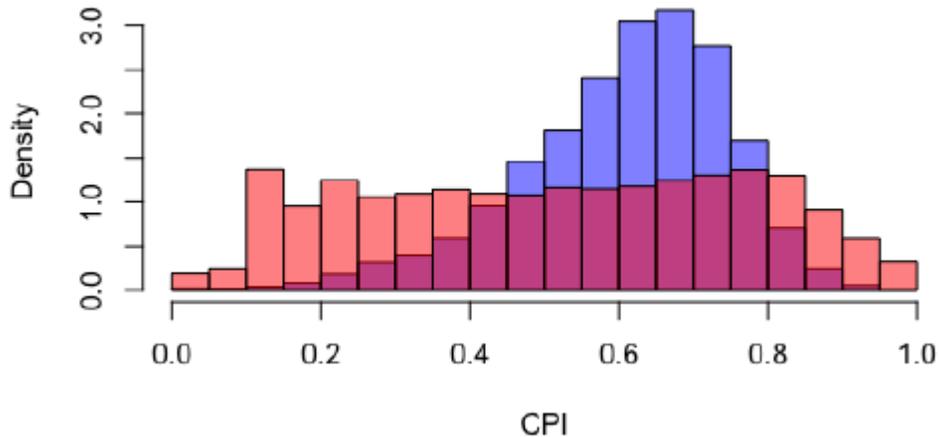
Note: The figure compares histograms of the conversion pressure index for 1-km^2 sections of land across the continental U.S. (red) and 1-km^2 sections of land containing NCED easements.

To assess the effects of transferability on the CPI, we run regression estimates from the basic model in equation (3). Table 9 reports the results. The dependent variable in all columns is the CPI. As above, the omitted easement purpose is "environmental" amenities and the omitted holder type is the federal government.

Consider first the results in Columns 1-2, which employ the full sample of NCED easements. Tax credit programs, whether transferable or not, have no statistical correlation with the CPI even after controlling for easement type and holder. Easements for farm and ranchland conservation have CPIs that are 0.024/0.62 = 3.8% higher than those for environmental amenities. By contrast, easements for historical conservation and recreational use have lower CPIs. This is noteworthy because, as shown in Table 6, transferability is associated with a higher proportion of working land easements.

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[28] The difference in means is statistically significant with a p-value < 0.01 for a two-tailed t-test whether assuming equal or unequal variance.

Table 8: Effects of Transferable Credits on Easement CPI

Dependent Variable:			Easement CPI			
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Tax Regime						
Credit	-0.0004	-0.0092	-0.0012	0.0154	0.0050	0.0074
	(0.0034)	(0.0067)	(0.0093)	(0.0129)	(0.0069)	(0.0058)
Transferability	-0.0031	-0.0072	0.0090	0.0223**	0.0426*	-0.0088
	(0.0072)	(0.0120)	(0.0094)	(0.0103)	(0.0231)	(0.0129)
Purpose						
Farmland	0.0236***	0.0281***	0.0350***	0.0303***		
	(0.0040)	(0.0089)	(0.0084)	(0.0106)		
Forest	-0.0025	0.0169	0.0376*	0.0357*		
	(0.0058)	(0.0136)	(0.0215)	(0.0186)		
Historical	-0.0540***	-0.0931***	-0.0209	0.0252		
	(0.0115)	(0.0149)	(0.0158)	(0.0301)		
Miscellaneous	0.0022	0.0077	0.0012	0.0087		
	(0.0027)	(0.0098)	(0.0047)	(0.0097)		
Ranchland	0.0077	-0.0027	0.0148	-0.0044		
	(0.0064)	(0.0106)	(0.0108)	(0.0083)		
Recreation	-0.0335***	-0.0602***	-0.0251	-0.0273		
	(0.0105)	(0.0128)	(0.0157)	(0.0248)		
Holder						
NGO	-0.0118***	-0.0161			-0.0065	0.0122
	(0.0032)	(0.0137)			(0.0074)	(0.0141)
State	-0.0104***	-0.0166			0.0014	0.0194
	(0.0031)	(0.0124)			(0.0072)	(0.0119)
Unknown	-0.0387***	-0.0251*			0.0096	0.0489***
	(0.0149)	(0.0126)			(0.0121)	(0.0126)
Fixed Effects						
Time	Year	Year	Year	Year	Year	Year
Space	County	State	County	State	County	State
Fit Statistics						
Observations	103,731	104,012	19,033	19,368	13,732	14,004
R Squared	0.45730	0.17481	0.54945	0.18356	0.55447	0.19095
Dep. Var. Mean	0.61745	0.61766	0.63150	0.63227	0.62262	0.62367
Cluster Level	County	State	County	State	County	State
Data Sample	Full	Full	NGO	NGO	F&R	F&R

Notes: Standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, * 0.1. The sample includes all NCED easements acquired in 1990 or later with information on year of acquisition and a shapefile. The number of observations is smaller with county fixed effects because counties with only a single observation are dropped from the analysis in the R estimating package. All regressions exclude easements in Massachusetts because it is not easily classified as transferable or non-transferable credit state.

Columns 3-4 focus on the subset of easements held by NGO land trusts because these easements are mostly likely to be donated and therefore most directly affected by tax policy. The CPI is higher within this subset for easements acquired under tax transferability, but it is only statistically significant in Column 4, when using state rather than county fixed effects.

Columns 5-6 focus on the subset of easements that are for the purpose of farm and ranchland conservation, which tend to have higher CPIs than easements for other purposes suggesting easements over working lands were otherwise under more development pressure. Our favored estimate in column 5 suggests transferability improves the targeting of working lands under high conversion pressure by 0.0426/0.622 by 6.8%.

Overall, this analysis of conversion pressure indicates that tax-credit transferability does not come at the expense of acquiring fewer "additional" easements. On the contrary, there is weak evidence that credit transferability may improve the targeting of additional easements.

9. Mechanisms

We hypothesize that transferability increases the proportion of high-quality easements for the following reasons. First, it increases the pool of landowners who are incentivized to donate as shown in simulations from our tax calculator. Second, the increased pool, combined with state-level aggregate caps on credit availability, encourages easement holders to be more selective about which easement donations to solicit and accept. Selectivity leads to higher average quality.

Although we lack detailed data on easement donations that are offered but rejected, and on the amount of time easement holders spend soliciting donations on desired lands, we do have data on whether the holder is accredited by the Land Trust Alliance (LTA). The LTA is the national trade organization for land trusts. It launched a voluntary accreditation program in 2008. Through this program, 478 land trusts have become certified as adhering to high standards for prudent, quality, and cost-effective conservation (Land Trust Accreditation Commission).[29] Land trusts earning accreditation must comply with the *Accreditation Requirements Manual;* this involves proving it employs rigorous easement selection criteria and follows easement monitoring and enforcement protocol (Land Trust Alliance, 2017, p. 1).[30]

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[29] https://ltac.neonccm.com/map

[30] For first-time accreditation, a land trust must have operated for at least two years and complete at least two easement acquisitions. Eligible land trusts must adopt guidelines following *Land Trust Standards and Practices* and

Variation in whether a land trust is accredited is partly driven by failed attempts to receive accreditation and by variation in whether organizations have applied. The national accreditation success rate was 56% for initial application filings in 2008 (Felmlee 2009). Recent success rates are not reported, and there is not public disclosure of information about non-approved land trusts.[31]

We use a regression model similar to (4) to estimate how transferability has influenced the probability of easement acquisition by land trusts accredited during the sample period. Table 9 shows results. The dependent variable in columns 1 and 2 is an indicator for whether the easement is held by a private land trust, rather than a government agency, because only private land trusts are eligible for accreditation. The dependent variable in columns 3-6 is an indicator for whether the easement is held by an accredited land trust. In columns 5 and 6, the sample is limited to easements held by land trusts.

Across models with county fixed effects – which are our preferred specifications - tax credit transferability is associated with increases in the proportion of easements held by land trusts generally, and by accredited land trusts in particular. In terms of magnitudes, the Column 5 coefficient suggests transferability increases the proportion of easement acquisitions by an accredited trust by 0.061/0.65 = 9.4%, where 0.65 is the mean proportion of land trust easements held by accredited organizations. Overall, the findings imply that transferable tax credits channel a larger share of easements to land trusts with well-defined selection criteria and strong quality standards.

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conduct assessments of all its easements to prove compliance. The accreditation commission examines materials from applicants and visits land properties to decide if a land trust receives accreditation. The initial accreditation is valid for five years. The renewal process is similar to the initial accreditation except that all materials can be submitted online and these procedures are simplified.

[31] One noteworthy example of non-approval was reported in detail in *Fortune Magazine* article by Elkind (2017). At that time, The Atlantic Coast Conservancy (ACC) held 80,000 acres of easements in 11 states. The ACC applied for LTA accreditation in 2013. The LTA expressed concern about the syndications that ACC was accepting, and the ACC dropped its application in response. In 2016, the LTA ruled accredited trusts must decline offers of syndicated easements.

Dependent Variable:	NGO	NGO	Accredited	Accredited	Accredited	Accredited
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Tax Regime						
Credit	0.0089	0.0382	-0.0184	-0.0050	-0.0186	-0.0767
	(0.0234)	(0.0907)	(0.0170)	(0.0527)	(0.0306)	(0.0734)
Transferability	0.0513**	0.1098	0.0591***	0.0697	0.0608*	0.0098
	(0.0252)	(0.0922)	(0.0207)	(0.0500)	(0.0327)	(0.1130)
Purpose						
Farmland	-0.0815***	0.0055	-0.0946***	-0.0382	-0.0357	-0.0646
	(0.0307)	(0.1101)	(0.0309)	(0.0754)	(0.0296)	(0.0570)
Forest	-0.0383**	-0.0250	-0.0363**	-0.0360	0.0801	0.0843
	(0.0183)	(0.0517)	(0.0154)	(0.0400)	(0.0615)	(0.1039)
Historical	-0.1326***	-0.0618	-0.1698***	-0.1141**	-0.2851***	-0.3985***
	(0.0312)	(0.0719)	(0.0282)	(0.0545)	(0.0803)	(0.1426)
Miscellaneous	-0.0374*	-0.0258	-0.0319*	-0.0331	-0.0490*	-0.0791*
	(0.0197)	(0.0639)	(0.0172)	(0.0529)	(0.0260)	(0.0430)
Ranchland	-0.0275	0.0646	-0.0170	0.0774	0.0105	0.0189
	(0.0262)	(0.0570)	(0.0258)	(0.0531)	(0.0280)	(0.0447)
Recreation	0.0328	0.0443	-0.0708***	-0.0536*	-0.1559***	-0.2328***
	(0.0304)	(0.0891)	(0.0180)	(0.0289)	(0.0475)	(0.0713)
Fixed Effects						
Time	Year	Year	Year	Year	Year	Year
Space	County	State	County	State	County	State
Fit Statistics						
Observations	104,889	105,170	104,889	105,170	19,428	19,760
R Squared	0.56926	0.32926	0.52545	0.27642	0.67070	0.28993
Dep. Var. Mean	0.18758	0.18789	0.12969	0.12976	0.65447	0.65157
Cluster Level	County	State	County	State	County	State
Data Sample	Full	Full	Full	Full	NGO	NGO

Notes: Standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, * 0.1. The sample includes all NCED easements acquired in 1990 or later with information on year of acquisition and a shapefile. The number of observations is smaller with county fixed effects because counties with only a single observation are dropped from the analysis in the R estimating package. All regressions exclude easements in Massachusetts because it is not easily classified as transferable or non-transferable credit state.

10. Conclusions

Tax-incentivized conservation easements shape U.S. landscapes, yet little research examines how tax policy design influences donation patterns. This study addresses that gap by analyzing a key design feature: the transferability of tax incentives within decentralized markets for tradable credits. Using simulations from a customized tax calculator, we quantify how

transferability lowers the after-tax cost of donations and reduces its dependence on donor income. The empirical analysis further evaluates its impact on easement growth and quality.

Evidence suggests that tax credit transferability resulted in notable differences in easement participation. On average, state programs allowing credit transfer increased annual easement donations by roughly 47-61%, partly by attracting new contributions from modest-income, local landowners managing working lands rather than affluent second-home owners. This policy raised the share of easements over farm and ranchlands and reduced the average distance between donors' mailing addresses and their easement properties.

Further evidence suggests that making credits transferable leads to higher-quality easements. Non-transferable tax credit programs tend to produce smaller easements with lower agricultural soil quality that are further from public lands. In contrast, introducing transferability is associated with easements that are larger, that score higher in terms of ecological value and agricultural soil quality, and that are closer to public lands. These gains do not come at the expense of acquiring fewer "additional" conservation easements. We find no significant differences in land conversion pressure between easements obtained under tradable versus non-tradable credit regimes. However, easements under transferable programs appear more likely to be additional, as they more often conserve farm and ranchland under higher conversion risk.

Our findings underscore the apparent effectiveness of transferable tax credits in simultaneously enhancing both quality and equity in conservation easements, without compromising additionality. Contrary to claims that decentralization undermines easement performance, our analysis suggests the opposite. Enabling market trading of tax credits promotes greater individual autonomy and local decision-making—essentially increasing decentralization—which appears to strengthen overall performance. Future drafts will subject this empirical conclusion to further robustness checks to better ensure its validity.

We acknowledge study limitations that we hope future research will address. First, although our theoretical reasoning suggests that making tax credits transferable will enhance conservation outcomes without requiring increased public spending on conservation, we did not examine the full fiscal implications. Some states raised aggregate credit caps when introducing transferability meaning the experiments have not always been fiscally neutral. Second, while our findings demonstrate that making existing tax incentives transferable can enhance conservation easement outcomes, we do not evaluate alternative financing approaches, such as purchasing easements with

grant funding. Moreover, we do not compare permanent conservation easements with shorter-term conservation contracts and leases, which constitute the majority of PES programs globally. We hope our work encourages further study of these complex issues, including an assessment of the benefits and costs of shorter-term conservation leases relative to perpetual easements.

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Appendix 1: The Tax Calculator

I.   Overview

The Tax Calculator updates MatLab code used in Parker and Thurman's (2018) programming of tax policies in each U.S. over 1987-2012. The updated calculator is coded in R but is otherwise very similar. It takes as input a user-specified taxpayer scenario, consisting of three values: the taxpayer's Adjusted Gross Income, the value of the taxpayer's easement donation, and a characterization of the taxpayer as one who either qualifies or does not for the extended carryover and easement contribution limits enacted in federal law in 2006 for qualifying farmers or ranchers. For example, a possible scenario would be ($250,000 AGI, $750,000 easement value, and qualified = 1). From this scenario, the calculator determines what the federal and state income tax liabilities for the taxpayer would be in each of the 50 states and in each of the years 1987-2024. The calculator assumes that the donation is made once and calculates the tax liability that results from the donation in the year in question, and adds to the liability the present value of all future changes in taxes that result from a carrying over of unused deductions and credits into future years.

The following narrative comes primarily from Parker and Thurman's (2018) appendix. We have made minor updates to it in our present description of how the calculator's code simulates the joint federal and state tax systems.

II.   Inputs External to the Calculator

The primary representation of the federal and state tax codes comes in the form of spreadsheets containing the tax brackets and rates for each year at both federal and state levels. Other spreadsheets are read in that contain, for each state and year, the fraction of AGI allowed as an easement deduction. For example, since 2006 an ordinary taxpayer has been able to take an easement deduction of up to 50% of their AGI as a federal deduction; a qualified farmer or rancher has been able to take a deduction up to 100% of their AGI. The federal limits were 30% of AGI for both types of taxpayers prior to 2006. States vary as to the percentages of AGI that limit easement donations and the state limits change over time. Many states conform to federal rules in their treatment of the deduction of charitable contributions and for those states the calculator assumes that the same federal limits apply as just described. (See *All States Tax Handbook*, various years 1987-2024.)

The calculator divides the 50 states into 11 tax code categories, depending on: how deductions and exemptions are treated, the relationship of the state tax to federal tax, and the treatment of tax credits for conservation easements. The categories are listed here. A few states change tax category once or more often over the 2012-2024 sample period.

<u>State Income Tax Categories (with states listed according to their most frequent status in the sample)</u>

1. States without an income tax (AK, FL, NV, SD, TX, WA, WY)

2. States that calculate income tax as a proportion of federal income tax (RI, VT)

3. States with an income tax that does not allow itemized deductions

   3a. States with a tax that does not allow itemization and that taxes dividends and wages at the same rate
   (CT, IL, IN, MI, OH, PA, WV, WI)

   3b. States with a tax that does not allow itemization and that taxes dividends and wages at different rates (MA, NH, TN)

4. States with an income tax that allows itemization of deductions
   (AL, AZ, HI, ID, KS, LA, ME, MN, MS, MO, MT, NJ, NY, ND, OK, UT)

5. States that allow itemization of deductions – exemptions are taken as credits (AR, CA, KY, NE, OR)

6. States that offer conservation easement tax credits

   6a. States that allow both deductions and credits – personal exemptions are deducted from income (GA, NC, SC, VA)

   6b. States that allow both deductions and credits – personal exemptions are taken as credits (IA)

   6c. States that allow either a credit or deduction – filers are assumed to take the credit. Exemptions are deducted from taxable income
   (CO, MD, NM)

   6d. States allow either a credit or deduction – filers are assumed to take the credit. Exemptions are taken as credits (DE)

   6e. States that allow donors to sell their credits – filers are assumed to sell and receive $0.85 of the donation value in the credit market.

III. Algorithm Logic

A. Adjustment for inflation

The scenario inputs of AGI and donation are specified in 2024 dollars. The dollar values for AGI and donation are converted into 1992-2024 time series of equivalent dollar values, where the CPI-All Urban Consumers is used for deflation. For example, if AGI is set to $100K in 2024 dollars and the value of the CPI in 1990 (normalized to 2024=1.00) is 0.50, then the AGI

fed into the calculator for 1990 is $100K X 0.50 = $50K. The 2024 value of the easement donation is similarly converted to dollar terms appropriate for the year in which the calculation is carried out. Because all dollar values are converted into purchasing-power adjusted values, the legislated nominal tax brackets from each year are appropriate.

B. Calculation of tax liability and the price of conservation for a state without an income tax

Residents of states without an income tax owe only a federal tax payment. To evaluate the consequences of donating an easement, the taxpayer's federal tax is calculated under three hypothetical situations, which are considered in the theory section of the paper: Full0, Base0, and BaseC.

Full0 refers to the tax that would be owed if the taxpayer took their full available income (the "Full" part of Full0) and donated no easement income (the "0" part of Full0). Full income with no donation is AGI + rC: AGI plus the investment return on the potential donation of C. With full income and no donation, the federal tax bill is calculated assuming that the taxpayer is married filing jointly and itemizes deductions. The amount of deductions is set equal to the standard deduction under the no-donation hypotheticals; the taxpayer takes personal exemptions for the taxpayer and spouse. Denote the taxes owed under the Full0 hypothetical as TaxFull0.

The second tax calculation assumes the Base0 hypothetical: the consumer takes Base income (equal to AGI) and makes no easement donation. This is the tax situation for a donor in years after the donation. The taxpayer has reduced their market income to AGI (from AGI + rC) by virtue of the donation but does not receive the tax benefit of an easement donation in years after the donation (except for the consequences arising from the carryover of unused deductions, discussed below.) TaxBase0 is calculated from the federal tax code in the same way that TaxFull0 is calculated: the taxpayer is assumed to file jointly and take the standard deduction.

The third tax calculation assumes the BaseC hypothetical: the consumer takes Base income (equal to AGI) and makes an easement donation in the amount C. This results in the tax owed in the year of the donation, TaxBaseC. The calculation proceeds assuming that deductions are itemized and equal to the standard deduction plus any easement-related deduction. The calculation is similar to those under the two previous hypotheticals, with one important complication: the carryover of unused deduction. For example, if the taxpayer cannot deduct more than 30% of their AGI (as was the law in years prior to 2006), and if the value of the easement donation exceeds 30% of AGI, then the unused portion of the deduction is carried forward into future tax years. In consideration of the next tax year, the unused deduction from the first year might again exceed 30% of the taxpayer's AGI, resulting in carryover into the second year after the donation decision year. Carryover continues until either the deduction is used in its entirety or until the carryover limit is reached. U.S. law allowed carryover into five subsequent years under the tax code for 2005 and before. The law was changed in 2006 to allow 15 years of carryover beyond the donation decision year.

B.1.   The price of conservation without carryover

If there is no carryover (because, for example, the donation is less than 30% of AGI), then the calculation of the price of conservation proceeds directly from the three tax values TaxFull0, TaxBase0, and TaxBaseC.

The taxpayer who does not donate is assumed to pay a perpetuity of tax payments of TFull0. The taxpayer who donates pays taxes equal to TBaseC in the year of the donation and equal to TBase0 in every year thereafter. The present value of the tax savings due to the donation is:

(A1)   PV of tax savings = PV of tax stream without donation – PV of tax stream with donation

$$= \text{TFull0}/r – [\text{TBaseC}/(1+r) + (\text{Tbase0}/r)/(1+r)],$$

where periodic payments are considered taken at the end of the period and discounted to the beginning.

The PV of tax savings is the tax benefit from donating, while the cost of donating is the permanent loss of income rC, which has a capitalized value of C. Therefore the price of conservation is:

Dollar cost of donation = PV of foregone income - PV of tax savings

$$= C - \text{PV of tax savings}.$$

Expressed per dollar of donated value:

(A2) $P_c = 1 - (\text{PV of tax savings})/C$.

B.2. The price of conservation with carryover

Carryover of unused deductions affects only the calculation of TaxBaseC. (Hypotheticals Full0 and Base0 involve no donation and, hence, no carryover.) If the taxpayer is unconstrained by the AGI limits then carryover is zero and TaxBaseC is simply the tax bill owed in the year of donation. If the donation is large enough relative to AGI to result in a carryover into future years, the calculator adjusts TaxBaseC for the value of the additional tax benefits that accrue from having the carried over deductions in future years. In the year following the donation, the tax bill is calculated assuming a Base income (of AGI) and a deduction equal to the carried over value from the donation year. That tax bill is calculated and compared to the tax bill that would result from a Base income (of AGI) and no deduction. The difference between the two is the tax benefit, under the donation scenario, from having additional deductions carried into the second year. The difference between the two is discounted back to the donation year and subtracted from TaxBaseC to reflect the further tax benefit from carried over deductions.

If there remains unused deduction in the second year, the process is repeated into year three and beyond until either the deduction is exhausted or the carryover limit (of 5 or 15 years) is reached. For each future year in which carryover is relevant, the tax savings due to carryover is discounted back to the donation year and netted out of TaxBaseC. The ultimate adjusted value of TaxBaseC is used in expression A1 to calculate the present value of tax savings due to donating, and expression A2 is used to calculate the price of conservation.

C. Calculation of tax liability for a state with an income tax, but no itemization of deductions

For states with an income tax code that does not allow itemization, there is no explicit state tax benefit from charitable donations, including the donation of easements. However, state taxes can be deducted from federal taxable income and so the state and federal tax codes interact. The deductibility of state tax payments from federal taxable income can affect the marginal federal rate paid and, hence, the tax benefit from donations. Further, the choice of donating determines the market income of a taxpayer and so the state taxes paid are affected directly by the choice to donate.

The calculator takes state taxes into account by first calculating state taxes owed under the two hypothetical levels of income (Full and Base) and then deducting the relevant state tax from federal taxable income under the three federal hypotheticals described above (Full0, Base0, and BaseC.) In each hypothetical year, the calculation of federal tax liability proceeds as described above for states without income taxes, but with state taxes deducted from income. The resulting state and federal tax liabilities are added together in each year and the same carryover calculations are made—adjusting federal taxable income in each future year for the state income taxes paid—making A1 still the relevant expression for the PV of tax savings, where tax savings are now understood to encompass the combined federal and state tax bill.[1]

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[1] The calculator diverges from the real-time calculation of a taxpayer's liability in two notable ways. The first is that on an actual tax return, the state taxes that are deducted from taxable income are those paid in the previous year, not the current year. The calculator abstracts from this timing issue by assuming that the state taxes paid this year are entirely deducted from this year's income. This abstraction is harmless to the extent that a taxpayer's withholding for state taxes in the current year matches this year's state tax liability because it is withheld (and estimated) state taxes that are deducted from the current year's federal taxable income.

The second divergence is that while the calculator acknowledges the federal deductibility of state tax payments, it ignores the fact that some states allow the deduction of federal tax payments from state taxable income. The rationale for ignoring the deductibility of federal tax payments from these states' tax returns is that the deductibility would apply both to taxes paid if a donation is made and to taxes paid if no donation is made. While there would be some interaction between the donation's effects and the deductibility of federal tax payments, we believe the effect would be second order.

D. Calculation of tax liability for a state with an income tax with itemized deductions

In the previous case of a state with an income tax but no allowable deductions, the state tax bill depends only on taxable income, either Base (AGI) or Full (AGI + rC). Federal calculations proceed in all years and under all hypothetical assumptions taking state tax payments as exogenous. In the case of a state that allows the value of the easement to be deducted from state taxable income, the stream of state tax payments over time still is predetermined with respect to the calculation of federal tax, but carryover considerations influence the state tax calculations. The carryover limits at the federal level (5 years prior to 2006 and 15 years thereafter) are assumed to hold at the state level as well. However, carryover is determined by state-specific limits on the deduction as a proportion of AGI.

Just as in the federal case, when calculating the state tax bill assuming a donation, the calculator checks to see if the proportion-of-AGI limit is binding and, if so, carries forward the unused deduction into future tax years. Future state and federal tax bills are calculated year by year for as many years as federal or state allowed carryover is positive; the number of years in which deductions are allowed to be carried over need not be the same at the federal and state levels. The tax savings from carried over deductions are discounted back to the year of the donation and netted out of the state and federal tax bills. The present values of the tax savings due to the donation are combined from the federal and state tax calculations and the price of conservation is, again, calculated according to expression A2.

E. Calculation of tax liability for a state that offers income tax credits for easement donations

Tax credit provisions complicate the calculations described above.

E.1. Transferable credits

A tax credit is equivalent to a voucher for payment of state taxes equal to, say, 25% of the value of the easement donation. In some states (CO and VA) in some years, the credit is transferrable and easement donors can sell their credits, typically for 85 cents per dollar. In those states and years, if the state only allows the credit and not the deduction as well, then the calculation of state tax liability proceeds as above for a state with an income tax that does not allow itemization of deductions. The credit is calculated as a proportion of the easement value and assumed to be sold at $0.85 per dollar. The credit proceeds are considered to be a tax benefit to donating the easement. Further, the credit sale proceeds are taken to be taxable at the federal level. With these adjustments, the tax liabilities and price of conservation are calculated as above in III.C.

E.2.   Non-transferable credits: deductions and/or credits allowed

For some states, easement donations can be deducted from taxable income and the donors also receive a state tax credit. In states that allow the taxpayer to have their cake and eat it too, the calculator deducts the easement value from state and federal taxable income–as outlined above in the case of states that allow itemization–and then adjusts state tax liabilities by the amount of the credit generated. If the credit is less than the state tax liability in the year of the donation then there are no further implications. If the credit exceeds the state tax liability in the year of the donation then the credit is used to pay the state tax bill and the remainder is carried forward. Future state tax liabilities are met by the remaining value of the credit until the credit is exhausted. Federal income tax is affected by the state tax credits because state tax paid, hence the federal state tax deduction, is reduced by the amount of the credit applied. Net state tax payments are discounted back to the year of donation and expressions A1 and A2, now adjusted for the benefits of the state tax credit, describe the tax savings and resulting price of conservation.

In some states, credits are granted, but the taxpayer is not allowed to both take the deduction and receive the credit. The taxpayer must choose. In those states and years, the calculator assumes that the credit is the more favorable tax option. The calculator acknowledges receipt of the credit as discussed in the previous paragraph, but the calculation is simplified by the fact that no deduction from state taxable income is taken.

IV. Aspects of the Income Tax code not Incorporated in the Calculator

We call attention to two aspects of the income tax code that are not captured by the calculator and provide justification for price of conservation calculations that result.

A.   Pease limitations

The so-called Pease limitations were first introduced into the federal tax code in 1991. They were in effect until 2009, and reinstated in 2013. The Tax Cuts and Jobs Act suspended the Pease limitations for tax years 2018-2025. For high-income taxpayers, the Pease limitations reduced itemized deductions allowed. According to this description, one might expect that such limitations could mute the tax benefits from easement donations. However, even for high-income taxpayers and despite the proper name of the Pease limitations ("overall limitation on itemized deductions"), Pease limitations have no effect on incentives to donate for almost all taxpayers (see Rosenberg *et al.*, 2013). For affected taxpayers, Pease limitations act by adding a dollar amount of deductions back into taxable income, with the amount added determined by income and not by the amount of deductions. The deductibility of charitable donations, including easement donations, is not affected.

B.   Alternative Minimum Tax

The AMT is a tax system parallel to the ordinary federal income tax, affecting taxpayers with high incomes and large deductions. It taxes a broader base of income than does the ordinary tax, at different rates. However, the Tax Cuts and Jobs Act drastically increased exemption amounts and phase-out thresholds, reducing the number of taxpayers affected in 2018 to under 250,000 in 2018. The AMT levies a maximum rate of 28% (lower than the 2024 ordinary income tax maximum rate of 37%) and recalculates taxable income by adding back in deductions taken for state and local income taxes, property taxes, mortgage interest, and miscellaneous itemized deductions (but not charitable contributions.)

The AMT is triggered by high incomes and high deductions. But once in the AMT system, taxpayers are allowed deductions for charitable contributions and, therefore, face the ordinary incentives to donate that arise from one's marginal rates. (And tax credit provisions and state income taxes are unaffected by the AMT.) Where the AMT might affect the incentive to donate an easement is through its effect on the marginal tax rate. Typically, the AMT schedule determines a lower marginal rate than faced in the ordinary income tax system and thus could be said to diminish the donation incentive for those subject to the AMT

Appendix 2: Highlights of State Tax Credit Programs from Inception through 2025

California

First Year of Credit	2001
Initial Act	Natural Heritage Preservation Tax Credit Act of 2000
Eligible Donations	Fee simple and conservation easements
Individual Limit	None
Fair Market Value Cap	55%
Carryforward	8 years
Transferable	No
Take Credit and Deduction	No

Notes: The program was suspended in 2002 and then reinstated in 2005 with a sunset at year end 2008. The program was re-authorized in 2010 with a sunset in 2015. Eligible donations must be approved, and easement holders must reimburse the state's general fund for the loss in revenue resulting from the tax credits prior to acquiring the property. Given the constraints on this program, we treat California as having no income tax credit program in the empirical analysis.

Colorado

First Year of Credit	2000
Initial Act	Credit Against Tax - Conservation Easements
Eligible Donations	Conservation easements only
Individual Limit	$100K in 2000-02; $260K in 2003-05; $375K from 2006-2012; $1.5M from 2021-2025
Annual Aggregate Limit	$22M from 2011-2012, $34M in 2013, $45M from 2014-2024, $50M in 2025
Fair Market Value Cap	100% in 2000-02; 100% on first $100K & 40% thereafter in 2003-05; 50% on entire donation from 2006-2015 up to $375K; 75% on first $100K and 50% thereafter up to $1.5M per credit from 2016 to 2021; 90% from 2021-2025
Carryforward	20 years
Transferable	Yes
Take Credit and Deduction	No

Delaware

First Year of Credit	2000
Initial Act	Land and Historic Resources Protection Incentives Act
Eligible Donations	Fee simple and conservation easements
Individual Limit	$50K
Annual Aggregate Limit	$1M
Fair Market Value Cap	40%
Carryforward	5 years
Transferable	No
Take Credit and Deduction	No

Georgia

First Year of Credit	2006
Initial Act	Credit for the Donation of Property for Conservation Purposes
Eligible Donations	Fee simple and conservation easements
Individual Limit	$250K
Annual Aggregate Limit	$30M from 2016-2021, $4M from 2022-2025
Fair Market Value Cap	25%
Carryforward	5 years during 2006-2007; 10 years from 2008-2025
Transferable	No until 2011, when credit became transferable
Take Credit and Deduction	Yes (but not after 2012)

Iowa

First Year of Credit	2008
Initial Act	Tax Credit for Charitable Conservation Contribution of Land
Eligible Donations	Fee simple and conservation easements
Individual Limit	$100K
Annual Aggregate Limit	None
Fair Market Value Cap	50%
Carryforward	20 years
Transferable	No
Take Credit and Deduction	Yes

Kentucky

First Year of Credit	2017
Initial Act	AN ACT relating to tax credits promoting land conservation
Eligible Donations	Fee simple and conservation easements
Individual Limit	$100K
Annual Aggregate Limit	$2M
Fair Market Value Cap	40%
Carryforward	15 years
Transferable	No
Take Credit and Deduction	Yes

Maryland

First Year of Credit	2001
Initial Act	Income Tax Credit for Preservation & Conservation Easements
Eligible Donations	Conservation easements only
Individual Limit	$80K in total, $5K annually
Annual Aggregate Limit	None
Fair Market Value Cap	100%
Carryforward	15 years
Transferable	No
Take Credit and Deduction	No

Massachusetts

First Year of Credit	2011; 2024
Initial Act	Approved in State Environmental Bond from 2011 to 2021; Conservation Land Tax Credit from 2021-2024
Eligible Donations	Fee simple and conservation easements
Individual Limit	$50K from 2011-2021; $75K from 2021-2025
Annual Aggregate Limit	$2M
Fair Market Value Cap	50%
Carryforward	None (but a refund applies)
Transferable	No
Take Credit and Deduction	No

New Mexico

First Year of Credit	2004
Initial Act	Land Conservation Incentive Act
Eligible Donations	Fee simple and conservation easements
Individual Limit	$100K during 2004-07; $250K from 2008-2025
Annual Aggregate Limit	None
Fair Market Value Cap	50%
Carryforward	20 years
Transferable	No from 2004-2007; Yes from 2008-2025
Take Credit and Deduction	No

North Carolina

First Year of Credit	1983; Repealed 2013; Reinstated for 2025
Initial Act	Credit for Certain Real Property Donations
Eligible Donations	Fee simple and conservation easements
Individual Limit	$5K during 1983-88; $25K during 1989-1996; $100K during 1997-98; $250K from 1999 to 2013 and 2025
Annual Aggregate Limit	None from 1983-2013, $5M in 2025
Fair Market Value Cap	25%
Carryforward	5 years
Transferable	No
Take Credit and Deduction	Yes

South Carolina

First Year of Credit	2001
Initial Act	South Carolina Conservation Incentives Act
Eligible Donations	Fee simple and conservation easements
Individual Limit	$52,500 (annual limit)
Annual Aggregate Limit	None
Fair Market Value Cap	25%
Carryforward	Until credit is exhausted
Transferable	Yes
Take Credit and Deduction	Yes

Virginia

First Year of Credit	2000
Initial Act	Virginia Land Conservation Incentives Act of 1999
Eligible Donations	Fee simple and conservation easements
Individual Limit	$50K in 2000; $75K in 2001; $100K for 2002-2009; $50K for 2009-2012; $100K for 2012-2014; $20K for 2015-2017; $50K for 2018-2025; $100K for fee simple donations from 2015-2025
Annual Aggregate Limit	$100M indexed for inflation from 2008-2014, $75M from 2015-2025
Fair Market Value Cap	50% for 2000-06; 40% for 2007-2024
Carryforward	5 years for 2000-06; 10 years for 2007-09; 12 years for 2009-2025
Transferable	No from 2000-2001; Yes from 2002-2025
Take Credit and Deduction	Yes

Notes: Statewide credits limited to $75M which has been binding since 2019.

Appendix 3: Additional Tables

Table A3:1: Summary Statistics of Covariates for Estimates in Table 4

Variable	Mean	Std. Dev.	Min	Max	Description
Log Farm Income	22.38	1.38	17.91	25.09	The natural logarithm of gross farm income in a state in 2024 $s. The source is the Economic Research Service of the U.S. Department of Agriculture, Farm and Wealth Statistics, available at https://www.ers.usda.gov/dataproducts/farm-income-and-wealthstatistics/.
Log Forest Revenue	20.26	1.25	15.76	23.02	The natural logarithm of gross forest income in a state in 2024 $s. The source is the Economic Research Service of the U.S. Department of Agriculture, Farm and Wealth Statistics, available at http://www.ers.usda.gov/dataproducts/farm-income-and-wealth-Statistics/.
Log Per Capita Income	10.91	0.21	10.32	11.49	The natural logarithm of per capita income in a state, in 2024 $s. The source is the U.S. Bureau of Economic Analysis, available at www.bea.gov/regional/.
Log Population	15.12	1.01	13.05	17.49	The natural logarithm of total population in a state. The source is the U.S. Bureau of Economic Analysis, available at www.bea.gov/regional/.
Government Easement Acres	7,328	15,337	0.00	268,705	The acres of conservation easements acquired by government agencies in a state in including federal, state, and local governments. The source is the National Conservation Easement Database (NCED), retrieved from https://www.conservationeasement.us/.

Table A3:2: Easement Count and Acreage Elasticity Estimates with State Trends

Income:	*Ihs*(Easements)			*Ihs(*Acres)		
	Low	Medium	High	Low	Medium	High
ln(P$_{it}$)	-2.257***	-1.961***	-1.601**	-2.107	-0.8796	0.7267
	(0.4794)	(0.7289)	(0.6164)	(2.628)	(2.627)	1.545)
Controls						
Log Farm Revenue	x	x	x	x	x	x
Log Forest Revenue	x	x	x	x	x	x
Log Per Capita Income	x	x	x	x	x	x
Log Population	x	x	x	x	x	x
Government Easement Acres	x	x	x	x	x	x
State Time Trend	x	x	x	x	x	x
Fixed Effects						
State	x	x	x	x	x	x
Year	x	x	x	x	x	x
Fit Statistics						
Observations	1,550	1,550	1,550	1,550	1,550	1,550
R^2	0.816	0.815	0.816	0.692	0.602	0.682
Adjusted R^2	0.318	0.317	0.319	0.206	0.205	0.205

*Notes: Clustered (by state) standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, * 0.1.*

Table A.3:3: Summary Statistics of Covariates for Estimates in Tables 6-8

Variable	N	Mean	Std. Dev.	Min	Max	Description
Credit	105,170	0.258	0.29	0	1	An indicator for if a state has a state tax credit in year t.
Transferability	105,170	0.092	0.44	0	1	An indicator for if a state has a transferable state tax credit in year t.
Farm or Ranchland	105,171	0.134	0.34	0	1	An indicator for if the easement conserves farm or ranchland
Soil Quality	105,171	86.88	33.24	0	180	An index of soil productivity, ranging from 0-190. The source is USDA gSSURGO, retrieved from: https://www.nrcs.usda.gov/resources/data-and-reports/gridded-soil-survey-geographic-gssurgo-database.
ln(Acres)	105,171	3.08	2.34	-20.89	12.79	The natural logarithm of acre size. The source is the National Conservation Easement Database (NCED), retrieved from https://www.conservationeasement.us/
Ecological Value (EV)	102,506	1.54	0.69	0.001	3.63	An index of ecological value, ranging from 0-4, capturing ecological integrity, connectivity, ecosystem representation, and biodiversity. The source is Belote et al. (2017)
Near PADUS	105,171	0.496	0.50	0	1	An indicator for if the easement is within 1 mile of public lands. The source is USGS PADUS, retrieved from https://www.usgs.gov/programs/gap-analysis-project/science/pad-us-data-download.
NGO	105,171	0.188	0.39	0	1	An indicator for if the easement is held by an NGO.
Accredited	105,171	0.130	0.34	0	1	An indicator for if the easement is held by an accredited land trust. The source is the Land Trust Alliance, retrieved from https://ltac.neonccm.com/map
Minimum Distance (mi)	77,440	0	264.2	0	4,212	Minimum distance from the easement county as measured by mailing address of the owner. The source is ReportAll.
In County	77,440	0.695	0.46	0	1	An indicator for if the owner's mailing address is in the same county as the easement. The source is ReportAll.

Easement Purpose	N	Share of Total
Environment	45,289	0.43
Farm	12,775	0.12
Forest	14,591	0.14
Historical	589	0.01
Miscellaneous	29,088	0.28
Ranch	1,268	0.01
Recreation	1,571	0.01
Total	105,171	

Easement Holder	N	Share of Total
Federal	20,559	0.19
NGO	19,761	0.19
State	64,099	0.61
Unknown	752	0.01
Total	105,171	

Table A3:4: Effects of Credits and Transferability on Localness of Property Owner

Dependent Variable:	In County	In County	ln(distance)	ln(distance)
Model:	(1)	(2)	(3)	(4)
Tax Regime				
Credit	-0.0220*	0.0011	-0.1314	-0.2702**
	(0.0129)	(0.0324)	(0.1066)	(0.1122)
Transferability	0.0240	0.0184	-0.3229**	-0.0500
	(0.0258)	(0.0400)	(0.1316)	(0.1825)
Purpose				
Farmland	0.1524***	0.1278***	-0.5177***	-0.4723**
	(0.0156)	(0.0362)	(0.1383)	(0.2334)
Forest	-0.0021	-0.1413	0.2992*	0.9453**
	(0.0176)	(0.1096)	(0.1737)	(0.4041)
Historical	0.0035	-0.0609	0.0925	0.3785*
	(0.0228)	(0.0501)	(0.2245)	(0.2006)
Miscellaneous	0.0409***	0.0073	-0.0954	0.1412
	(0.0138)	(0.0495)	(0.0908)	(0.1766)
Ranchland	0.0994***	0.1213***	-0.1978	-0.0730
	(0.0222)	(0.0287)	(0.1241)	(0.2578)
Recreation	0.0703***	0.1434***	-0.4842	-0.3929*
	(0.0263)	(0.0420)	(0.3974)	(0.2013)
Holder				
NGO	-0.0228*	-0.0190	0.2150***	0.2929***
	(0.0121)	(0.0198)	(0.0683)	(0.0977)
State	-0.0582***	-0.0533	0.1469*	0.0284
	(0.0130)	(0.0416)	(0.0795)	(0.1696)
Unknown	-0.1664**	-0.1720	0.5520***	-0.2904
	(0.0730)	(0.1339)	(0.2092)	(0.1811)
Fixed Effects				
Time	Year	Year	Year	Year
Space	County	State	County	State
Fit Statistics				
Observations	77,117	77,438	23,205	23,613
R Squared	0.27231	0.16457	0.50302	0.36616
Dep. Var. Mean	0.69515	0.69507	3.7369	3.7285
Cluster Level	County	State	County	State

Notes: Standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, *0.1. The "All" sample includes all NCED easements acquired in 1990 or later with information on year of acquisition, a shapefile, and a purpose other than "miscellaneous". The number of observations is smaller with county fixed effects because counties with only a single observation are dropped from the analysis in the R estimating package.

Table A3.4: Effects of Transferable Credits on Easement Quality and Size, with No Controls

Dependent Variable:	ln(Acres)	ln(Acres)	EV	EV	Near PADUS	Near PADUS
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Tax Regime						
Credit	-0.750***	-1.170***	0.004	-0.011	-0.079***	-0.114***
	(0.142)	(0.350)	(0.027)	(0.059)	(0.018)	(0.031)
Transferability	0.805***	1.298***	0.070***	0.120*	0.070***	0.079
	(0.150)	(0.381)	(0.02)	(0.069)	(0.019)	(0.033)
Fixed Effects						
Time	Year	Year	Year	Year	Year	Year
Space	County	State	County	State	County	State
Fit Statistics						
Observations	104,889	105,170	102,221	102,505	104,889	105,170
R Squared	0.58145	0.43244	0.62753	0.39164	0.29352	0.15536
Dep. Var. Mean	3.0767	3.0814	1.5364	1.5372	0.49620	0.49622
Cluster Level	County	State	County	State	County	State

Notes: Standard errors in parentheses. Signif. Codes *** = 0.01, ** 0.05, *0.1. The sample includes all NCED easements acquired in 1990 or later with information on year of acquisition and a shapefile. The number of observations is smaller with county fixed effects because counties with only a single observation are dropped from the analysis in the R estimating package.
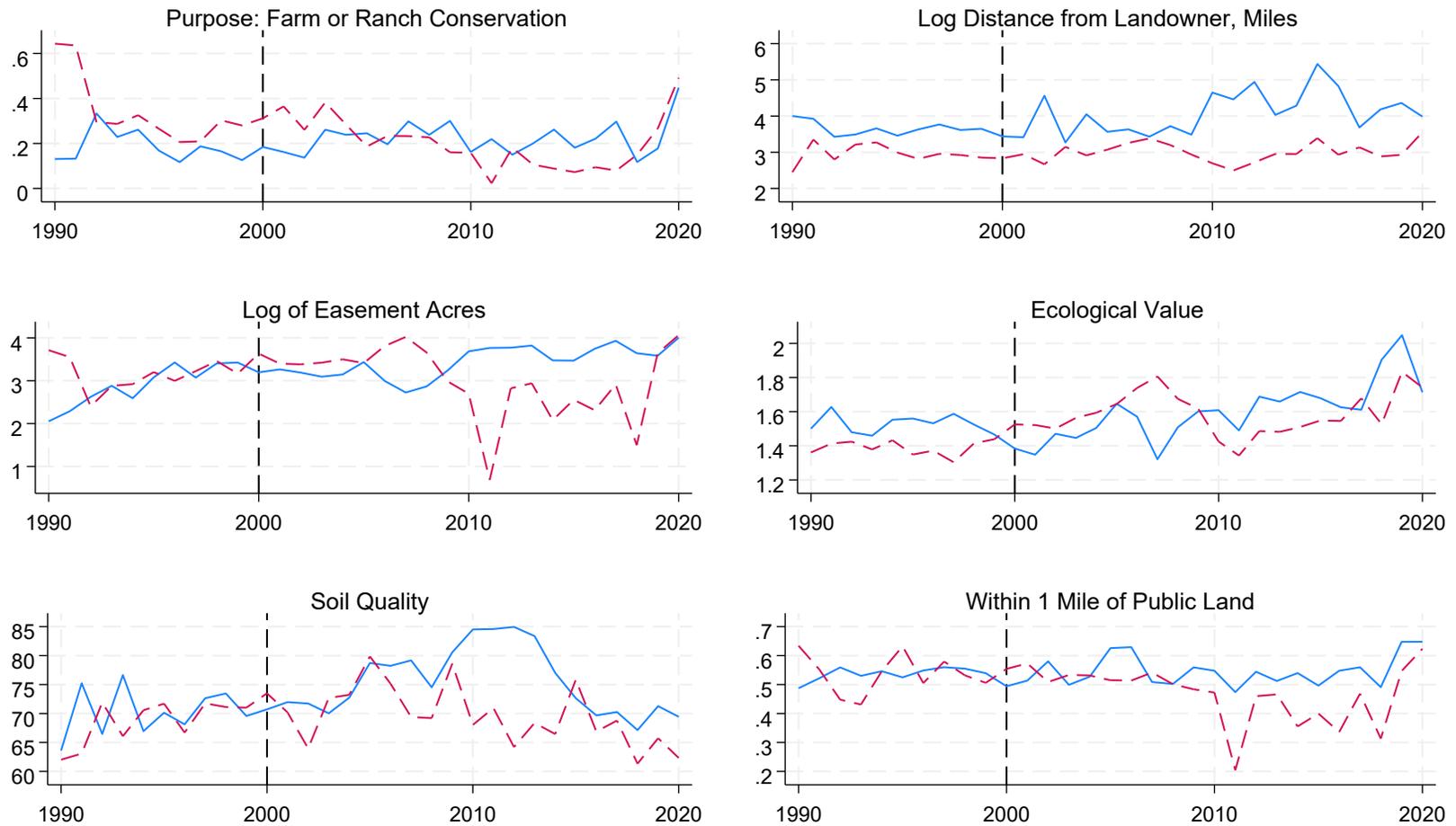
Figure A4.1: Cumulative Number of States with Tax Credit Programs
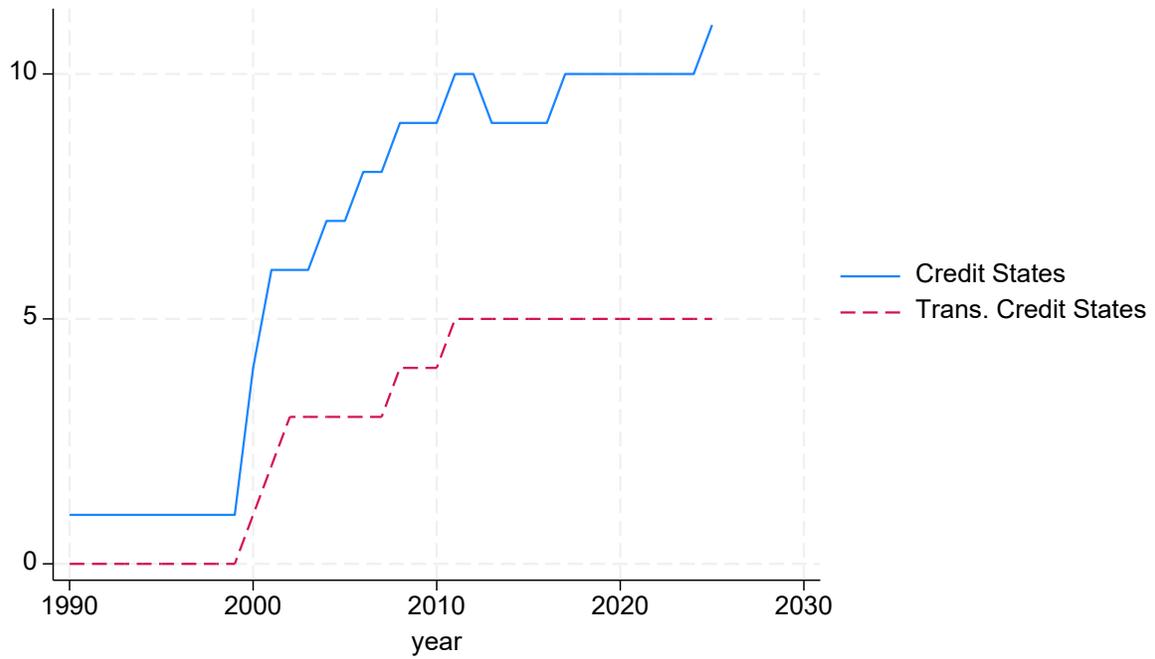

Notes: California is not considered a tax credit state here. Massachusetts' refundable credit is considered transferable.

Figure A4.2: Outcomes in Credit and Non-Tax Credit States

Note: Legend: dashed line = credit, solid line = non-credit. The vertical bar at 2000 indicates when states, other than North Carolina, began introducing tax credit programs.

Figure A4.3: Outcomes in Non-Transferable and Transferable Tax Credit States
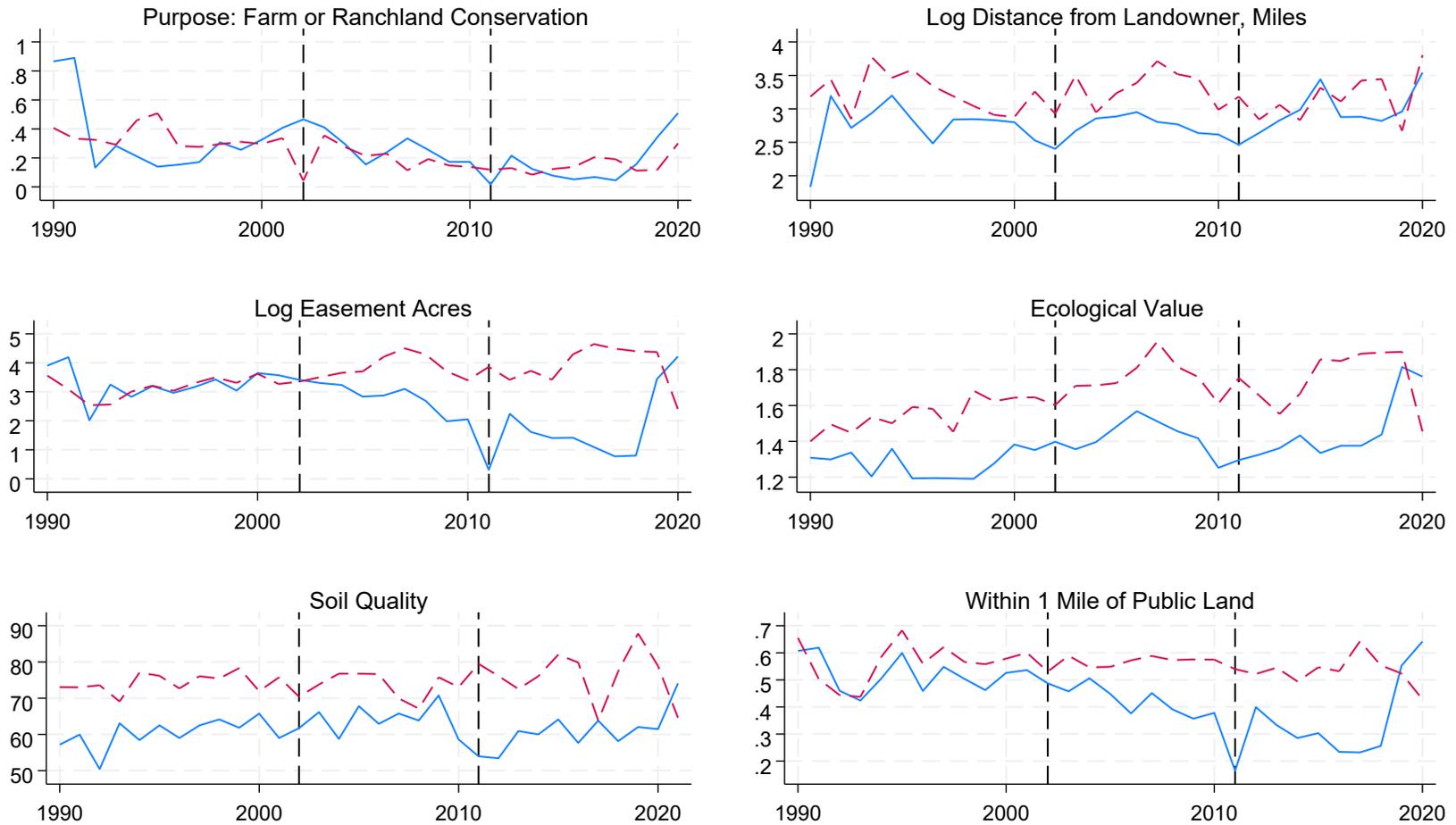
Notes: Legend: dashed line = transferable, solid line = non-transferable. The vertical bar at 2002 and 2011 indicate the first and last adoption of transferable tax credits.

A4.3