LEVERAGING FEDERAL ECONOMIC DEVELOPMENT RESOURCES WITH STATE HISTORIC REHAB TAX CREDITS

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INTRODUCTION

STATES CONSTANTLY FACE DIFFICULT POLICY choices about how to stimulate the most development, job and income growth, and revenue returns using scarce economic development dollars. This paper considers one economic development policy area – the preservation and rehabilitation of historic buildings – and how different state policy choices have fared in maximizing the "bang for the buck" of state funds. We conducted a two-part study where we asked two sequential questions:

1. Does implementing a historic tax credit at the state level ("state HTC") allow a state to leverage more resources through the federal Historic Rehabilitation Tax Credit (HTC) Program ("federal HTC")?
2. If so, what program design elements of the state HTC programs are most important in determining their success in leveraging federal HTCs?

The historic rehab subfield of economic development is worth studying for both academic and practical reasons. First, from an academic perspective, it is an illustrative case of creative federalism: once the federal government set basic standards and a funding mechanism for preservation, the states acted as policy laboratories in building on the federal model to attract federal dollars to their state and, simultaneously, advance local economic development goals. A similar dynamic exists with many federal economic development programs, so studying the state response to the federal HTC can provide useful general insights. In the event that federal tax reform alters the landscape for economic development tax credits, insights from this program design analysis could help practitioners design new programs to achieve similar goals.

Second, and more practically, states looking to create, change, or eliminate a state HTC program need solid empirical data to make informed policy decisions. Historic rehab projects are popular in many states, in part because they often help revitalize older, lower-income neighborhoods, and they embody smart growth principles (Rypkema & Cheong, 2011). The economics can be compelling as well: studies suggest that rehabilitation projects are among the most impactful economic stimulus investments and that public investments in rehab projects often pay for themselves and can be net revenue generators over time (Listokin & Lahr, 2011). With this in mind, some states created or enhanced HTC programs as part of their economic stimulus efforts in recent years. At the same time, however, other states cut back on or eliminated HTC programs during the recession in order to save money.

What, then, should a state policy maker conclude about the effectiveness of HTC programs? If a primary goal of state HTC programs is to generate economic development, to be successful they must make feasible projects that would not be financeable with the federal subsidy alone. The economic impacts, then, of these marginal projects can be attributed to the state program, and the federal HTCs they receive are the additional federal resources leveraged for the state by the state HTC program. Our analysis does not evaluate or reproduce economic impact modeling in this field, but rather tries to quantify the "success" of state-level programs and program elements in leveraging federal HTC resources.

LITERATURE REVIEW

We believe this to be the first study in the empirical literature to address the leverage effects between federal and state HTC programs. A number of comparative studies look at other state economic development tax credit programs, such as low-income housing tax credits, employment tax credits, and research and development tax credits, but few, if any, model federal-state interaction effects in these areas. However, there is a large body of economic analysis on federal and state HTCs that we consider in our study.

Studies of the federal and state HTC programs tend to focus on modeling their economic impacts. In particular, the Rutgers University Center for Urban Policy Research has created a detailed economic impact model for preservation projects that they use each year to quantify the employment, economic, and tax impacts of the federal HTC on each state. These studies support the premise that state programs leverage federal resources in that they include the economic spillover effects of these marginal federal resources in the total impacts to each state. David Listokin and Michael Lahr (2011) note anecdotally in their report that "NPS [National Park Service] statistical reports document that the states with strongest [State] HTC statutes regularly lead the nation in the use of the federal HTC" (pg. 3). Our study examines the strength of this correlation, how it holds up across states with different economic and demographic profiles, and what the performance of different program designs can tell us about what drives this correlation.

Many states have completed economic and fiscal impact assessments of their state HTC programs as well; indeed, some state legislatures mandate such a study every year. These studies typically share many conclusions, including that each dollar spent on state HTCs generates many times that amount in private economic development spending and that the fiscal return to the state on state HTC tax expenditures is usually positive within the first few years of a rehab project. In its final report, the Governor's Task Force on Maryland's Heritage Structure Rehabilitation Tax Credit Program (2004) lists leveraging federal HTC resources to the state as a specific goal of that program (pg. 5). That report also presents survey data suggesting that most state HTC projects would not have proceeded without the state subsidy, a conclusion supported by the large increases in state HTC applications observed immediately before legislative changes weakening the program were to take effect (2004). Studies in Minnesota and Delaware reached similar conclusions, providing further evidence that the leveraging effect is real across various state programs (Tuck & Nelson, 2011, pg. 10; Rypkema & Cheong, 2010, pg. 4).

A 2011 study in Pennsylvania highlights how our analysis expands the literature in a useful way. The study estimates the value to the state of adopting an HTC program (which its legislature did the following year). Based on an assessment of programs in Maryland, Virginia, and Missouri, the study notes that having a state HTC program "has been proven in these three states to increase the number of rehabilitation projects that become economically feasible and that therefore are completed," and calculates that a program in Pennsylvania would enable the feasibility of 25 to 50 percent more rehab projects per year (Pennsylvania Historical and Museum Commission et al., 2011). This range is the basis for the study's estimate of the costs and benefits of a state HTC program. However, it is not clear that the experience of these three states best informs what would happen in Pennsylvania. Our study provides an empirical basis for these types of estimates by providing results that control for differences across states and programs. In fact, our study shows that the existence of a program correlates much stronger with certified expenditures in a state than with number of projects completed, suggesting that an estimate based on expected certified expenditures may have more empirical validity.

PROGRAM BACKGROUND

Federal Historic Tax Credits

The Tax Reform Act of 1976 was the first time Congress included financial incentives for preservation of historic buildings in the tax code. The federal HTC program underwent several subsequent changes, culminating in the comprehensive tax code changes of the Tax Reform Act of 1986, which created the two-tiered federal HTC we know today. The federal HTC is essentially two credit programs – a 20 percent credit for preservation/rehab of a certified historic structure, and a 10 percent credit for renovations of buildings built prior to 1936 but not considered historic.[1] This paper is concerned only with the first of these two and uses "federal HTC" to mean the 20 percent credit program.

The federal HTC is administered as a partnership between the National Park Service (NPS), the Internal Revenue Service (IRS), and the State Historic Preservation Offices (SHPO) in each state. According to the NPS, to qualify for the federal HTC, a preservation project must meet four criteria. First, the building being rehabilitated must either "be listed in the National Register of Historic Places or be certified as contributing to the significance of a 'registered historic district'."[2] Second, the project must constitute a substantial rehabilitation as defined in the Internal Revenue

Code. Third, the rehabilitation work must comply with the Secretary of the Interior's Standards for Rehabilitation. Finally, the building must be used for income-producing purposes for a minimum of five years following the renovation project. The project sponsor must demonstrate compliance with these criteria through a three-part application process in which each part must be approved by both the SHPO and the NPS.

Once a project is approved and complete, the sponsor qualifies for a federal tax credit equal to 20 percent of the project's certified expenditures, which are those expenditures that the SHPO and NPS certify as being part of the rehab of the historic building. Certified expenditures typically include most of the total project costs, so for our analysis we feel comfortable using this number as a proxy for the total project cost.[3] Tax credits are dollar-for-dollar reductions in federal tax liability. The project sponsor may claim the full tax credit amount in the year the project is completed, or "placed in service." However, the project must remain compliant with the above criteria for five years, and over this period a declining amount of the tax credits claimed remain recoverable by the IRS if the project falls out of compliance. If, for example, the project becomes non-compliant two years after completion, such as by undergoing a further renovation that is not approved by the NPS, the IRS may recover 60 percent of the tax credits claimed by the project (after three years, only 40 percent would be recoverable, etc.). This enforcement action is called "credit recapture" (Curran, 1997).

In practice, using the federal HTC to finance a project normally involves another level of complexity. Few project developers have enough tax liability to utilize the tax credits themselves, so they must transfer the credits to someone (typically a corporation) with tax liability in exchange for cash that can pay project costs. Federal HTCs cannot be sold or transferred directly to a third party, so monetizing them requires a complex syndication transaction including, typically, the creation of special purpose entities and a multi-tiered lease structure. The details of syndication are beyond the scope of this paper. The important point is that monetizing the federal HTC is complicated and requires financially-sophisticated investors, specialized legal and tax expertise, and significant time to close the transaction. As a result, the costs of monetizing the federal HTC can cut into the financial benefit of the HTCs to the project. Tax credits that can be transferred or sold directly will have lower transaction costs than those like the federal HTC that must be syndicated.

State Historic Tax Credit Programs

Since 1986, more than half of American states have created HTC programs to subsidize rehab projects with state-level tax expenditures. This paper considers 31 such programs: all programs active in 2012, plus programs in Michigan and Rhode Island that were cancelled in recent years. The Pennsylvania HTC program, which becomes active in 2013, is not included.

Under all state programs, projects that qualify for the federal HTC also qualify for the state HTC, thus making possible the goal of leveraging federal resources with the state investment.[4] Beyond this similarity, however, state HTC programs vary widely on many measures, such as how deep a subsidy they provide and how much money is available each year in tax credits. Some programs add extra benefits for certain kinds of projects, such as affordable housing, or restrict eligibility to targeted projects, such as those in lower-income areas, in order to better reflect state priorities. Analyzing whether these programs are effective in leveraging federal HTCs, and analyzing the patchwork of program design elements to evaluate their relative effectiveness, is the central purpose of this paper.

To build our panel of comparative data, we researched each state HTC program and interviewed professionals in the SHPOs that implement them. We quantified each of the program design elements and measured them for each state in each year the state had an active program. The following chart describes the program design elements we measured and how they compare between federal and state programs (details on specific variables are provided in a later section).

THEORETICAL FRAMEWORK

Question and Hypothesis 1

Question 1: Does implementing a historic tax credit at the state level allow a state to leverage more resources through the federal HTC?

Our study measures the economic interaction between state HTCs and the federal HTC, and considers the success of state HTC programs in

Prog Design Measure	*Description*	*Value for Fed HTC*	*Range for State HTCs:*	
			Low	*High*
Credit value (rehab proportion)	Tax credit amount, based on a % of rehab costs	20%	5%	50%
Annual budget cap	Funding available for the program overall each year	Unlimited	$450,000/yr	No cap
Per project cap	Max credit amount an individual project can receive	Unlimited	$5,000	No cap
Transferability of credit to third party	Measure of ease of transfer: 0=nontransferable, 1=transferable by syndication (high transaction cost), 2=credit sold directly or refundable (lower transaction cost)	1	0	2
When credits may be claimed	Either credits may all be claimed in Year 1, or they must be spread over a period of years	1 yr	1 yr	5 yrs
Carry forward	The number of years that credit recipient may carry credits forward	20 yrs	0 yrs	20 yrs
Recapture	Period when government can recapture some or all credits due to project non-compliance	5 yrs	0 yrs	5 yrs
Added benefit for affordable housing	Credit % on top of base % for projects that generate affordable housing	0	0	10%
Project use restrictions	Is the program limited to projects of certain use types? (0=No, 1=Yes)	0	0	1
Geographic targeting	Does the program target investment to certain areas within the state? (0=No, 1=Yes)	0	0	1

their goal of leveraging federal HTC resources for the state. We think of leverage as bringing federal HTC funds to the state that would not be available without the subsidy a state HTC provides. Thus, to be successful in leveraging federal HTCs, state HTCs must *help make additional projects financially feasible*, thus generating *net new* economic development and attracting *additional federal HTC resources*. This effect is possible because the federal HTC has no annual cap, so more qualifying projects in a state leads directly to more federal dollars.

Hypothesis 1: *The existence of a state HTC program will be associated with a statistically and substantively significant increase in certified expenditures and number of projects completed within a state in a given year.*

Question and Hypothesis 2

Question 2: What program design elements of the state HTC programs are most important in determining their success in leveraging federal HTCs?

The historic rehab market in a state functions in the context of both local real estate markets and local and national financing markets. Our thesis is that the amount of subsidy provided by a program, and the state's budget cap and per project cap, should bear heavily on how a program interacts with both markets because these features determine which projects and how many can utilize the program. Further, because developers often monetize HTCs by transferring them to national corporate investors in exchange for project equity, the supply, preferences, and capacity of these investors should be important in determining how and how much

HTC financing is used in a state. This is one way that we expect other program design elements to be important, because some state HTC policies, such as having no recapture period or making transfer of credits easier, can lower an investor's risk and make a program easier for an investor to use. We suggest that transferability will exert the most observable effects of these variables, because it is the broadest measure of how the financing and investing market work.

Hypothesis 2: *Value of credit (rehabpro10), annual budget cap (bcap100k), per project cap (pcap100k), and transferability (transfer) will be the program design variables that are most influential in increasing certified expenditures in states with HTC programs.*

STUDY DESIGN

Empirical Model

Our strategy for analysis is a function of the data structure. As noted, we constructed a panel data set that covers all 50 states for 18 years (1993-2010; n=900). Testing Hypothesis 1 utilizes the entire balanced panel. Evaluating Hypothesis 2, the efficacy of the relevant design parameters, relies on an unbalanced subset characterized by only those state-year observations that carry an active state-level program.[5]

In the process of developing our specification, as expected, the data failed poolability tests and demonstrated significant heteroskedasticity across states and across time.[6] The charts below visually demonstrate the state-wise and temporal variation. Our estimation approach sought to control for both the state- and year-level heterogeneity inherent in the data.

Since we were evaluating virtually the entire universe of state HTC programs, we expected the fixed effect estimator to be applicable generally. In selecting between fixed and random effect approaches, we performed Hausman specification checks, which report the existence of an inconsistent model in the pairwise comparison. Given the random effects estimator's critical reliance on orthogonality between the additional error component and identified regressors for consistency, and the robustness of the fixed effect estimator in this regard, we can infer the appropriateness of fixed effects for this analysis. The basic fixed effects model we considered is as follows:

$$Y_{it} = x_{it}\beta + \alpha_i\theta + \varepsilon_{it}$$

where:

Y_{it} = phenomenon of interest for group *i* at time *t*
x_{it} = vector of regressors at time *t*
ε_{it} = error for group *i* at time *t*
α & β = coefficients (α measures the grouped fixed effect)

In evaluating both hypotheses, we ran a variety of specifications within the fixed effect class of estimation. These specifications fell into three groups: untransformed, logged, and demeaned. The fixed effect estimator inherently assumes that bias is introduced via time-invariant (group-invariant) factors that are unique to individual states (years). In contrast, autoregressive models explicitly account for lagged values on the assumption that a dynamic trend is the source of bias. We ran these as well, given our uncertainty regarding the likely source of omitted variable bias, to add robustness to our findings. The general form of these models that we use is as follows:

$$X_t = \alpha_1 X_{t-1} + \alpha_2 X_{t-2} + \dots + \alpha_p X_{t-p} + \delta\theta_t + \varepsilon_t$$

where:

X_t = phenomenon of interest at time *t*
θ_t = vector of covariates at time *t*
ε_t = error at time *t*
α & δ = coefficients

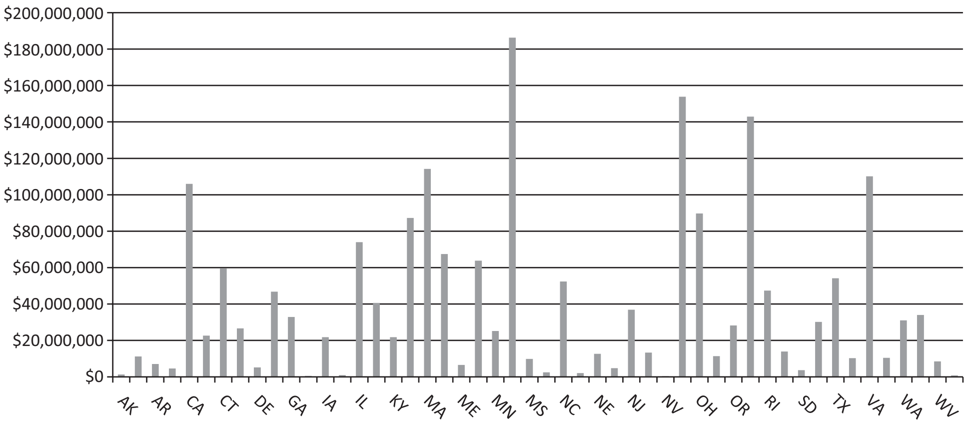
Data

The data we have compiled for this analysis comes from three primary sources: the NPS, the SHPOs in each state, and the Bureau of Economic Analysis.

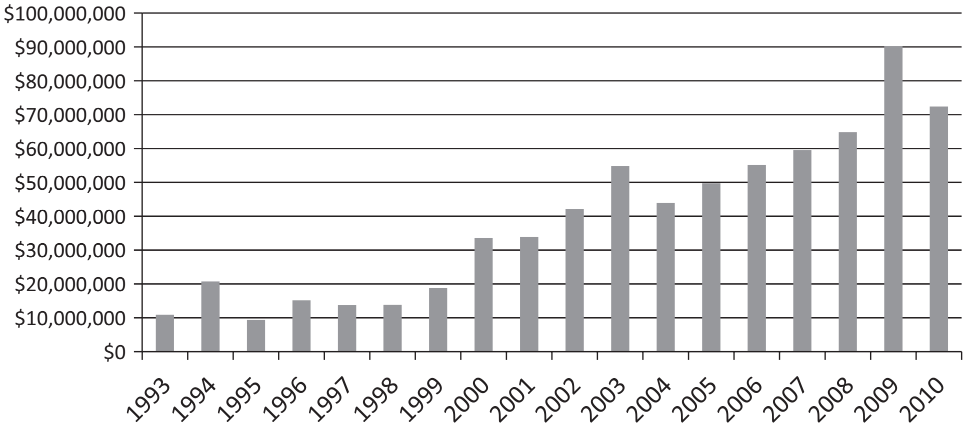
National Park Service (NPS)

NPS is the primary collector of data on the federal HTC at the national level. We used this source for data on certified expenditures, average project size, and project approval activity across all states for the period of 1993-2010. We focused

Average Certified Expenditures by State



Average Certified Expenditures by Year



on expenditures, which are provided in nominal terms over the study period, in part because they speak most directly to the economic impact of HTC projects on the states. The data cover the full extent of our panel.

State Historic Preservation Offices (SHPO)

The critical data for this analysis are the details of policy levers in state HTC programs (please see table in section III). We sourced the data from SHPO and other state websites and verified it through interviews with SHPO professionals across the country. These data provide the program resolution required to address both of our primary hypotheses. To our knowledge, the standardizing, quantifying, and analyzing of this data distinguishes our analysis from any assessment of state HTC programs that have preceded it.

Bureau of Economic Analysis (BEA)

BEA served as our source for macroeconomic environment variables. We relied heavily on gross state product and population variables for scaling purposes. We also developed indicators that allowed us to estimate the size of the construction industry relative to each state's economy. Such measures are imperfect proxies for rehabilitation activity specifically, but they help control for the variation in real estate and development activity across states. The number of pre-1939 homes in each state, which is used in the "pdens_b39" variable, comes from the 2000 census.

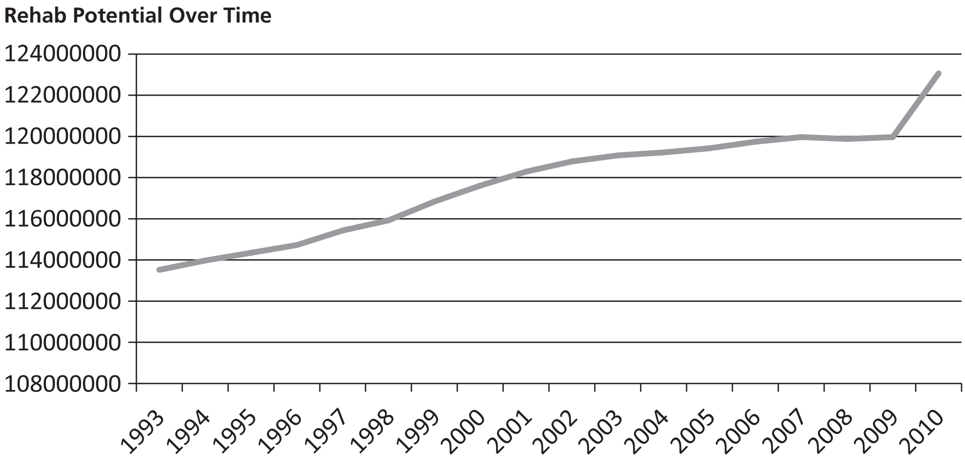
RESULTS

Hypothesis 1

Our results strongly support the supposition that states with active HTC programs are likely, on average, to leverage more federal expenditures. They also support the idea that program design is important to program success.

We were able to run a number of fixed effect specifications under three broad groups: fixed state effects, fixed year effects, and two-way fixed effects. Ultimately, the autoregressive model shown above explained more of the variation in certified expenditures. However, the general narrative was the same in virtually every model we tried: the effect of the existence of a state HTC program remained a statistically robust finding, corresponding to a boost in certified expenditures averaging between \$15 million and \$35 million. Taking 20 percent of this range would approximate how much additional federal HTC resources are leveraged, on average, to a state due specifically to the state having an HTC program. This is a substantively significant finding that can represent real economic development resources for a state considering the usefulness of an HTC program. Moreover, this range is likely a floor with the real number potentially higher, because our model, with R^2 values at 0.18 and 0.19, only explains around one fifth of the observed variation. As will be shown below, the model has more explanatory power with program design elements, emphasizing their critical role in determining how much rehab expenditures respond to the creation of a state program.

		Certified Expenditures ~ Existence of Program					
		Single Lag		*Double Lag*		*Triple Lag*	
Variable	*Description*	*Estimate*	*St. Error*	*Estimate*	*St. Error*	*Estimate*	*St. Error*
prog	Program dummy	***2.57E+07***	6.62E+06	***2.42E+07***	6.74E+06	***2.39E+07***	6.95E+06
lcertex	Certified expenditure (1 lag)	3.00E-02	3.00E-02	3.00E-02	3.00E-02	2.00E-02	3.00E-02
l2certex	Certified expenditure (2 lag)			*6.00E-02*	3.00E-02	*6.00E-02*	3.00E-02
l3certex	Certified expenditure (3 lag)					4.00E-02	3.00E-02
pop	Population	**9.66E+00**	4.08E+00	**9.65E+00**	4.12E+00	**9.52E+00**	4.17E+00
apcgsp	Per cap gross state product	*6.91E+02*	3.65E+02	*6.61E+02*	3.70E+02	5.77E+02	3.81E+02
pdens_b39	Rehab potential proxy	***2.19E+00***	3.60E-01	***2.23E+00***	3.60E-01	***2.23E+00***	3.70E-01
comprat	Constr. compensation ratio	2.72E+08	3.77E+08	2.49E+08	3.80E+08	2.49E+08	3.85E+08
prodrat	Constr. production ratio	***-1.38E+09***	4.83E+08	**-1.26E+09**	4.93E+08	**-1.19E+09**	5.05E+08
taxrat	Construction tax ratio	3.40E+09	2.51E+09	2.32E+09	2.61E+09	2.93E+08	2.64E+09
R2		0.18		0.19		0.19	
Adj. R2		0.17		0.17		0.17	
Obs		881		863		845	
Note: *Italics* = p < .1; **Bold** = p <.05; ***Bold/Italics*** = p < .01							



For this analysis, we sought to control for environmental factors such as state size (population), size of the state economy (using gross state product (GSP)), and the relative importance of the construction industry in each state (see below discussion). Further, we wanted a variable to capture the potential for rehabilitation activity in a given state. The indicator we developed (pdens_b39) is the interaction between the current population density and the number of homes built in the state before 1939 (as of the 2000 census). We believe the first component is a useful proxy for housing demand, with higher density levels increasing the demand for all housing. It is also relevant to rehab directly in that 1) research suggests historic rehab projects are more common in more urbanized areas, and 2) one would expect available land for new construction to be less plentiful in population centers, resulting in market pressure for reuse of existing properties. The second component uses the data available on age of housing stock as a proxy for the amount of buildings available for historic preservation. The expected relationship is direct – more old housing increases the probability of a historic preservation project. This variable proves to reliably indicate the impact of program existence throughout our analysis. The effect appears small, but it is important to note that the range of feasible values greatly exceeds that of certified expenditures. Moreover, while the pre-1939 housing stock will decrease in the future, population density is increasing over time. The plot below demonstrates that it is growing fast enough to likely offset declines in pre-1939 housing stock.

To control for the relative importance of the construction industry, we used three variables: "comprat," the ratio of compensation in the construction industry to compensation overall in the state; "prodrat," the ratio of production in the construction industry to overall GSP; and "taxrat," a similar ratio looking at taxes on production. The results for production ratio (prodrat) are intriguing. We expected a positive correlation with certified expenditures, with more construction infrastructure driving increased rehab activity, but instead prodrat displays a consistently negative relationship. This led us to hypothesize that perhaps the construction industry tends to be a larger share of the state economy in places like the Sunbelt, where land is relatively plentiful and development patterns relatively sprawling. In such areas, construction activity may be biased toward new construction over historic rehab, especially if these are also states with fewer old buildings to rehab. A negative correlation between prodrat and pdens_b39 would support this theory, and we were able to confirm with a bivariate regression that the two are indeed negatively correlated. Exploring this relationship and others between the control variables is beyond the questions posed in this paper, but it would be an interesting track for future research that might teach us more about the context for HTC usage in different states.

Finally, it is interesting that our model could not find a relationship between the existence of a state HTC program and the number of projects within that state in a given year. It appears that the variation in the number of rehab projects in a given year must relate more to other factors, such as perhaps local real estate market forces, that are not captured well in our model. The relatively low R^2 values in the specifications we evaluated for Hypothesis 1 support this conclusion that the model is not capturing some important elements of the story.

Hypothesis 2

Among program design elements of the state HTC programs, the rehab proportion (the percent of certified expenditures provided as a subsidy) stood out as having a large and consistent correlation with increased HTC certified expenditures. Several other design elements correlated with certified expenditures as well when considering temporal fixed effects, which, as discussed further below, we believe to be the most useful model for interpreting this data. It is notable also that the proxy variable for rehab potential (pdens_b39) does not appear significant when looking at program design elements, whereas it was significant when considering the impact of program existence in Question 1. This may be a signal of the importance of program design: it appears that among states with HTC programs, the differences between their programs are more important in determining the relative "success" of the programs than are the differences in the size of the potential rehab markets across the states.

		Certified Expenditures ~ Program Design					
		Temporal FE		*State FE*		*Triple Lag*	
Variable	*Description*	*Estimate*	*St. Error*	*Estimate*	*St. Error*	*Estimate*	*St. Error*
lcertex	Cert. expenditure (1 lag)					-2.00E-02	7.00E-02
l2certex	Cert. expenditure (2 lag)					7.00E-02	6.00E-02
l3certex	Cert. expenditure (3 lag)					-9.00E-02	6.00E-02
agsp	Per cap gross state product	***1.93E+02***	4.40E+01	***7.53E+02***	1.31E+02	***8.30E+02***	1.46E+02
pdens_b39	Rehab potential proxy	7.00E-02	4.00E-02	1.15E+00	1.65E+00	7.90E-01	1.67E+00
rehabpro10	Rehab proportion (increments of 10%)	***3.37E+07***	5.67E+06	***7.62E+07***	2.42E+07	***7.78E+07***	2.47E+07
bcap100k	Annual budget cap ($100,000 units)	3.82E+02	1.27E+03	-6.49E+02	3.42E+03	-7.54E+02	3.50E+03
pcap100k	Per project cap ($100,000 units)	***4.60E+03***	1.12E+03	-2.55E+06	2.50E+06	-2.81E+06	2.51E+06
transfer	Transferability	***3.85E+07***	9.52E+06	9.64E+07	1.29E+08	1.04E+08	1.29E+08
recap	Recapture	2.21E+06	2.14E+06				
restrict	Project use restrictions	**-3.74E+07**	1.73E+07				
geo	Geographic targeting	***-3.61E+07***	1.26E+07				
R2		0.34		0.22		0.23	
Adj. R2		0.31		0.19		0.20	
Obs		287		287		285	
Note: *Italics* = p < .1; **Bold** = p <.05; ***Bold/Italics*** = p < .01							

Before analyzing these results, we should first note that the analysis of Question 1 revealed material differences between states that have programs and states that do not. The subset of data for analyzing Question 2 – only those state-years with active state HTC programs (310 of the 900 state-year observations) – is biased toward state-years with higher certified expenditures, as shown in the following chart.

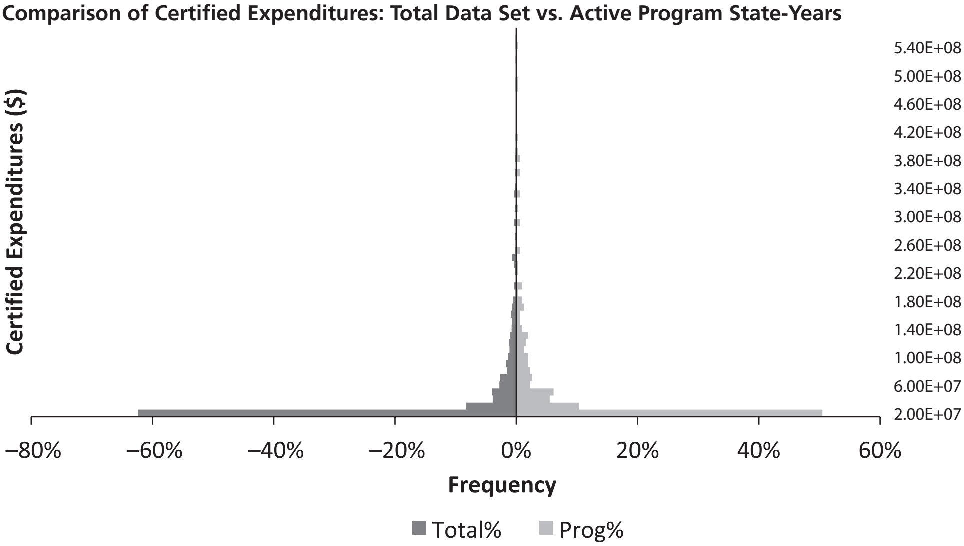
While the shapes of the distributions are similar, there are noticeably more instances of high certified expenditures in the Question 2 pool of observations (in blue on the graph). Judging simply by the R^2 values, our Question 2 model shows more explanatory power, but since the models ask different questions and test different pools of observations, such direct comparisons of the models could be misleading. Nonetheless, the analysis shows that program states are in some ways different than non-program states, and program design factors significantly influence just how different a particular state might be.

In particular, the rehab proportion (credit percentage) shows a clear positive influence on the amount of certified expenditures accrued in a state-year. This makes intuitive sense, as the credit percentage represents the actual subsidy available to program participants. As shown in the results table, the impact of a 10 percent increase in credit percentage accounts for between \$34 million and \$78 million in additional certified expenditures. The strong influence of "rehabpro" is evident across all specifications.

As hypothesized, we find in the temporal fixed effects model that increasing credit transferability, which makes it easier for projects to utilize the subsidy offered by a program, appears to increase certified expenditures substantially. Also, raising project caps, which would grow the available project universe, has a similar effect, though the substantive impact is fairly weak. Finally, as one might expect, we see that explicit and geographical restrictions diminish the available project universe and, thus, are negative influences on certified expenditures.

Why do the significant results for project cap, transferability, use restrictions, and geographic targeting not hold up across other specifications? With regard to state fixed effects, we explored this question by comparing the average coefficient of variation of these variables within state groups with the average within year groups, and found dramatically more variation within year groups. This makes sense, because many states do not alter these program elements once the program is created. The result is that the state fixed effects model essentially considers these elements fixed and covers up any variation that we would hope to observe. The same phenomenon may be limiting the ability of the autoregressive model to pick up variation as well, since the state-specific characteristics captured in the lags will likely obscure the signal provided by

Comparison of Certified Expenditures: Total Data Set vs. Active Program State-Years



weakly-varying program design elements. This contrasts to the analysis of Question 1, where the data set included state-years both before and after HTC programs were enacted in each given state. There, the lagged year autoregressive approach did pick up the variation within states caused by the creation of a program. We believe these results both highlight the temporal fixed effects model as the most useful set of results to consider and serve to further emphasize the importance of design factors within active program state-years.

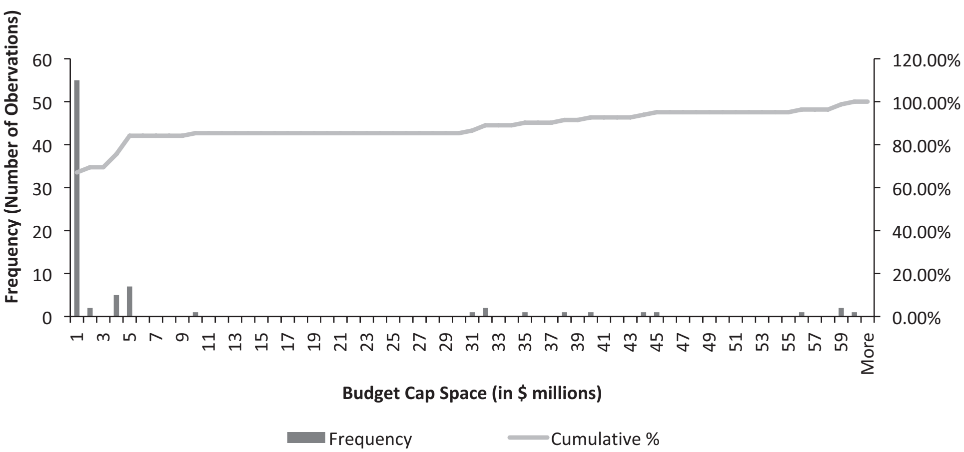
Contrary to our hypothesis, the budget cap variable does not appear significant in any model. This leads us to reflect on an important caveat to our results: our model and variables measure average effects. This is useful in identifying relationships between variables, but we also must remember that the impacts, in some cases, may vary dramatically across the feasible ranges of values. For example, the budget cap variable does not present a substantial average effect. However, intuitively, if the cap were very low, it would be a substantial constraint on the level of certified expenditures one could hope to realize in a state. In contrast, a very high cap may have essentially no functional impact. Of the 310 state-year observations with active programs, 83 included active budget caps and 55 times these caps were met or exceeded (we do not have information on how it is possible to exceed the budget cap in individual states). In other instances, as shown in the histogram below, the space between the certified expenditures in a given year and the budget cap in that year could be quite large (suggesting that in those cases the budget cap did not serve to depress demand for the program). When averaged out, the many observations with no budget cap mask the impact of caps that may well have limited program demand or turned projects away entirely in as many as 17 percent of the state-years. More broadly, the wide range of impacts within any given variable is likely a hindrance to better model fit.

We must add an additional caution when comparing impacts across variables. While rehabilitation proportion and transferability appear from the results to be similarly important, the magnitudes of their impacts are not directly comparable. The first is a continuous variable while the latter is a categorical variable. The marginal impact of an additional 10 percent subsidy cannot be reasonably compared with the impact of moving from one transferability state to another. Consequently, this analysis is more valuable in flagging those variables that are impactful and warrant further study than in serving as a basis for comparing relative impacts.

LIMITATIONS AND FUTURE RESEARCH

Our results highlight certain limitations of our model and opportunities for further research. First, while our model shows that some program design elements have explanatory power over the level of certified expenditures in a state year, the model overall explains about one-third of the variation in certified expenditures. Further research could

Where Budget Cap Exists, Space Between Cap and Certified Expenditures



be done to identify variables not included in our model that play an important role in the system. For example, differences across states in the political environment and policy infrastructure for preservation projects could well play a role in explaining the variation in certified expenditures across states. We have not yet identified useful measures for these variables. State preservation professionals advised us against counting state-level historic preservation programs, statutes, or interest groups as proxy measures, because so much historic preservation activity occurs at the local level.

Second, as previously noted, the program design analysis uses an unbalanced subset of the original data set that includes only those state-years that have active state HTC programs. The structure and content of this subset had implications for what analysis could be performed and what conclusions could be drawn from it. In particular, our statistical analysis platform does not support two-way fixed effect models for unbalanced panel data, so we focused on state and temporal fixed effects and ran autoregressive specifications as well. In the future, two-way fixed effect models could be analyzed to see if they help elucidate the results.

One intriguing cross-cutting finding in the state HTC economic impact literature is that even credit programs with no geographic targeting tend to subsidize projects in areas with higher minority populations, higher percentages of renters, and lower household incomes compared to other areas in their states (Listokin et al., 2009, pg. 5). Possible implications worth further study are 1) targeting the program to lower-income areas may add complexity that does little to shape use of the program, and/or 2) providing additional incentives for affordable housing through a program could be an attractive program element for developers, because these are the types of projects they want to do. The first of these implications could be the basis for an interesting spatial study, and may turn out to be largely explained by the existence of other programs, such as the New Markets Tax Credit, that subsidize projects in low-income areas and are readily combined with HTC financing. Testing the latter implication empirically would be of great interest to practitioners as well, but would require time-consuming assembly of data on housing units and affordability by state that most states do not maintain electronically.

IMPLICATIONS AND CONCLUSIONS

We can conclude from our study that having a state HTC program that piggy-backs on the federal HTC helps leverage federal economic development resources to the state through these programs. Further, program design does matter in the success of a program's leveraging effect, with the level of subsidy offered by the state program being the program element most closely associated with increased certified expenditures. The ease with which a developer can monetize the credits by either claiming them directly or transferring them to a third party is very important as well, and per project caps, geographic limitations, and use restrictions are also notable determining factors of program success. These conclusions, and the performance of the model generally, answer some questions and raise others, so there is plenty of opportunity for further research in this area.

That said, our findings do suggest some policy implications. Broadly speaking, a state should prioritize its goals for a state HTC program and derive a suitable program design from there. For example, states looking to create a program to boost economic development without excessive cost might consider a more generous subsidy level paired with a reasonable budget cap to limit potential expenditures. Such a program design may, given our findings, more successfully stimulate projects and leverage federal HTCs than a program with a lower subsidy amount but an unlimited annual budget. Or, such a state might do just as well with a relatively smaller-budget refundable or easily-transferrable credit as compared to a somewhat larger-budget program where credits must be syndicated. If a state wants an active program and also prioritizes investment in low-income areas, it may find that explicit geographic restrictions do more to limit program use than they do to target its impacts. A carrot approach of providing increased subsidy to projects in targeted areas could be an effective way to achieve both goals simultaneously. We hope that practitioners and policy makers will be able to use our results and derive further useful insights from them.

Notes

1 I.R.C. § 47(a)(1)-(2) (1996).

2 http://www.nps.gov/tps/tax-incentives/before-apply/eligibility-requirements.htm, accessed September 24, 2012.

[3] Generally, qualified expenses include most hard and soft construction costs applicable to rehabilitating the historic structure, but do not include acquisition costs, site improvements, furniture and fixtures, or costs associated with new additions to the building.

[4] In many cases state HTC programs also support projects that advance other state redevelopment policy priorities but do not qualify for the federal program, such as rehab projects on owner-occupied homes. This paper does not consider these program elements, because they do not serve the function of leveraging federal HTC resources.

[5] All analysis for this paper was performed in R, and the authors relied heavily on the "plm" package. For more information on this data management package, see http://cran.r-project.org/web/packages/plm/index.html.

[6] We tested poolability using F-Test comparing full sample estimates with those from estimates by group. We performed Breusch-Pagan Langrange Multiplier tests for heteroskedasticity by regressing squared residuals on regressors.

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