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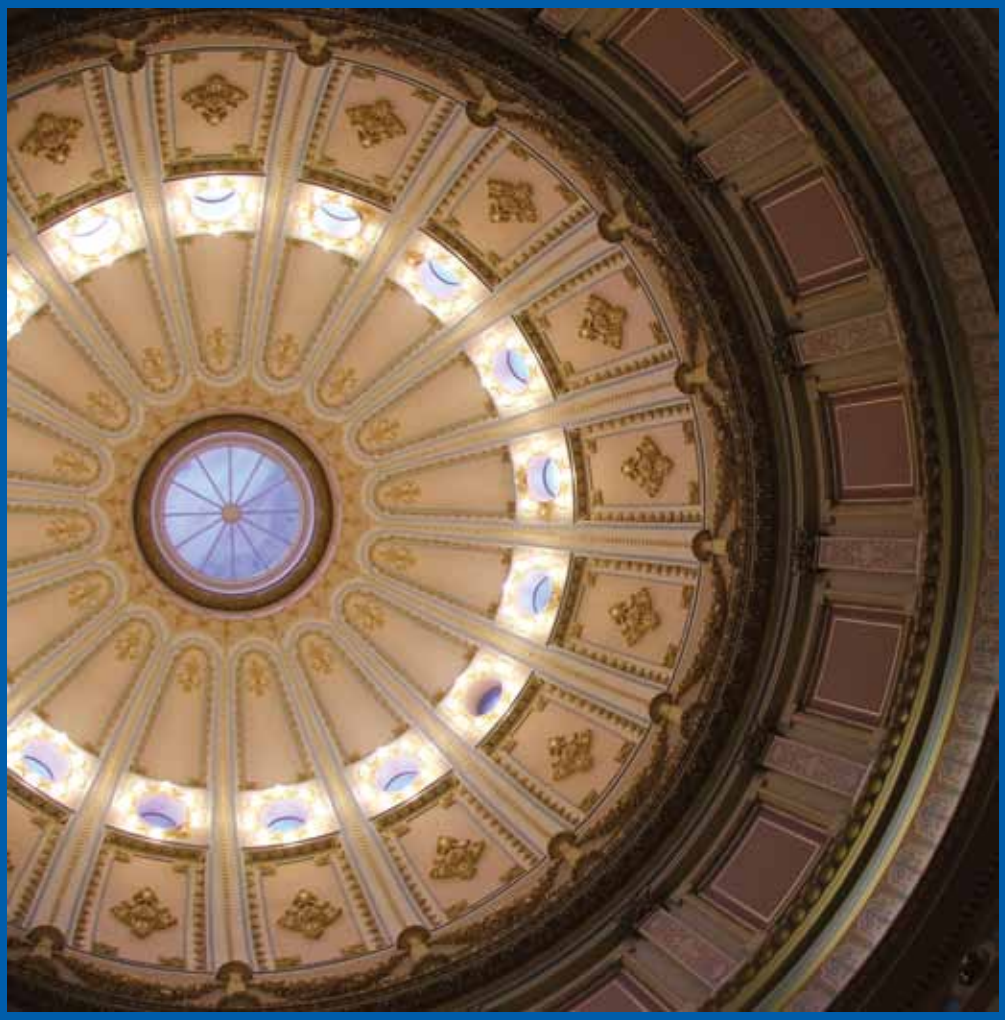

State Business Tax Incentives: Examining Evidence of their Effectiveness

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Executive Summary

Tax credits are preferences in the tax code that aim to induce some type of economic activity that would not have occurred—or would have occurred to a lesser degree—without the credits. Championed by some and vilified by others, these types of incentives have been widely embraced as an economic development tool by state governments in New England and across the country.

Tax credits allow businesses to reduce their tax liability dollar for dollar, based on the amount of desired activity they undertake. Although tax credits usually do not require state governments to make cash outlays, they can represent forgone revenue. And because most states must balance their budgets, they must "pay for" any expected revenue losses stemming from the credits by increasing other taxes or reducing spending.

Whether state business tax credits actually spur new economic activity—and whether they do so in a cost-effective manner—are important concerns. This is particularly true in times of fiscal and economic stress, when policymakers must balance a desire to spark the economy with the need to cope with budget deficits. Unfortunately, determining a tax credit's costs and benefits is inherently difficult—partly because it is impossible to know the level and mix of economic activity that would occur without the credit.

This report focuses on four types of state business tax credits: those targeting capital investment, research and development (R&D), job creation, and film production. It examines credits offered by New England states, and the choices policymakers have faced in creating them, which can affect their cost-effectiveness as well as other tax policy goals. This report also evaluates the approaches and findings of studies of business tax credits. This analysis reveals the challenges entailed in measuring the impact of business tax credits, and the need for both analysts and policymakers to consider those challenges carefully when undertaking or reviewing such studies.

Business tax credits in New England

Tax credits for investment, R&D, job creation, and film production are common across the region. For example, all six New England states have enacted tax credits for R&D. Five states—all except New Hampshire—offer tax credits to businesses that invest in capital equipment. Four states offer tax credits to film production companies, while four offer credits or credit-type incentives to businesses that create jobs. (See Table 1 for a summary of business tax credits offered by New England states.)

Designing tax credits: Key considerations

What type of economic activity is a credit designed to induce? Beyond explicit goals such as increased levels of capital investment, R&D, job creation, and film production, tax credits may also implicitly aim to induce other types of activity. For example, one implicit goal of a film tax credit may be expanding tourism.

Which businesses will receive a credit, and how does the state distribute them? States may require firms to meet certain requirements to be eligible for a tax credit. For example, a firm may have to engage in a minimum level of targeted activity, or be part of a particular industry. The latter type of selective targeting can have negative implications if subsidized industries are relatively inefficient. States can also grant credits to any eligible firm (known as an "entitlement") or award them on a discretionary basis, which may be more administratively burdensome. To limit potential costs, a state may cap the total amount of tax credits it will grant in a given year.

How will a credit be calculated? The size of the credit a firm will receive is most often determined by multiplying the amount that it spends on a "qualified" activity by a predetermined rate. While broad definitions of qualified activity and high rates can make a credit more attractive to businesses, they can also undermine state budgets. Policymakers can try to increase a credit's "bang for the buck" by capping the tax credit each firm can receive, or by confining "qualified" activities to those likely to provide the biggest benefits for the state.

What happens if a credit exceeds a firm's tax liability? The calculated amount of a credit may sometimes exceed a business's state tax liability. Tax credits can include provisions that allow firms to retain at least some portion of the credit they would otherwise lose in this situation. These provisions include carry-forwards, transferability, and refundability. Carry-forward provisions allow a business to claim the unused portion of a tax credit in future years. Transferable credits are those that a business can sell to another firm, which can then apply the credit to its own tax liability. A business can redeem a refundable credit for cash from the state. These provisions can increase a state's costs while also complicating the tax system.

What happens if a firm fails to deliver? Some states require firms to continue certain activities after they receive a tax credit. To help ensure that firms deliver the expected benefits—and that states get the biggest bang for their buck—a credit may include recapture or "claw-back" provisions. Under a claw-back provision, firms that do not meet certain requirements must pay back all or part of the credit they received.

Evaluating business tax credits: A framework

Does the credit induce the targeted activity? To answer this question, analysts must compare what actually happened with the credit in place with what would have happened without the credit (the "counterfactual"). Because no one can actually observe the counterfactual, determining whether a credit induces the desired activity can be difficult. Analysts can simply make assumptions about the counterfactual, or rely on econometric modeling to estimate the incremental activity induced by a credit.

What is the credit's overall economic impact? To answer this question, analysts must consider not only the direct economic effects of a credit, but also the indirect effects, or "spillovers," which may be positive or negative. Direct effects are new economic activity by the firm receiving the credit. Indirect effects can also occur when employers or business owners—now earning higher wages and profits, respectively—spend their new earnings in the state. On the other hand, reductions in state spending needed to balance the budget as well as cut-backs by non-subsidized firms can have negative economic effects.

What is the credit's fiscal impact? To answer this question, analysts must consider not only the total dollar amount of credits generated or expected to be generated, but also changes in tax revenue and public spending resulting from the credit. For example, as companies hire new employees, a state may collect more income tax revenue, which can help offset the tax credits.

Is the credit cost effective? To answer this question, analysts must estimate the costs and benefits of a credit and compare them to those of similarly targeted policies. Measures of cost-effectiveness may try to capture the cost of achieving a given outcome (such as net cost per job created), or how much of a given outcome a state can achieve for a fixed cost (such as dollars of state personal income per dollar of net cost). Analysts can compare these values to an "acceptable" level of cost-effectiveness—if such a threshold exists—or to the impact of other economic development initiatives. The latter approach can be used to determine whether another policy would yield a bigger bang for the buck.

What the evidence shows

Business tax credits do seem to foster their targeted activities. However, studies also reveal that at least some of those activities would have occurred without the credits. There is also evidence that credits may simply shift spending among states rather than raising the nationwide level of spending.

The economic activity produced indirectly by business tax credits is not trivial, and may sometimes be sizable. However, stakeholders should examine the methodologies and results of any study with a critical eye, as analysts' assumptions can strongly

influence their findings. For example, some analysts assume that all activity that is credit-subsidized is also credit-induced. Others fail to account for the fact that most states must balance their budgets. These types of methodological flaws can lead studies to overstate the overall economic impact of a credit. Stakeholders should use particular caution when comparing results from different states, as divergent findings could stem from both cross-study differences and cross-state differences.

Business tax credits do lead to new revenues for state government, but not enough to completely offset the initial costs. In other words, for each dollar of credit granted, states usually collect less than one dollar in new tax revenue. Thus most credits do not appear to "pay for themselves." It is therefore important to understand the benefits states are gaining for the revenues they are giving up.

Existing studies do not allow for clear conclusions on the cost-effectiveness of business tax credits. Shortcomings include a lack of methodological transparency, limited evidence on long-term effects, and a lack of comparability across studies, among others.

Concluding thoughts

As states' efforts to collect and disseminate data improve, more high-quality studies of business tax credits are likely to emerge, allowing for sounder conclusions on their effectiveness and cost-effectiveness. In the meantime, policymakers and other stakeholders need to understand the strengths and limitations of existing studies when using them to inform the debate on tax credits.

Considering the larger picture is also critical. For example, policymakers need to consider how business tax credits support or undermine other goals of state tax policy—and who is benefiting and how—when determining the proper role of such credits in promoting economic development.

State Business Tax Incentives: Examining Evidence of their Effectiveness

Championed by some and vilified by others, business tax credits have been widely embraced by state governments as an economic development tool. Recent compilations from the Federal Reserve Bank of San Francisco have found that more than 30 states offer tax credits for research and development (R&D), and that almost half have enacted credits for capital investment or job creation.[1] A September 2008 *Los Angeles Times* article reported that more than 40 states now offer tax credits and other incentives to film production companies.[2] New England states have followed this trend, establishing credits for these and other economic activities ranging from biofuel production to the preservation of historic buildings to data processing.

What are business tax credits? In short, they are preferences in the tax code that aim to induce some specific type of economic activity that would not have occurred—or would have occurred to a lesser degree—without the credits. These incentives allow businesses to reduce their tax liability on a dollar-for-dollar basis by the amount of the credit. This amount, in turn, is typically tied to the level of desired activity that the firms undertake.

Although tax credits usually do not involve cash outlays by state governments like direct subsidies or grants, they can have costs in terms of forgone revenue.[3] Because most states must balance their budgets, they typically must "pay for" any expected revenue losses associated with a credit—known as the "tax expenditure"—by reducing state spending or increasing other taxes.

Unfortunately, determining the actual "cost" of a credit is difficult, for it ultimately depends on two closely related factors: (1) the precision with which a credit subsidizes its targeted activity; and (2) the level and mix of economic activity that will occur with the credit versus what would have occurred in its absence (the "counterfactual"). A credit that subsidizes activity that would have occurred anyway, or one that is larger than necessary to induce new activity, can mean less revenue for a state. On the other hand, if the credit does induce at least some new activity, a state may gain new tax revenues from that expanded activity. Thus, in theory, a state could experience a net revenue loss, gain, or even no change in revenue, depending on how these factors play out.

In reality, policymakers cannot observe the counterfactual. Furthermore, they must typically make budget decisions before they can observe how firms will behave with a tax credit in place. Therefore, they can only assume or estimate the revenue changes that will occur when setting state budgets. Most conclude that business tax credits incur a net revenue loss, at least in the short run.

Indeed, the estimated tax expenditures for credits and other tax incentives granted to businesses can be sizable. For example, estimated corporate tax expenditures in Connecticut totaled $556.2 million in fiscal year 2009 (FY 2009), while estimated tax expenditures for film-related tax credits alone were more than $100 million.[4] In comparison,

the FY 2009 appropriation for the Connecticut Department of Economic and Community Development (DECD), the state's lead agency for attracting and retaining businesses and jobs, was only $33.5 million.[5] A policy brief from the nonprofit Massachusetts Institute for a New Commonwealth reported that the Bay State also "spent" more than half a billion dollars in FY 2009 on tax incentives targeting specific industries—slightly more than the $498 million allocated to the state's university system that year, and more than double the amount appropriated to housing and economic development agencies.[6]

Proponents of tax credits see them as an effective means of spurring new economic activity. Some advocates also argue that credits can "pay for themselves"—meaning that revenues stemming from the new economic activity will more than cover the tax credits granted. Critics, however, maintain that tax incentives actually have little impact on firms' decisions, and thus that any increases in economic activity induced by incentives are likely to be small. Furthermore, detractors argue, cuts in public services necessary to finance the tax credits may negate any economic benefits that do occur.

Given these opposing viewpoints, one may ask: Do business tax credits pay off? This question has particular relevance in times of economic and fiscal stress. Faced with a flagging economy, policymakers may be inclined to turn to tax incentives as a means of creating jobs and stimulating investment. However, difficult fiscal conditions should require a closer investigation of these types of tax expenditures. What tax credits are states offering businesses? How do they complement—or detract from—other goals of tax policy? Are the credits inducing the desired economic activity? If so, are they a more cost-effective means of doing so than other policy options? These important questions often go unanswered.

This paper addresses some of these questions while laying the groundwork for future analyses. Specifically, I first examine business tax credits in the context of different tax policy goals. I then catalog selected tax credits offered in the six New England states, and discuss some of their structural features. Finally, I synthesize findings from recent empirical studies evaluating the effectiveness and/or cost-effectiveness of tax credits, both in New England and elsewhere in the nation.

"Bang for the buck" and other tax policy goals

As noted, business tax incentives such as credits represent an attempt by policymakers to use the tax system to generate new economic activity. A "good" tax incentive should produce economic benefits greater than its costs. An even better incentive is one that is cost-effective, meaning that it delivers more benefits for a given cost than other similarly targeted initiatives.

Unfortunately, determining which incentives provide the biggest "bang for the buck" can be easier said than done. An important goal of this paper is to synthesize the available empirical evidence on the cost-effectiveness of business tax credits. As later sections will show, these types of evaluations entail many challenges.

However, it is also important to note that promoting new economic activity in a cost-effective manner is but one potential goal of tax policy. Most people would agree that a "good" tax system should also meet other objectives, such as equity and simplicity. It is therefore worth considering these additional tax policy goals and how business tax credits may enhance or detract from them.

Equity

Two major principles underlie the concept of tax equity: the ability-to-pay principle and the benefit principle. Under the ability-to-pay principle, those with more resources at their disposal should pay more than those with fewer resources. Under the benefit principle, taxes are viewed as the "price" paid for public services such as police and fire protection, public education, and road maintenance. According to this principle, businesses as well as individuals should be taxed in a manner reflecting the cost of services they use.

Research has suggested that, in practice, tax payments made by businesses tend to exceed the costs of the public services they use—in other words, they are "overpaying."[7] Reducing business tax liabilities through credits and other incentives could, at least in theory, lead to a better alignment between the tax "price" and the cost of the public services firms enjoy.

In practice, however, it is difficult to apply either equity principle to business taxation. This is because it is nearly impossible to know who ultimately bears the burden of business taxes.[8] In some cases, business owners themselves may bear the burden through lower profits, while in other cases owners may shift the burden to employees (in the form of lower wages) or customers (in the form of higher prices).[9] Given the uncertainty surrounding the distribution of business tax burdens, assessing the equity implications of business tax credits is difficult.

Neutrality

A neutral tax system is one in which individuals and businesses base decisions on their economic merit rather than tax considerations.[10] The argument for neutrality is based on the idea that unfettered markets allocate resources most efficiently. Business tax incentives tend to violate the neutrality principle; indeed, they are an attempt to use the tax system to influence economic decisions. This can lead to inefficiencies if firms are induced to locate in areas or invest in activities that they would not have selected based on non-tax factors.

However, in some cases, violation of the neutrality principle may be a good thing. Business tax credits may actually enhance efficiency when markets under-produce a certain activity. Tax incentives promoting R&D spending are a classic example. Markets tend to under-produce R&D because individual firms consider only their own costs and benefits when deciding how much research to pursue—not the benefits to society as a whole.[11] By

lowering the cost of R&D to firms, tax incentives may encourage them to boost their research efforts to the socially optimal level.[12]

Simplicity

According to the simplicity principle, a tax system should be straightforward and easy to understand, and should not impose excessive compliance burdens on taxpayers, or excessive enforcement burdens on tax administrators. Business tax incentives tend to reduce tax simplicity in a number of ways. As later sections will show, credits often come with restrictions on which taxpayers or activities are eligible, or on how much of a credit firms can claim, and when. Some eligible firms may not take advantage of a credit simply because they do not know whether they are eligible, or because the costs of complying with the credit's provisions are too high.

Transparency

Somewhat related to simplicity is the principle of transparency. A transparent tax system is one in which taxpayers, policymakers, and the public know (or can easily determine) how and when a tax is imposed. Tax credits and other preferences such as tax deductions and tax abatements tend to reduce the transparency of a tax system. Transferable credits—those that can be sold to other taxpayers—are particularly troublesome in this regard.

Adequacy

Revenue adequacy refers to the ability of a tax system to raise just enough revenue to cover the cost of government services demanded by the public—no more, no less. A concern commonly raised by critics of business tax incentives is that they harm a state's ability to fund vital public services by reducing revenue collections. In contrast, those who think that revenues are more than adequate to cover necessary services may view tax credits and other incentives as a useful tool for achieving smaller government.

The adequacy implications of tax credits may also vary in the short versus long run. Credits that are effective at inducing economic activity may lead to more revenue in the future, even if they harm collections in the near term.

Competitiveness

A competitive tax system is one that helps a state attract or retain businesses and individuals who might otherwise have located elsewhere. Competitiveness has seemingly become a more important tax policy goal as capital and labor have become more mobile. Tax credit supporters argue that tax incentives enhance competitiveness, which they claim is essential for a location's economic vibrancy—if not its survival. Critics characterize tax competition as a "race to the bottom," which eventually lowers the revenues of all competing jurisdictions while stripping away the relative advantage of any, and jeopardizing the funding of vital

public services.[13] From this point of view, tax incentives may actually harm a location's competitive standing if associated service cuts make the area a less desirable place to live or work.[14]

Business tax credits in New England

To what extent have New England states relied on business tax incentives to further their economic development goals? Table 1 catalogs four common types of tax credits offered in the region: investment, R&D, job creation, and film production.[15] The table also shows the estimated FY 2009 tax expenditure associated with each credit, shedding light on their respective magnitudes. Of course, a credit's ultimate net cost to a state will depend on any offsetting fiscal changes resulting from the credit, which tax expenditure estimates do not necessarily capture.

Tables 2 through 5 provide more information on individual tax credits offered by New England states, by type of credit. These tables reveal the myriad issues that policymakers must consider when designing a new tax credit. These choices can affect the credit's effectiveness and cost-effectiveness as well as other tax policy goals. This section examines some of these key structural considerations, using examples from New England states where possible.

What type of economic activity is a credit designed to induce? One of the first questions policymakers must answer when designing a tax credit is what type of economic activity it will target. Although capital investment, R&D, job creation, and film production are the *explicit* goals of the four types of credits I have chosen to analyze, these incentives often have additional *implicit* goals. For example, expanded employment is an explicit goal of job creation tax credits, but it is often an implicit goal of the other types of credits as well. An implicit goal of film production tax credits is greater publicity for a state, which policymakers hope will spur tourism.

As noted, the use of tax credits as an economic development tool can have ramifications for efficiency. Tax credits may enhance efficiency if they foster activity that markets tend to under-provide, such as R&D. However, in other cases tax credits may lead to distortions that reduce efficiency. For example, job creation credits promote labor over other inputs to production. In markets that are already operating efficiently, such credits may lead to an over-allocation of resources to labor.

Which businesses will receive a credit, and how does the state distribute them? In designing tax credits, policymakers may choose to target particular industries or types of businesses, as evidenced by examples from New England. In Massachusetts, investment tax credits are available only to companies in selected industries: manufacturing, R&D, agriculture, commercial fishing, and the life sciences. Connecticut offers three types of investment credits: one that is largely unrestricted by industry or type of business, one that is geared to small- and medium-sized businesses, and one that targets the film industry.

Such selective targeting could have negative implications if the recipient industries or businesses tend to be less efficient.[16]

Some credits may require businesses to engage in a minimum level of activity to be eligible. For example, Maine's jobs and investment tax credit—a hybrid of a job creation and investment tax credit—requires that eligible firms invest at least $5 million in personal property in a taxable year, and create at least 100 jobs over the ensuing two years. Likewise, film tax credits often require producers to have a minimum level of in-state expenditures or photography days, though the stringency of these requirements varies. For instance, Connecticut's main film credit requires only that a company have at least $50,000 in "qualified" production expenditures.[17] Rhode Island's guidelines are stricter, requiring that film companies have a minimum production budget of $300,000, and that they shoot at least 51 percent of principal photography in the state.

Once a state has determined what entities are eligible for credits, it may rely on a number of mechanisms to distribute them. Many of the credits in Tables 2 through 5 are designed as entitlements. That means that any eligible firm claiming a credit will receive one.

In some cases, a state will cap the total amount of credits that companies may claim in a given year. Policymakers have different options for distributing credits to eligible businesses under these circumstances. For example, the state may award some credits on a first-come, first-served basis to any firm meeting the eligibility criteria. Alternatively, a state may distribute the awards on a pro rata basis to all eligible firms claiming the credit. New Hampshire's R&D credit is designed in this manner: if the total credits claimed in a year exceed the $1 million cap, the state reduces all credits proportionately.

A state may also award tax credits at the discretion of the government agency that administers them.[18] Eligible firms must usually submit an application and other supporting materials to the administering agency, which determines which companies will receive the credit and which will not. The Vermont Employment Growth Incentive (VEGI) is an example of this type of incentive. Firms applying to the VEGI program must show that their project (a) would not have occurred without the incentive (the "but-for" test); (b) will provide a net positive fiscal benefit to the state (cost-benefit analysis); and (c) will meet "quality-control" guidelines, such as minimum compensation requirements for new jobs. This approach allows the state to judge firms and projects on their merits, but it can also impose a greater administrative burden on both applicants and the state government.

How will a credit be calculated? States usually calculate the size of a credit a firm will receive by multiplying the amount that it spends on a "qualified" activity by a predetermined rate. Credit rates and definitions of qualified activities and expenditures vary considerably among states. For example, Connecticut's credit for fixed capital investment has a rate of 5 percent, and applies to expenses for equipment and machinery but not buildings. The Massachusetts investment tax credit, in contrast, has a lower rate—3 percent—but does include buildings in its definition of qualified investment.

Although a state may enhance its competitive standing by enacting generous credits with high rates or broad definitions of qualifying activities, this approach may have drawbacks. First, costlier credits can have negative implications for state budgets. Second, such credits may be less cost-effective if they do not provide significant benefits to state residents, or if they provide "windfalls" to businesses. Windfalls occur if a credit subsidizes activity that would have occurred anyway, or if it is larger than necessary to achieve a given outcome.

As noted, some states attempt to keep costs down by capping the total amount of credits available in a given year. States may also cap the amount each individual firm may claim. For example, New Hampshire's R&D credit has an aggregate cap of $1 million per year and a per-firm cap of $50,000. States may also cap a firm's credit as a percentage of its total tax liability. That is the case with Maine's "super" credit for R&D, which limits the credit a firm may claim in a given year to 50 percent of the taxes it owes, after accounting for other tax credits it is claiming.

Some states base tax credits on a firm's incremental expenditures on a qualified activity rather than total spending. Incremental expenditures are the difference between a firm's current-year spending and some base amount that usually reflects spending in previous years. State R&D credits are commonly structured as incremental credits, and are often patterned after the incremental federal R&D credit. According to a report from the Congressional Budget Office, the base amount of an incremental credit approximates what the firm would have spent on research without the credit (i.e., the counterfactual).[19] Five New England states currently offer an incremental R&D credit.[20]

Policymakers may increase a credit's cost-effectiveness by defining "qualified" activities or expenditures to include only those that are likely to have the biggest economic benefits for a state. For example, qualified expenditures may include wages paid to state residents but not non-residents. This approach provides an incentive for firms to hire state residents, who not only benefit directly but who are also more likely to spend their earnings within state borders. Other credits may require that a subsidized activity meet certain "quality-control" criteria. For example, job creation credits often require firms to provide minimum compensation or hours to employees.

What happens if a credit exceeds a firm's tax liability? As noted, tax credits allow a business to reduce its tax liability on a dollar-for-dollar basis. In some cases, however, the calculated amount of a credit may exceed the tax liability against which it may be claimed. Many states allow firms to retain at least some portion of the credit they would otherwise lose in this situation.

"Carry-forward" provisions are one common feature that allows a business to hold onto any unused portion of a credit and apply it to tax liabilities in future years. For example, all the R&D credits offered by New England states allow carry-forwards for periods ranging from five years to indefinitely. Somewhat less common are "carry-back" provisions, which allow businesses to apply a credit to tax liabilities from previous years. While carry-forward and carry-back provisions boost the value of a credit to firms, they also increase the complexity

of the tax code. Such provisions can also make it difficult for a state to predict how the credits will affect revenue collections in a given year.

Credits may also be transferable or refundable. A firm may sell a transferable credit to another taxpayer, which can then apply the credit to its own tax liability. If a credit is refundable, the original recipient can claim the credit in exchange for cash from the state. Film tax credits are particularly likely to be transferable or refundable. Among the New England states, Connecticut, Massachusetts, and Rhode Island all offer transferable film credits. Massachusetts' credit is also refundable at 90 percent, meaning that a production company with a $100,000 credit but no tax liability can receive a $90,000 payment from the Commonwealth.[21] These features make film credits more attractive to production companies, which usually do not have significant tax liability in New England states.[22]

On the downside, these features—particularly transferability—can reduce the transparency of the tax system. When production companies sell film tax credits to other taxpayers, it is difficult for policymakers and the public to know who is actually benefiting. Because the buyer need not be in the same industry as the seller, transferable credits often subsidize activity that is completely unrelated to their original target. Refundable credits, in contrast, may be more likely to subsidize only the targeted activity.

Transferable and refundable credits can have other ramifications. Transferable credits usually sell at a discount, meaning that the selling firm receives less than their full value. The state, however, still forgoes the entire amount. Credits that are refundable at less than their face value can be less costly to the state, but they do require the state to pay for the credit with cash rather than forgone revenue.

What happens if a firm fails to deliver? Some business tax credits stipulate that a firm must undertake or continue certain activities after the credit has been "paid" out. For example, a job creation credit may require that the recipient firm maintain higher levels of employment for a minimum length of time. These types of incentives can be risky for states because firms may not follow through with the promised activity.[23]

To help ensure that firms deliver the expected benefits—and that states get the biggest bang for their buck—some tax credits include recapture or "claw-back" provisions. That is, recipients must pay back all or part of the incentive if they do not meet certain requirements. For example, Connecticut's credit for fixed capital investment requires a firm to pay back a portion of the credit it received if it does not keep the qualifying capital property in service in the state for at least five years.

Empirical evaluations of business tax credits

Studies seeking to measure the effectiveness or cost-effectiveness of business tax credits usually try to answer one or more of several key questions:

- Does the credit induce the targeted activity?
- What is the credit's overall economic impact?
- What is the credit's fiscal impact?
- Is the credit cost-effective?

These questions provide a framework for examining existing evaluations of business tax credits. I will explore each question in turn.

Does the credit induce the targeted activity? This question is the first hurdle that any business tax credit must clear. Business tax credits seek to spur economic development above and beyond what would have occurred without the credit. To answer this question, analysts must compare what actually happened with the credit in place with what would have happened without the credit (the counterfactual). The counterfactual is also sometimes referred to as the "baseline" or "but-for" scenario.

For example, consider a firm that plans to invest $1 million in new machinery in the coming year. When the firm learns that it can receive an investment tax credit, it invests $1.2 million instead. In this case, the investment tax credit actually induced $200,000 in investment; the remaining $1 million would have occurred even without the credit. This is the counterfactual. When estimating the overall economic impact of this particular credit, an analyst would ideally capture the effects of the incremental $200,000 rather than the full $1.2 million investment.[24]

Unfortunately, in practice, analysts can observe only what actually occurs with a credit in place. Therefore, it is not always straightforward to determine whether a credit induces the desired activity—and, if so, the size of the impact.

One simple approach to capturing the effect of a credit on the targeted activity is to make assumptions about what the counterfactual would look like. Analysts may also rely on econometric modeling to isolate the effects of a credit from other factors, although empirical obstacles can make this type of analysis challenging.

For example, endogeneity is a problem that occurs when the variable whose impact is being estimated is not determined independently from the rest of the model. Consider a study that attempts to model R&D expenditures as a function of the amount of R&D credits granted. Although the model attempts to measure the impact of R&D credits granted on R&D expenditures, the amount of credits granted is itself partly determined by expenditures. Failure to account for potential endogeneity and other empirical obstacles can lead to upwardly biased estimates of the impact of tax incentives.

Under either approach, analysts should also consider how interactions between state and federal taxes may affect the impact of state-level credits. Firms can typically deduct taxes paid to state and local governments from their federal taxable income. Thus credits and other incentives that lower a firm's state tax liability will increase its federal tax liability, reducing the firm's overall tax savings.[25] Ignoring this interaction might cause an analyst to overestimate the benefit a firm receives from a credit, and therefore the impact of the credit on the firm's behavior.

What is the credit's overall economic impact? Business tax credits that do foster their targeted activity obviously affect the firms and industries receiving the credits. A firm that expands its investment in new machinery may hire more workers to operate it, and will likely produce and sell more goods. These are direct impacts of the credit.

Business tax credits can also have indirect effects, or "spillovers," which can take several forms. First, a firm's expanded economic activity can lead to more activity both up and down the firm's supply chain. Imagine, for example, a computer manufacturer that expands its production because of a tax credit. The firm that supplies the computer manufacturer with microprocessors may also create jobs or invest in capital to meet the greater demand for its product. On the downstream side, computer retailers may need to expand their sales staff as the growing supply of computers pushes down prices, spurring more purchases.

Second, this expanded economic activity can also lead to higher wages for employees and higher profits for owners. As these individuals spend their earnings on goods and services in the local economy, they create new income for the businesses and individuals supplying those purchases. These firms and individuals then turn around and spend a portion of their new earnings, starting another cycle. This process of dollars cycling through the economy is known as the "multiplier" or "ripple" effect.[26]

Third, as firms in a particular industry expand their activities as a result of tax credits, other businesses in that industry may also choose to locate in the same area—a phenomenon known as agglomeration or clustering. Agglomeration may occur because, for example, industry leaders wish to take advantage of an existing pool of skilled labor. California's Silicon Valley is a prime example of agglomeration.

Of course, not all indirect effects will benefit the state offering the tax credit. First, "leakages" may occur. For example, a firm's suppliers and customers may reside in other states or abroad, so some of the benefits of increased activity may "leak" to other areas.[27] Workers earning higher wages may also reside in or travel to other states, or purchase goods online from out-of-state vendors. Under these circumstances, later rounds of consumer spending are likely to occur outside the original state's borders.

Firms that do not receive credits may be at a competitive disadvantage relative to subsidized firms. Unable to compete on price or other dimensions, non-subsidized firms may be forced to scale back or even go out of business. This is one reason why many

observers argue that a jurisdiction should not provide tax credits or other subsidies to specific out-of-state retailers contemplating the jurisdiction as a potential location: new retailers may simply take business from existing retailers. Even in other industries, higher wages and increases in other costs of production stemming from expanded economic activity could have deleterious effects on non-subsidized firms.[28]

Negative effects may also result from measures taken by a state to maintain a balanced budget. All U.S. states except Vermont have some kind of balanced-budget requirement. Such a provision usually requires a state to either cut spending or increase other taxes to offset the expected loss in tax revenues from the credit. Like private expenditures, government spending generates income, which leads to later rounds of spending by individuals and businesses. When a state government cuts its expenditures, such as by eliminating public-sector jobs or reducing purchases, these later rounds of economic activity will also be curtailed. Tax increases that result from a credit can also have negative multiplier effects, by reducing disposable income that would otherwise cycle through the economy.

It is worth noting that a state may need to cut spending or raise taxes to balance its budget even if a tax credit is expected to "pay for itself " over the long run. In at least some states, for example, the tax expenditure estimate—the number the budget-balancing process must offset—is static. This means it does not take into account changes in taxpayer behavior that could lead to new revenues or reduced spending. Even if that is not the case, timing can be problematic: a state may incur the fiscal cost of a credit early, while many of the fiscal benefits occur over time. Some short-term financing may be necessary, which will exert negative economic effects.

Given these direct and indirect effects, what is the best metric to capture the overall impact of a tax credit? States presumably try to spur economic development to enhance the economic well-being of their residents. Job creation is often seen as the primary means of fulfilling this goal: new jobs provide tangible economic benefits to the employees filling them, and also have indirect benefits as the money earned by these individuals ripples through the state economy. Thus, the number of new jobs resulting from a business tax credit often serves as the metric of choice.[29]

Analysts also sometimes use other aggregate measures of economic activity—such as state gross domestic product (GDP, formerly known as gross state product, or GSP), and personal income—to capture the overall economic impact of a tax credit. GDP is a broad measure of the economic activity within a state's borders. One of its potential drawbacks is that some of the benefits associated with a targeted activity may accrue to non-resident owners or workers. However, a high GDP sustained over time may itself spur new business activity, creating benefits for residents.[30] Personal income—which measures the income of state residents only—may be a better measure than state GDP for capturing the benefits of tax credits to residents in the short and medium term.

Analysts can use several approaches to evaluate the impact of a tax credit on jobs, state GDP, and personal income. One approach relies on regional input-output models, which attempt to capture all the relationships among different industries in a region. Analysts use these models to project how spending in one industry cycles through the regional economy, generating new GDP, income, and employment. IMPLAN, developed by researchers at the University of Minnesota and available for individual states, is one of the most commonly used input-output models.

Analysts also often rely on the REMI model, developed and marketed by Regional Economic Modeling, Inc., to estimate the economic impacts of tax incentives and other policies. REMI is an input-output model at its core, but it also incorporates other features. For example, an analyst can use the model to capture changes that occur over longer periods of time, after firms and individuals have had a chance to modify their behavior.

To use an input-output model to estimate a tax credit's overall impact, analysts must first determine how the credit will affect the targeted activity. They then enter this information into the model, which calculates the impact across the broader state economy.[31] The model can also project the fiscal impact of changes in economic activity.

Some analysts use econometric analysis as an alternative approach to estimating the overall economic impact of tax incentives. This type of evaluation often relies on county-level data. For example, analysts may try to estimate the relationship between the incentives firms in a particular county receive and total jobs or job growth in that county, controlling for other factors that influence employment patterns.[32] In so doing, analysts can capture not only direct employment effects—that is, changes in employment at the firms receiving the incentives—but also any positive or negative indirect effects accruing to the county.[33] However, because these studies provide information only on county-level effects, they may be limited in what they can say about the statewide impact of a tax credit.

What is the credit's fiscal impact? The previous section focused on the potential *economic* impact of business tax credits. However, the *fiscal* impact—the net cost to a state—is also important. Analysts typically measure the gross fiscal impact—or gross cost—of a tax credit as the total dollar amount generated, or expected to be generated. However, this is a static measure, in that it does not take into account the fiscal implications of changes in economic activity spurred by the credit.

To obtain the net fiscal impact or net cost, analysts must consider other changes in tax revenues and public spending stemming from the credit. If a company expands its operations as a result of the credit, the increased economic activity—both direct and indirect—can produce more tax revenue for both state and local governments. Revenues from corporate and personal income taxes may rise as businesses and employees enjoy higher earnings. Property tax revenues may also increase, as companies expanding their facilities and people migrating into the state to fill new jobs bid up real estate values. Sales tax revenues may also grow as business and consumer spending rises. All these factors can reduce the net cost of a business tax credit to state taxpayers.

Tax credits may also affect government spending, but analysts cannot easily predict the net direction of such changes. Greater economic activity in the state could, for example, lead to fewer Medicaid enrollees and claims for unemployment insurance, if new jobs go to unemployed state residents. In that case, public spending might decline, effectively lowering the cost of a credit. However, if higher levels of economic activity fostered by the credit lead to population growth, public spending may need to rise at both state and local levels to meet new demand for infrastructure, public safety, education, and other government services. These higher expenditures could offset the incremental tax revenues stemming from the credit.[34]

Is the credit cost-effective? Determining whether a particular business tax credit provides good bang for the buck requires constructing measures of cost-effectiveness. Such measures typically try to capture the cost of achieving a given outcome (such as the net cost per job created), or how much of a given outcome a state can achieve at a fixed cost (such as dollars of state personal income per dollar of net cost). Analysts can then compare these values to a standard threshold for "acceptable" cost-effectiveness—if such a threshold exists—or to values for other economic development initiatives.

Although I am unaware of any standard cost-effectiveness threshold for state business tax credits, the federal government has established guidelines for some of its programs that could serve as such a benchmark. For example, regulations for the Community Development Block Grant administered by the U.S. Department of Housing and Urban Development set a cap of $35,000 per permanent full-time-equivalent (FTE) job created or retained.[35]

While standard thresholds can be useful, analysts should ideally compare the cost-effectiveness of any business tax credit with those of other policies designed to achieve similar goals. Even a credit with an "acceptable" level of cost-effectiveness may not be the best deal if another policy would yield a bigger bang for the buck.

The impact of taxes on economic activity

Before using the above framework to examine empirical evidence on the effectiveness of individual state business tax credits, I will briefly explore the effect of taxes on economic activity more generally. Several comprehensive reviews have evaluated the broad literature on this topic.

Based on his survey of existing studies in the early 1990s, economist Timothy Bartik concluded that state and local taxes have a small but statistically significant effect on inter-regional business activity—that is, across states and metropolitan regions—with elasticities ranging from -0.1 to -0.6, and averaging about -0.3.[36] That implies that a 10 percent decrease in taxes in a given state or metropolitan area would lead, on average, to a 3 percent increase in economic activity in that same state or metropolitan area. In a 1997 review

updating Bartik's work, Wasylenko concluded that the average inter-regional elasticity was slightly smaller: around -0.2.[37]

Both reviews concluded that taxes have a bigger impact *within* metropolitan areas. For example, Bartik's review found that intra-metropolitan elasticities ranged from -1.0 to -3.0. This suggests that a 10 percent decrease in taxes in one particular municipality in a metropolitan area would lead to a 10–30 percent increase in economic activity in that municipality. The larger intra-metropolitan impact is not surprising. Other factors such as labor force quality and energy costs tend to be more similar within a metropolitan area than across areas, meaning that tax differences are likely to play a more influential role in business decisions.[38]

Stakeholders often cite the findings of Bartik and Wasylenko when debating business tax incentives. Still, there are some important points to consider when using this literature to inform discussions of tax credits. In his own later writing, Bartik noted that much of the research he had examined suffered from serious measurement difficulties, potential endogeneity problems, and a lack of focus on critical public policy issues, such as how taxes affect different industries and local economies.[39] By his own calculations, tax changes are likely to spur economic growth in a more cost-effective manner in areas where unemployment is high.[40]

What is more, many of the studies captured in these reviews hold public services constant. Although that approach allows analysts to isolate the effect of taxes, it is not necessarily realistic, given the balanced-budget requirements of most states. Changes in service levels stemming from cuts in public spending may also affect economic growth. A more recent survey of the literature by Lynch highlights this point.[41] Skeptical of the effectiveness of using taxes to spur economic activity, Lynch concludes that "any jobs that might be gained by cutting taxes can be more than offset by the jobs lost as a result of cuts in public services."

The finding that taxes have a statistically significant effect on economic activity has also proven fragile. Various attempts to replicate studies showing that taxes affect business activity have found that the effects disappear when analysts use slightly different data. This fragility has caused some observers, such as McGuire, to question whether taxes really matter.[42]

Recent work by Reed suggests that the weak findings in earlier studies may stem from their use of annual data.[43] Aggregating data over longer periods, Reed found a robust negative relationship between taxes and personal income growth.[44] However, he also found that the effects of taxes on income growth—while negative and significant overall—vary from state to state. This finding may give some credence to Bartik's notion that the initial economic conditions in an area matter.

All that being said, it is unclear how much any analyses of changes in overall tax levels can tell us about the effectiveness of a specific type of business tax credit. It is even less clear

how much such analyses can tell us about the cost-effectiveness of a particular tax credit in a particular state. Tax credits tend to be targeted at specific types of businesses or activities, and the impact of such a targeted approach may not mimic the impact of broad tax changes. On top of that, conditions can differ greatly across states, meaning that even similarly designed credits may have different effectiveness from state to state.

At the time of Bartik's review in the early 1990s, studies of specific state and local economic development programs, especially tax credits, were scarce. Part of the reason was likely a lack of data on state-level tax incentives. That situation may be changing as more states enact "disclosure" laws, which require agencies to collect and disseminate information on tax credits and other incentives. However, for now, the literature remains fairly sparse, and the quality of existing studies far from uniform. The next sections take a closer look at studies that have evaluated the impact of the four selected tax credits.

Investment tax credits

Multi-state studies

A working paper from the Federal Reserve Bank of San Francisco by Chirinko and Wilson provides perhaps the most compelling evidence on whether investment tax credits are effective in spurring their targeted activity.[45] In that study, the authors sought to answer two questions: Are state-level investment tax credits effective in boosting in-state investment? And if so, do states draw this investment away from other states? To conduct this analysis, the authors compiled a detailed data set for all 50 states over a 20-year period.

In their main analysis, Chirinko and Wilson derived and estimated a model for capital demand. Like a typical demand model, their model relates quantity (here, a state's capital stock) to price (here, the "user cost" of capital for a representative firm in the state), and to other factors that affect quantity.[46] The user cost reflects not only the purchase price of capital, but also state and federal tax rates, investment tax credits, and tax deductions, as well as the opportunity cost of holding capital. Using this approach, the authors estimated how capital investment would change in response to changes in state investment tax credit rates, holding other tax and non-tax factors constant.[47] To answer their second question, Chirinko and Wilson also included cross-state effects in their model—that is, they looked to see how a state's capital stock is affected by changes in the user cost of capital in other states.

Using multiple regression analysis, Chirinko and Wilson found the expected negative and statistically significant relationship between user cost and capital stock. In other words, they found that as a state's user cost declines—which would occur if the state's investment tax credit rate rises—the quantity of capital increases. Using their regression estimates, the authors calculated that a one-percentage-point increase in the investment tax credit rate in the average state would increase its capital stock by 0.62 to 0.87 percent.[48] Thus if the average state had a capital stock valued at $100 billion and a 5 percent investment tax credit

rate, increasing the rate to 6 percent would yield $620–$870 million in new capital investment.

These results clearly suggest that state investment tax credits are effective in generating capital investment—their targeted activity—and estimate the average magnitude of that effect. The authors also found evidence that a state is likely to draw at least some portion of the new capital investment away from other states.[49]

However, these findings are limited in what they can tell us. First, the study reports effects for the average state which, by itself, does not tell us what would happen in any particular state. Second, the study does not attempt to estimate the broader economic impact of these tax credits, or their fiscal impact or cost-effectiveness.

Studies of investment tax credits in New England[50]

Connecticut. In a 2005 study, researchers from the Connecticut Center for Economic Analysis (CCEA) used the REMI model to assess the economic impact of various tax law changes in the state over the previous decade.[51] The changes included a reduction in the corporate tax rate, as well as specific business tax credits and exemptions, including two investment tax credits: the fixed capital investment credit, and the machinery and equipment (M&E) expenditure credit.

The CCEA authors acknowledged that some capital investment would have occurred without each of the two credits. However, to account for this, they assumed that investment induced by the credits equaled 20 percent of the total amount of credits claimed—a questionable assumption.[52] In light of Connecticut's balanced-budget requirement, the authors also assumed that the state government reduced its spending by the full amount of the credits claimed. The authors measured the economic impact of each credit as the number of FTE jobs created (or lost) relative to baseline–that is, the number that would have existed without the credit, according to the model.

The authors estimated that the fixed capital credit and the M&E credit both led to a net loss in total employment in 2002, with losses in public-sector jobs exceeding gains in private-sector jobs. The cut in the corporate tax rate, in contrast, led to nearly 6,000 new private-sector jobs, and a net increase in total employment of more than 3,600 jobs. The authors posit that the relative success of the tax rate reduction is at least partly due to the fact that it is less restrictive than other tax changes.[53] However, the negative employment impact of the two investment tax credits may simply be an artifact of the authors' assumption of a low level of induced investment.

The same question could be raised about the relatively weak cost-effectiveness of these credits. The authors reported the net cost per private-sector job created, taking into account both revenue and spending changes induced by the credits. The estimated net cost per private-sector job was more than $130,000 for both credits—among the four highest of the 17 tax preferences the authors examined.[54]

Massachusetts. In 2003 the Associated Industries of Massachusetts (AIM) Foundation contracted with Ernst & Young (E&Y) to estimate the economic and fiscal effects of the Bay State's investment tax credit.[55] The E&Y authors calculated the user cost of capital in Massachusetts, which they then included as an input in the state's REMI model. The authors do not appear to have considered federal deductibility of state taxes in their computation of user cost, nor did they take into account the Commonwealth's balanced-budget requirement. Both these factors mean that the analysis probably overstates the credit's economic impact.[56]

The authors estimated that in 2003 the investment tax credit increased the state's capital stock by $218 million, employment by 4,220 jobs, and personal income by $314 million. According to the analysis, the state recouped about $0.54 in new revenues for each dollar of credit.[57] These findings suggest that each net dollar spent on the investment in 2003 yielded more than $14 in new personal income, and that the net cost per job was around $5,000.[58]

Studies of investment tax credits in other states

Analysts have not widely examined state-level investment tax credits outside New England, although a few studies do exist. A 1996 report by the New York Office of Tax Policy Analysis explored the effectiveness of that state's investment tax credit, though the authors did not conduct a rigorous empirical evaluation.[59] On the other hand, North Carolina's investment tax credit for machinery and equipment has been the subject of more quantitative study.

The North Carolina M&E credit was one of several business tax credits created under the 1996 William S. Lee Act. The Lee Act divides the state's counties into five tiers, with Tier 1 counties being the most economically distressed, and Tier 5 counties the most prosperous. Firms in lower-tier counties usually receive more generous tax credits.

North Carolina law requires periodic assessments of the Lee Act's various credits, including the dollar amount claimed, the number of claimants, and the resulting amount of targeted activity.[60] Data from the 2003 assessment suggests that firms invested about $12.3 billion in qualified machinery and equipment in North Carolina, generating close to $860 million in tax credits over the program's first six years. However, because businesses actually claimed only a portion of those credits during that period—partly because they receive the credits in installments—each dollar of M&E credit *claimed* was associated with $106 in capital investment.

Although this type of statistic may be easy to calculate using information from credit applications or tax returns, its usefulness as a measure of cost-effectiveness is limited in several important respects. First, the measure is based on total qualified investment by firms receiving the credit, not just investment induced by the credit. Second, this statistic measures only targeted activity—it does not capture the broader effects on the state

economy from induced investment. Third, the measure does not account for any fiscal changes stemming from induced economic activity.

Germane to the first limitation, a 2005 paper by Luger and Bae found that only a small portion of activity qualifying for Lee Act credits is actually induced by the credits.[61] The authors relied on a user-cost approach to simulate the effects of various Lee Act credits at hypothetical levels of investment for a firm in each tier. They found that for any given level of capital investment, only up to 8 percent actually stemmed from the lower user cost resulting from the M&E tax credit—the rest being investment that would have occurred anyway. Because the simulation did not account for the interactions between state and federal taxes, even this modest level of induced activity may be somewhat overstated.

Luger and Bae also estimated the direct effect of the M&E credit on employment. They found that for a hypothetical firm in a Tier 1 county making a $1.5 million investment in M&E, the reduction in user cost stemming from the credit would induce the hiring of 1.82 new workers. In contrast, a firm in a Tier 5 county, receiving a less generous credit, would hire only 0.58 workers for the same-sized investment.[62] Luger and Bae did not report any cost-per-job figures for the M&E credit. However, other data in the paper suggest that the cost per job induced by a $1.5 million investment in M&E is higher than for a similar investment in R&D or central administrative offices, and aircraft facilities.

Investment tax credit summary

The available evidence suggests that state investment tax credits do have a positive impact on capital investment. The multi-state study by Chirinko and Wilson, which combines a rich data set with sophisticated methodology, is particularly compelling in this regard. Simulations involving North Carolina's M&E tax credit suggest that while it does appear to induce new investment, a majority of the subsidized activity would have occurred anyway.

The broader economic and fiscal implications of these types of credits are less clear. Assessments of the Connecticut and Massachusetts investment tax credits paint drastically different pictures, with the latter credit appearing to exert a more favorable impact. However, because of the different—and sometimes questionable—methodological assumptions by the authors, the two studies are not strictly comparable. The Bay State's credit may also be better designed, or the Massachusetts economy may be or have been better positioned to benefit from expanded capital investment.

Evidence from the studies conducted by the CCEA in Connecticut and Luger and Bae in North Carolina suggests that investment tax credits may be less cost-effective in creating jobs than other incentives. Though this is not necessarily surprising—companies may substitute capital for labor to some extent—one must again use caution in interpreting the CCEA results.

R&D tax credits

Multi-state studies

Analysts have also used multi-state studies to investigate whether R&D tax credits generate their targeted activity. A study by Daniel Wilson of the Federal Reserve Bank of San Francisco employed a user-cost approach to study the impact of state R&D tax credits on in-state R&D expenditures.[63] He estimated that, over the long run, a 1 percent drop in the user cost of R&D for firms in a given state would yield a 2.5 percent increase in R&D spending in that state, on average.[64]

Wilson's second key finding was that state-level R&D tax credits promote a "zero-sum game": any increases in R&D spending in one state stemming from a change in user cost will be exactly offset by an overall drop in R&D spending in other states. In other words, state-level credits appear to shift R&D spending around the country, rather than increasing overall spending.

Wu has also used a multi-state approach to examine the impact of state tax credits on in-state R&D activity. In a 2005 study of data from 13 states, Wu found that R&D tax credits have a positive effect on in-state R&D expenditures—a finding consistent with Wilson's.[65] Specifically, Wu estimated that the establishment of a state R&D tax credit spurs an additional $75 to $120 in industrial R&D spending per capita. In a second study published in 2008, Wu looked at the relationship between R&D tax credits and the number of high-tech firms in a state.[66] Using data from 49 states, he estimated that a state R&D tax credit would spur the creation of 17 new high-tech firms per million state residents, on average.

The Iowa Department of Revenue used data from several states to examine the relationship between tax credit features—such as the credit rate, and whether it is refundable—and R&D.[67] The authors used several different variables for R&D activity, including in-state R&D expenditures, the number of doctorate-level scientists and engineers in the state, and the number of patents granted in the state. Although some limitations in the data hampered the study, the findings suggest that the design of a tax credit does affect its impact on R&D activity.

Studies of R&D tax credits in New England

Connecticut. The CCEA analysis of changes in Connecticut's corporate tax policy also evaluated the economic and fiscal impact of the state's two major R&D credits.[68] The researchers again made assumptions about how much activity each credit induced, though the plausibility of their assumptions is again somewhat unclear. The authors also adjusted public spending to account for the state's balanced-budget requirement.

Using the REMI model, the authors estimated that the state's non-incremental R&D credit led to 249 new private-sector jobs in the state in 2002—a gain nearly offset by the loss of

227 public-sector jobs. The net cost per new private-sector job was $81,876, though the implied net cost per *net* job created was more than $900,000.[69]

The authors' assumptions about activity induced by the incremental credit—and hence the model's estimates of its impact—were decidedly more favorable. They estimated that the incremental credit helped create 1,261 private-sector jobs in 2002, and 1,159 net jobs. The net cost per private-sector job was $4,706—the lowest of all but one of the 27 tax changes the authors examined. The implied net cost per net job created was only slightly higher, at $5,120.

Massachusetts. A second E&Y study, again sponsored by the AIM Foundation, used the Massachusetts REMI model to evaluate the economic and fiscal impacts of the state's research tax credit.[70] The authors estimated how the credit would affect a firm's cost of production, and entered that information into the model, although again they do not appear to take into account federal deductibility of state taxes. The authors also did not make any adjustments for the state's balanced-budget requirements in their main analysis, another methodological shortcoming.

The model projected that in 2003 the R&D credit raised the number of jobs by 2,050, and personal income by $96.7 million. The model also estimated that $0.11 in new state revenue slightly offset each dollar of credit. These results suggest a net cost per job of $31,500, and an increase of $1.50 in personal income for each net dollar of credit.

Taken together, the two E&Y studies suggest that the Massachusetts research credit is less cost-effective than the investment tax credit in generating new jobs and income for state residents.

New Hampshire. Gittell and Tebaldi used the New Hampshire REMI model to estimate the economic impact of several proposed R&D credits.[71] They first assumed that a hypothetical credit based on total R&D expenditures—with a $1 million cap on total credits—would spur a $1.8 million increase in R&D spending.[72] The model predicted that this increase would expand total employment by 73 jobs, personal income by $2.8 million, and state GDP by nearly $5 million.

The authors estimated that for each dollar of credit, the state would recoup only about $0.05 in new revenues, and that the net cost per job would be around $13,000.[73] Each net dollar of credit would yield about $2.99 in new state personal income, and $5.28 in new state GDP. Because the analysis did not consider a balanced-budget requirement, it probably overstates the benefits of the hypothetical credit.

Studies of R&D tax credits in other states

A 2005 study by Paff used two approaches to assess the impact of California's R&D tax credit on in-state R&D spending.[74] In her first approach, Paff looked at how R&D spending changed after increases in the state's R&D credit rate. To isolate activity actually

attributable to the rate changes, Paff compared spending changes in California with spending changes in Massachusetts—where the rate was stable—during the same period. Paff's initial analysis suggested that the increases in California's credit rate had a positive impact on in-state R&D spending, but her results did not hold up well in sensitivity analyses—that is, supplemental analyses used to check whether results remain consistent under alternative conditions.

In her second approach, Paff estimated how both contract and in-house R&D spending responded to changes in the "price" of R&D stemming from changes in tax policy. Though she did not find any evidence that R&D tax credits affected contract research, Paff did find that tax credits had a large impact on spending on in-house research. Taken together, Paff's findings suggest that California's R&D credit has exerted at least some influence on firms' R&D spending.

A 2002 report from Office of the State Auditor evaluated Missouri's qualified research expense tax credit. The authors used the REMI model to project outcomes over a 16-year period (2000–2015) for credits the state expected to grant through 2009.[75] The model predicted a loss of jobs during the first five years, with job growth beginning in the sixth year and peaking in the final year at 160 new jobs. The authors also predicted that the R&D credit would initially have a negative impact on state GDP, personal income, and state revenues. Though it is unclear what is driving the results, the study suggests that some effects may take a long time to surface.

The 2003 assessment of North Carolina's Lee Act credits reported that each dollar of R&D credit claimed during the program's first five years was associated with $62.98 in new—but not necessarily induced—R&D expenditures. Luger and Bae's simulations suggest that induced R&D expenditures represent only around 6 percent of total R&D expenditures—again, a possible overstatement because the authors did not account for federal deductibility of state taxes. These authors also estimated that the tax credit for a hypothetical firm with $1.5 million in total R&D spending would induce the firm to hire 5.97 new workers—a larger employment effect than that of a similar-sized investment in machinery and equipment.[76] Their results also suggest that the R&D credit would be more cost-effective in fostering new jobs than the state's M&E credit.

R&D tax credit summary

The available evidence suggests that state R&D tax credits do induce new in-state research activity and related employment. However, benefits at the national level are less clear. Wilson's analysis—which considered both in-state and cross-state effects—suggests that these credits shift spending among states rather than raising overall levels of R&D.

Estimates of the cost-effectiveness of New England R&D credits—measured as cost per job created—vary from study to study and are not necessarily comparable, because of differences across both states and studies. For example, the evaluation in Connecticut assumed a balanced budget, while the studies of other New England states did not.

The CCEA study illustrates the importance of underlying assumptions. The authors estimated a net cost per job created of about $5,000 for Connecticut's incremental R&D credit, but a net cost per job nearly 200 times greater for the state's non-incremental credit. Because the authors used the same REMI model to evaluate both credits, their *inputs* to the model—that is, their assumptions about how the credits would initially affect spending in the recipient industries—led to these vastly different estimates.

The cost-effectiveness of R&D credits compared with other types of tax incentives is also unclear. The findings from the studies by the CCEA and Luger and Bae in North Carolina suggest that R&D credits may be more cost-effective in creating jobs than investment credits. However, the E&Y studies of Massachusetts' investment and research credits lead to the opposite conclusion.

Job creation tax credits

Studies of job creation tax credits in New England

Vermont. The 2008 annual report on the Vermont VEGI program found that the state authorized $9.7 million in incentives during its first year, and projected that the recipient companies would create 1,310 new jobs from 2007 to 2012.[77] This implies an average gross cost of around $7,400 per job. The authors also estimated that the program's net fiscal impact in its first year would be positive—that is, that the state government would gain net revenue for each job created.[78] The report did not attempt to estimate the tax credit's indirect effects on employment.

Studies of job creation tax credits in other states

Although New England's job creation tax credits have not received extensive study, analysts have evaluated a few such credits offered by other states. For example, Faulk (2002) examined the impact of Georgia's job creation tax credit.[79] She compared growth in employment at participating firms with that among eligible firms that did not participate, the latter serving as the counterfactual. Faulk used econometric techniques to control for the fact that the characteristics that lead a firm to claim a tax credit may also influence its job growth.[80]

Faulk attributed 23.5–27.6 percent of the employment change among participating firms to the tax credit. In other words, up to three-quarters of new jobs created by these companies might have occurred even without the tax credit. Still, while this finding addresses the first question in our framework, it tells us little about the credit's overall economic and fiscal impact, or its cost-effectiveness.

LaFaive and Hicks used an econometric model to estimate the impact of tax credits granted through Michigan's primary business tax incentive program geared toward employment: the

Michigan Economic Growth Authority (MEGA).[81] Using techniques to address potential biases, the authors found that counties with firms that received MEGA credits did not fare any better in income, employment, or unemployment than other counties in the state. The researchers captured both direct and indirect effects by examining county-level rather than firm-level outcomes. However, their results assume that all the effects of an incentive will occur in the county where a recipient firm resides—that is, no leakages to other parts of the state will occur—an unrealistic assumption.

Analysts at Rutgers University used an input-output model developed by the school's Center for Urban Policy Research to project the economic and fiscal impact of awards granted through New Jersey's Business Employment Incentive Program (BEIP).[82] The authors estimated that 183 BEIP awards granted from June 1997 to February 2005 led directly to 51,665 permanent jobs and indirectly to another 58,089 jobs, and to an annual increase of $8.4 billion in state GDP. The model predicted that the state would collect $349.3 million per year in new revenues from expanded economic activity—vastly exceeding the program's original $95 million price tag. However, these figures may be overstated. For example, the authors implicitly assume that credit-assisted activity was also credit-induced. However, they predicted that the program would still "break even"—recoup the full amount of the awards—even if the BEIP incentive actually induced only a quarter of the 51,665 jobs created directly.

Periodic analyses of the Lee Act tax credits have also examined North Carolina's job creation tax credit. According to the 2003 assessment, the credit led to 104,275 new jobs in its first six years, with a gross cost per job of $227 to $349. However, because firms would probably have created some of these jobs without the credit, the cost per induced job was likely higher. Indeed, simulations performed by Luger and Bae suggest that induced jobs represented just 1.2 percent of total jobs created by firms receiving credits in 1999. That finding suggests that the credit induced only 1,250 new jobs in its first six years, with a gross cost per job of almost $27,000.[83]

Job creation tax credit summary

One concern with many business tax credits is that they simply reward behavior that companies would pursue even without the credit. In Georgia, Faulk used econometric techniques to estimate the level of job creation that such a credit actually induced. Her findings, as well as the simulations by Luger and Bae in North Carolina, suggest that job creation tax incentives do influence firms' hiring decisions, but that the companies would have created a majority of the subsidized jobs anyway.

One might expect job creation tax credits to be more cost-effective in inducing employment than credits targeted primarily at investment or other business activities. Unfortunately, evidence on the economic and fiscal impacts of job creation tax credits is thin, and the studies that do exist paint an inconsistent picture. A county-level analysis of Michigan's MEGA program did not find substantial differences in overall employment between counties with firms receiving incentives and counties without such firms. Yet an input-

output analysis of New Jersey's BEIP program did find a fairly sizable impact on jobs in the state and a positive net fiscal impact, although the New Jersey authors may have used overly favorable assumptions.

Film tax credits

Studies of film tax credits in New England

Connecticut. A 2008 study by the Connecticut DECD used the REMI model to assess the economic and fiscal impacts of the state's main film tax credit.[84] This evaluation specifically sought to estimate the impact of 13 productions that filed for the tax credit between July 2006 and September 2007.[85]

The DECD authors made a number of assumptions and adjustments in their analysis. First, they assumed that the credit induced all productions filing for the credit. The authors also made explicit assumptions about what types of production expenses would or would not generate economic benefits for the state. For example, the authors excluded salaries paid to "above-the-line" workers (such as principal actors, producers, and directors). The basis for this assumption—that most of these individuals reside outside the state, and are therefore unlikely to spend their earnings in Connecticut—appears to be reasonable.[86] To account for Connecticut's balanced-budget requirement, the authors also assumed that state government would exactly offset the $16.5 million in tax credits granted to the 13 productions by an across-the-board spending cut. The authors projected outcomes for each of six years.

The REMI model estimated that the 13 productions resulted in $20.7 million in new state GDP, $6.6 million in new disposable personal income, and 395 net new FTE positions in 2007. However, the model also projected that these increases would dissipate rapidly over the next five years. This implies that the state must continue to attract new productions—presumably via additional tax credits—to sustain these higher levels of employment and other outcomes.

The study found that each dollar of credit was offset by about $0.20 in 2007, with $0.07 coming from new state revenues and the remainder from reduced state spending. These results suggest that each net dollar spent on the film credit produced $1.57 in new state GDP and 50 cents in new disposable personal income in 2007. The net cost per FTE job created that year was around $33,400.

Massachusetts. The Massachusetts Department of Revenue (DOR) has released three analyses of the Commonwealth's film production incentives. The first, issued in March 2008, simply summarized information from applications for the film credit, and data on the state workforce.[87] Based on this evidence, the DOR authors concluded that film tax incentives have likely increased employment in Massachusetts, though the jobs created tend to last less than four months, on average.

The second analysis, requested by a state legislator and released in May 2008, used the REMI model to estimate the economic and fiscal impacts of a hypothetical $100 million in film tax credits.[88] In its most recent evaluation, released in July 2009, the DOR again used the REMI model to estimate the effects of actual credits granted between 2006 and 2008.[89]

In this latest analysis, the DOR authors conducted a detailed review of actual film tax credit applications. This analysis revealed that $676 million in production spending qualified for $167 million in tax credits over the three-year period. Feature films represented 37 of 267 projects and accounted for 91 percent of the credits. Wages for all projects totaled $429 million, with more than 82 percent paid to individuals residing outside Massachusetts.

Based on the application data, the authors assumed that about 7 percent of production spending qualifying for the credit—mostly television programs and local advertising—would have occurred without the incentives. The authors further assumed that none of the wages paid to non-resident, above-the-line employees earning $1 million or more would be spent in Massachusetts. The authors assumed that only 5 percent of wages for non-residents earning less than $1 million would be spent in state.[90] The authors also made adjustments to account for the state's balanced-budget requirement.

The REMI model estimated that the credits generated $52 million in new state GDP in 2006, $115 million in 2007, and $343 million in 2008. Estimated increases in state personal income were less dramatic: $18 million in 2006, $28 million in 2007, and $65 million in 2008. According to the authors, the large difference in growth rates between GDP and personal income reflects the large proportion of wages paid to non-resident employees, which are not included in state personal income. Employment—measured as FTEs—increased by 536 jobs in 2006, 834 in 2007, and 1,807 in 2008. The model also estimated that for each dollar of tax credit granted, the state recouped about $0.16 in new revenues in each of the three years.

These results imply that each net dollar of credit was associated with $3.61–$3.93 in new GDP for each of the three years. While this impact appears fairly stable, other measures suggest that the credit became less cost-effective over the period. New personal income per net dollar of credit fell from $1.35 in 2006 to $0.68 in 2008. And net cost per FTE job rose over the three-year period, from $25,000 in 2006 to $38,200 in 2007 and $52,850 in 2008.[91] According to the DOR authors, the declining cost-effectiveness reflected a lag between when production spending occurred and when companies used the credits to reduce their tax payments, and thus when the state cut spending to balance its budget.

Maine. In 2009 the Maine legislature considered adopting a new, transferable tax credit geared to out-of-state filmmakers.[92] A 2008 study commissioned by the Maine Film Office estimated the effects of the film industry in Maine, and expounded on the likely fiscal impact of such a credit.[93] Using the IMPLAN model, the authors estimated that $7.3 million in film production spending in Maine in 2005 generated $16.4 million in new output, $8.8 million in new labor and proprietor income, and 221 new jobs.

The authors estimated that for each $1 million in local spending on film production, the state government captured about $108,000 in new revenues, while local governments captured about $40,000. Based on these estimates, the researchers claimed that state and local governments could together "recoup" up to three-quarters of a tax credit worth 20 percent of in-state spending on film production. However, the authors may overstate this hypothetical impact on revenue. They did not account for the fact that a credit might subsidize projects that would occur in Maine even without the credit, or the fact that the state's balanced-budget requirement might create negative offsetting effects.

Rhode Island. A 2008 study by Rhode Island's Department of Revenue analyzed the impact on government revenue of the state's film credit.[94] The authors estimated that for every dollar spent on film tax credits, the government recoups $0.28 to $0.32 in new revenue from direct economic effects.

The methods employed by the authors were not particularly rigorous. They estimated new state revenues attributable to the film credit by applying historical ratios of tax revenues to state GDP and personal income to actual Rhode Island production spending on credit-assisted projects. Under this approach, in-state production spending was assumed to represent the direct change in GDP (in one case) or personal income attributable to the credit. Both are problematic; some production costs will be paid to out-of-state suppliers, including non-resident workers.

The authors also did not attempt to adjust for any film activity that might have occurred without the credit. Although they did not attempt to capture the indirect effects of film credits, including potential negative effects due to the state's balanced budget requirement, the authors did conclude that each dollar of subsidized production spending would need to yield $3.13 to $3.57 in direct and indirect effects for the state to "break even"—that is, collect enough new revenues to offset the gross cost of the credit.

Studies of film tax credits in other states

A number of studies have estimated the economic and fiscal impacts of film tax credits offered by states outside New England, including Louisiana,[95] New Mexico,[96] New York,[97] and Pennsylvania.[98] These studies—summarized in Table 6, along with analyses from Connecticut and Massachusetts—are comparable, in that they relied on input-output models. As the table shows, however, the studies do vary in both their assumptions and their findings, even though they relied on a similar overall approach.

Most studies of film credits offered outside New England made less realistic assumptions than the Connecticut and Massachusetts studies. For example, most non–New England studies: (1) assumed that all projects receiving a film credit are actually induced by the credit;[99] (2) did not impose a balanced-budget requirement; and (3) did not make any adjustments for above-the-line or non-resident earnings, which are unlikely to create multiplier effects within a state. These choices—methodological shortcomings, in my view—may explain, at least in part, why film credits in non–New England states appear to

be more cost-effective based on net cost per job. These estimates ranged from a *negative* $1,200 in New York (implying that the state *makes* money on each job created) to $16,100 in one Louisiana study, compared with $33,400 in Connecticut and up to $52,850 in Massachusetts in 2008.[100]

The results of two E&Y analyses, in particular, are strikingly different from those of other studies.[101] One reason is that the E&Y authors included a broader range of effects. For example, the E&Y New Mexico study included the impacts of film-related spending on infrastructure and tourism. Most studies—including that of New Mexico's tax credit by Popp and Peach—do not attempt to capture these effects, although some acknowledge them. Analysts may exclude infrastructure effects because they are usually one-time events and can vary greatly from year to year. Input-output analyses of production spending also already account for some infrastructure spending. Other analysts, including those at the Massachusetts DOR, have noted the difficulty of estimating the effects of a film tax credit on tourism. Indeed, some observers have questioned the appropriateness of E&Y's methods and the plausibility of its results.[102]

State-specific characteristics—such as the design of a state's tax credit, and the nature of its tax system and economy—may also influence the effects of a credit. Those characteristics have also likely contributed to the divergent results of the E&Y studies, particularly the New York study. A production company shooting a film in New York City—a traditional production center—may hire local workers and purchase local goods and services more easily than a company shooting in an area with a less-established film industry. Because more money stays in New York's economy, the economic and fiscal impacts of the state's film credit are likely to be larger than those in an area where spending "leaks" out.

Film tax credit summary

To my knowledge, no study has attempted to model what level of film production state tax credits actually induce. Anecdotal evidence of production counts and spending before and after such credits take effect suggests that they do attract the targeted activity. However, the assumption embedded in most studies—that all credit-assisted projects are credit-induced—may be generous.

This review of studies estimating the economic and fiscal impacts of film tax credits clearly shows that assumptions and other methodological choices are important. The two studies from New Mexico are a case in point. Though both use the same input-output model to measure the effects of the same credit, they arrive at markedly different conclusions. And while both studies have shortcomings, the methodological validity of the E&Y study is particularly debatable.

Most studies suggest that while film credits do generate some additional revenue for state governments, they do not "pay for themselves." The one exception—E&Y's evaluation of New York's film credit—is likely not a good example for other states, because of the authors' questionable methodological choices and New York's unique characteristics.

Unfortunately, most studies fail to consider the whole picture when estimating the fiscal impact of a tax credit. Only one study reviewed here—the DECD analysis of Connecticut's film tax credit—examined effects on both state revenue and state spending. Ideally, cost-effectiveness calculations would consider the impact on both.

For this and other reasons, the relative cost-effectiveness of film tax credits is unclear. Several of the cost-per-job estimates appear—at least on their face—to fall within the $35,000 threshold used for some federal programs. However, the federal threshold refers to permanent jobs, whereas the cost-per-job estimates in state studies are based on one-year impacts. And as noted, jobs spurred by film credits are likely to be short term. States would probably need to grant credits year after year to sustain the new jobs, which means that the net cost per permanent job could be considerably higher than estimates suggest.[103] Finally, a lack of head-to-head comparisons makes it difficult to gauge the cost-effectiveness of film tax credits versus that of other economic development initiatives.

Conclusions

The economic and fiscal challenges facing New England states—and indeed, states across the nation—underscore the need to carefully examine measures used to promote economic growth. During times such as these, policymakers have a strong motivation to both "restart" the economy and reverse or prevent budget deficits. Whether tax credits spur growth or simply make a bad fiscal situation worse without any redeeming economic benefits is a pressing question.

Understanding the business tax credits that states are actually offering is an important start. The design of such credits can influence not only their cost-effectiveness, but also whether they reinforce or detract from other, sometimes competing tax policy goals. For instance, recapture provisions may enhance a credit's cost-effectiveness but reduce the simplicity of the tax code. Generous credits with features such as transferability or refundability may make a state's tax system more competitive vis-à-vis that of other states. However, those features can reduce revenues, preventing the state from pursuing its other priorities (including other programs and projects designed to boost its competitiveness), and can make the tax system less transparent. Policymakers and other stakeholders should not ignore these "big-picture" considerations when evaluating business tax credits.

This review of recent studies of the effectiveness of four types of business tax credits offered by New England states suggests several conclusions. First, these credits do seem to foster their targeted activities, at least to some extent. In other words, the level of in-state capital investment, R&D, job creation, and film production is likely higher with tax credits in place than without them.

However, a couple points are important to note. First, credits appear to subsidize some activity that would have occurred regardless, meaning that at least some businesses are receiving windfalls. Second, there is evidence that state business tax credits are a zero-sum

game. Still, while the finding that business activity is simply shifting from state to state may be undesirable from a national perspective, it may reinforce the view of state leaders who see tax credits as a competitive tool.

Next, and as expected, evidence suggests that indirect effects do matter. Analyses based on REMI and other input-output models suggest that economic activity produced indirectly by tax credits is not trivial, and may sometimes be sizable. However, the methodologies and results of any study should be viewed with a critical eye, as assumptions by individual researchers can strongly influence the economic and fiscal impacts they find. Indeed, studies showing the largest positive impacts from business tax credits often suffer from problematic approaches: for example, they may not consider a state's balanced-budget requirement or adequately account for windfalls or leakages.

Finally, despite varying assumptions, most studies suggest that while business tax credits do lead to new revenues for state government, those revenues do not completely offset the initial costs. In other words, most credits do not appear to "pay for themselves." Thus, understanding what benefits states are receiving for the revenues they are giving up is important: What is the bang for the buck?

Unfortunately, existing evidence does not provide clear conclusions on the cost-effectiveness of business tax credits. A few observations suggest why:

Lack of methodological transparency. Some analysts do a good job of outlining and justifying their assumptions, but many do not. Furthermore, the input-output models commonly used to estimate the economic and fiscal impact of tax credits are often somewhat of a "black box" for those unfamiliar with them. This lack of transparency in assumptions and methods can make it difficult to assess the plausibility of the study findings.

Lack of evidence on whether credits have long-term effects. Ideally, measures of cost-effectiveness should take into account all the benefits associated with a tax credit, regardless of when they occur. Unfortunately, few studies have tried to evaluate the long-term effects on employment and other outcomes of tax credits awarded in a particular year. This makes it difficult to gauge (1) whether the effects take time to manifest; and (2) whether they persist over time. Because no one knows whether the employment effects measured in most studies are "permanent," policymakers cannot easily compare per-job cost estimates with one known federal threshold for cost-effectiveness.

Lack of comparability across studies. Another—perhaps preferable—means of judging a tax credit's cost-effectiveness is to compare it with that of other initiatives designed to achieve the same purpose. Very few studies have evaluated more than a single economic development initiative. And cross-study comparisons of the cost-effectiveness of different tax credits are complicated by the fact they rely on different assumptions and often measure different things. For example, some studies measure only direct rather than all economic effects, while others capture gross rather than net costs.

Lack of sensitivity analyses. Because assumptions play a key role in any study of the impact of business tax credits, researchers would ideally perform their analyses multiple times under different sets of assumptions. Such "sensitivity analyses" can show how results may change under different conditions. A few studies have reported outcomes under multiple scenarios—usually a "balanced-budget" versus "no-balanced-budget" scenario—but most have relied on a single set of assumptions.

The existing literature is also limited in that few studies consider who exactly benefits from tax credits, and how they are benefiting. For example, many analyses tell us the number of jobs created but not much else. Do these new jobs go to state residents who were previously unemployed or out of the labor force, or do they go to non-residents or people relocating to the state? Do they pay well and provide good benefits? Are they permanent? What is the distributional impact across income groups or regions within a state? These questions are also important in assessing the success or desirability of a tax credit.

As states' efforts to collect and disseminate data improve, more high-quality studies of business tax credits will likely emerge, which may allow for more definitive conclusions regarding their effectiveness and cost-effectiveness. In the meantime, it is essential for policymakers and other stakeholders to understand the strengths and limitations of existing studies when using their findings to debate business tax credits. Stakeholders also need to keep in mind the larger picture: How do these incentives enhance or detract from other goals of state tax policy? Who is benefiting, and how? It is the hope of this author that policymakers will consider such questions when determining the role that business tax credits should play in economic development policy.

Table 1: Selected tax credits offered by New England states, with estimated FY2009 tax expenditures

State	Targeted economic activity			
	Investment	R&D	Job creation	Film production
Connecticut[1]	Fixed Capital Investment Credit ($60M) Film Infrastructure Investment Tax Credit ($10M) Machinery and Equipment Expenditure Credit ($3M)	R&D Expenses Credit ($5M) Research & Experimental Expenditures Credit ($10M)	Jobs Creation Tax Credit ($10M)	Film and Digital Media Production Tax Credit ($91M) Digital Animation Production Credit ($16M)
Maine[2]	Jobs and Investment Tax Credit ($2M) High-Technology Investment Credit (<$1M)	Research Expense Tax Credit (<$1M) Super R&D Expense Tax Credit ($1M)	Jobs and Investment Tax Credit ($2M)	Certified Media Production Credit (<$1M)
Massachusetts[3]	Investment Tax Credit ($50M) Life Sciences Investment Tax Credit (went into effect in January 2009)	Research Tax Credit ($105M)	Job Creation Incentive Payment ($3M)	Payroll/Production Credits for Motion Picture Production ($63M combined)
New Hampshire[4]		R&D Tax Credit ($1M)		
Rhode Island[5]	Investment Tax Credit ($12M) R&D Property Credit (<$1M) Biotechnology Investment Tax Credit (no estimate)	R&D Expense Credit ($2M)		Motion Picture Production Company Tax Credit ($14M)
Vermont[6]	Vermont Employment Growth Incentive (VEGI) ($10M)	R&D Tax Credit (goes into effect in 2011)	Vermont Employment Growth Incentive (VEGI) ($10M)	

[1] Connecticut General Assembly, Office of Fiscal Analysis, "Connecticut Tax Expenditure Report," January 2008.

[2] Maine Revenue Services, "Maine State Tax Expenditure Report, 2008-2009," January 2007.

[3] Massachusetts Fiscal Year 2009 Tax Expenditure Budget.

[4] New Hampshire Statutes, Title V, Chapter 77-A, Section 77-A:5.

[5] State of Rhode Island, Department of Revenue, Division of Taxation, "Tax Expenditures Report," January 2008.

[6] Vermont State Auditor, "Vermont Employment Growth Incentive Compliance Audit Pursuant to 32 V.S.A. Section 163(12)(B)," June 2008.

Notes:

(a) Tax expenditure estimates reported here are aggregated across all taxes against which a particular credit may be claimed. For example, the Connecticut film credits may be claimed against either the tax on business corporations or the tax on insurance premiums.

(b) The $1M for the New Hampshire R&D credit and $10M for the Vermont VEGI program represent total program caps, not necessarily estimated tax expenditures.

Table 2: Summary of investment tax credits offered by New England states

State	Credit name and description	Eligibility requirements	Exclusions or limitations	Selected key features
Connecticut[1]	**Fixed Capital Investment Credit** 5% of the amount paid or incurred for new fixed capital investment.	Recipients must use capital property in Connecticut for 5 years or more.	Excludes land, buildings, and motor vehicles.	5-year carry-forward; recapture provision.
	Film Infrastructure Investment Tax Credit 10-20% of costs of state-certified film infrastructure projects.	At least $15K in film-related capital expenditures.	Cannot be taken with the fixed capital credit.	Transferable.
	Machinery and Equipment Expenditure Credit 5-10% of incremental machinery and equipment expenditures.	Firms with 800 or fewer Connecticut employees.	Cannot be taken with the fixed capital credit.	Base is expenditures for previous year.
Maine[2]	**Jobs & Investment Tax Credit** Credit amount based on formula for former federal investment credit (usually 10% of qualified investment).	Applicants must invest at least $5M in one year, and create 100 jobs over the next 2 years.	A firm may claim up to $500K per year for up to 7 years ($3.5M total); investment in certain retail facilities is not eligible.	7-year carry-forward; recapture provision.
	High-Technology Investment Credit Credit amount is equal to the total adjusted basis of high-tech equipment eligible for federal income tax purposes, or the lease payments for such equipment.	Businesses engaged primarily in high-tech activities (e.g., computer design and production).	Individual credits capped at $100K.	5- to 10-year carry-forward.

Table 2: Summary of investment tax credits offered by New England states (continued)

State	Credit name and description	Eligibility requirements	Exclusions or limitations	Selected key features
Massachusetts[3]	**Investment Tax Credit** 3% of the cost of qualified tangible property after any federal deductions.	Manufacturing corporations, or corporations engaged primarily in R&D, agriculture, or commercial fishing.	The credit may not reduce the tax due below certain levels established by statute.	3-year carry-forward; recapture provision.
	Life Sciences Investment Tax Credit 10% of the cost of qualified property.	Certified life sciences companies.	Total tax incentives granted under state's life sciences initiative cannot exceed $25M per year.	Refundable at 90%; recapture provision.
Rhode Island[4]	**Investment Tax Credit** 10% of the cost of qualified tangible property.	Businesses engaged in manufacturing, wholesale trade, FIRE, film production, and selected services meeting minimum compensation or other requirements.	Excludes some motor vehicles, furniture, buildings, and structures; credit may not reduce tax due in any year by more than 50%, or to less than the statutory minimum.	7-year carry-forward; recapture provision; special provisions for "high-performance manufacturers."
	R&D Property Credit 10% of the cost of qualified tangible property used for R&D.	Businesses engaged in R&D.	Excludes leased property; allowed only on property not claimed under investment tax credit; credit may not reduce tax due in any year to less than the statutory minimum.	7-year carry-forward; recapture provision.
	Biotechnology Investment Tax Credit 10% of the cost of qualified tangible property used in the production of biotech products.	Businesses engaged primarily in biological R&D or the production of biotech products; firms must meet minimum compensation and other requirements.	Excludes motor vehicles and furniture; credit may not reduce tax due in any year to less than the statutory minimum, or by more than 75% if credit is available for more than 7 years.	Up to 15-year carry-forward (may exceed 7 years only if businesses meet certain provisions).

Table 2: Summary of investment tax credits offered by New England states (continued)

State	Credit name and description	Eligibility requirements	Exclusions or limitations	Selected key features
Vermont[5]	**Vermont Employment Growth Incentive (VEGI)** Award is based on a formula that considers employment, payroll, and capital investment; awards are paid out of a business withholding account.	Applicants must show that their project (a) would not have occurred without the incentive; (b) will provide a net positive fiscal benefit for the state; and (c) will meet specified "quality-control" guidelines.	Individual awards are limited to a percentage of the projected net benefit to the state; total credits capped at $10M per year.	VEPC must approve applications; awards are paid only if a business meets self-imposed targets for payroll, employment, and/or capital investment.

[1] General Statutes of Connecticut, Title 12, Chapter 208, Sections 12-217w, 12-217kk, and 12-217o.

[2] Maine Statutes, Title 36, Part 8, Chapter 822, Sections 5215 and 5219-M.

[3] General Laws of Massachusetts, Part 1, Title IX, Chapter 63, Section 31A. Life Sciences Investment Tax Credit summarized in Massachusetts Department of Revenue Technical Information Release 08-23.

[4] State of Rhode Island General Laws, Title 44, Chapters 44-31-1, 44-32-2, and 44-31-1.1.

[5] Vermont Statutes, Title 32, Chapter 151, section 5930b; Vermont State Auditor, "Vermont Employment Growth Incentive Compliance Audit Pursuant to 32 V.S.A. Section 163(12)(B)," June 2008.

Notes:

(a) Except where otherwise noted, information is based on statutes available on state legislature websites as of the week of October 26, 2009. Credits may be subject to other statutory provisions not included in the table.

(b) Connecticut's credit for film infrastructure investment was modified in 2009. As of January 2010, the minimum expenditure will be $3M and the credit rate will be a flat 20%. See Connecticut Public Act 09-03.

(c) The Maine Jobs and Investment Tax Credit and the Vermont Employment Growth Incentive are also summarized in Table 4.

(d) FIRE = finance, insurance, and real estate.

Table 3: Summary of R&D tax credits offered by New England states

State	Credit name and description	Eligibility requirements	Exclusions or limitations	Selected key features
Connecticut[1]	**R&D Expenses Credit** Credit amount generally calculated as 1% of R&D expenses less than $50M, plus 2% of expenses from $50M to $100M, plus 4% of expenses from $100M to $200M, plus 6% of expenses above $200M.	Firms that have qualified in-state research expenses as defined under federal law.	The credit amount shall be reduced for any taxpayer with R&D expenses in excess of $200M that has workforce reductions in excess of a defined threshold; the amount of credit that may be claimed is limited by statute.	Indefinite carry-forward; special provisions for "qualified small businesses."
	Research & Experimental Expenditures Credit 20% of incremental R&D expenditures.	Firms that have qualified in-state research expenses as defined under federal law.	Cannot be taken with the non-incremental R&D Expenses Credit.	15-year carry-forward; refundable at 65% for qualified small businesses; base is R&D expenditures in preceding year.
Maine[2]	**Research Expense Tax Credit** 5% of incremental R&D expenditures, plus 7.5% of basic research payments.	Firms that have qualified in-state research expenses as defined under federal law.	Credit is limited to 100% of the firm's first $25K of tax due before credits, plus 75% of tax due in excess of $25K.	15-year carry-forward; base is average R&D expenditures over previous 3 years.
	Super R&D Expense Tax Credit Excess expenditures, if any, over super credit base amount.	Firms that qualify for the Maine Research Expense Tax Credit.	Credit may not exceed 50% of the firm's tax due after other credits, or reduce tax liability to less than tax due in preceding year.	5-year carry-forward; base is 150% of average R&D expenditures over previous 3 years.
Massachusetts[3]	**Research Tax Credit** 10% of incremental expenditures, plus 15% of basic research payments.	Firms that have qualified research expenses as defined under federal law.	Credit is limited to 100% of the firm's first $25K of tax due before credit, plus 75% of tax due in excess of $25K.	15-year carry-forward; refundable at 90% for life science corporations; base defined similarly to that of federal credit.

Table 3: Summary of R&D tax credits offered by New England states (continued)

State	Credit name and description	Eligibility requirements	Exclusions or limitations	Selected key features
New Hampshire[4]	**R&D Tax Credit** 10% of incremental qualified manufacturing R&D expenditures.	Manufacturing firms paying wages eligible for the federal R&D credit.	Only wage expenses qualify; individual credits capped at $50K; total credits capped at $1M per year.	5-year carry-forward; pro rata distribution if total credits claimed exceed annual aggregate cap; base defined similarly to that of federal credit.
Rhode Island[5]	**R&D Expense Credit** 22.5% of incremental R&D expenditures up to $111,111; 16.9% thereafter.	Firms that have qualified research expenses as defined under federal law.	Credit may not reduce tax due in any year by more than 50%, or to less than the statutory minimum.	7-year carry-forward; base defined similarly to that of federal credit.
Vermont[6]	**R&D Tax Credit** 30% of federal credit amount that reflects in-state R&D expenditures.	Firms eligible for the federal R&D credit.		10-year carry-forward.

[1] General Statutes of Connecticut, Title 12, Chapter 208, Sections 12-217n and 12-217j.

[2] Maine Statutes, Title 36, Part 8, Chapter 822, Sections 5219-K and 5219-L.

[3] General Laws of Massachusetts, Part 1, Title IX, Chapter 63, Section 38M.

[4] New Hampshire Statutes, Title V, Chapter 77-A, Section 77-A:5.

[5] State of Rhode Island General Laws, Title 44, Chapter 44-32-3.

[6] Vermont Statutes, Title 32, Chapter 151, Subchapter 11L, Section 5930ii. (enacted in 2009 Special Session, Act. No. 2).

Notes:

(a) Except where otherwise noted, information is based on statutes available on state legislature websites as of the week of October 26, 2009. Credits may be subject to other statutory provisions not included in the table.

(b) Research qualifying for the federal R&D credit must be "undertaken for the purpose of discovering information which is technological in nature, and the application of which is intended to be useful in the development of a new or improved business component of the taxpayer." Expenses associated with salaries, wages, supplies, and computer use are usually eligible, whereas those for equipment, buildings, overhead, and fringe benefits are not.

(c) The base for the federal credit is usually calculated as a fixed percentage of the firm's average gross receipts over the previous four years. See Title 26 USC 41(d).

(d) Basic research payments are costs associated with contributions made to research organizations such as hospitals and universities.

Table 4: Summary of job creation tax credits offered by New England states

State	Credit name and description	Eligibility requirements	Exclusions or limitations	Selected key features
Connecticut[1]	**Job Creation Tax Credit** Up to 60% of state income taxes withheld from new employee wages.	Applicants must create and maintain at least 10 new full-time jobs, and show that job growth would (a) be economically viable only with the credit; and (b) that the jobs provide a net benefit to the state.	Total credits capped at $10M per year.	DECD must approve credit applications; credits may be granted for 5 successive years; recapture provision.
Maine[2]	**Jobs & Investment Tax Credit** Credit amount based on formula for former federal investment credit (usually 10% of qualified investment).	Applicants must invest at least $5M in one year, and create 100 jobs over the next 2 years.	A firm may claim up to $500K per year for up to 7 years ($3.5M total); investment in certain retail facilities is not eligible.	7-year carry-forward; recapture provision.
Massachusetts[3]	**Job Creation Incentive Payment** Award equal to 50% of salary of each newly created job multiplied by the state's personal income tax rate.	Biotechnology, medical device manufacturing, or marine science technology firms. Applicants must increase in-state employment by at least 10 FTEs over previous year.	Firms may apply for incentive in no more than 3 different years.	Incentive payments for a given year are paid in annual installments. Payments may be withheld if a firm's employment falls.
Vermont[4]	**Vermont Employment Growth Incentive (VEGI)** Award amount based on a formula that considers employment, payroll, and capital investment; awards are paid out of a business withholding account.	Applicants must show that their project (a) would not have occurred without the incentive; (b) will provide a net positive fiscal benefit for the state; and (c) will meet specified "quality-control" guidelines.	Individual awards are limited to a percentage of the projected net benefit to the state; total credits are capped at $10M per year.	VEPC must approve applications; awards are paid out only if a business meets self-imposed targets for payroll, employment, and/or capital investment.

[1] General Statutes of Connecticut, Title 12, Chapter 208, Section 12-217ii.

[2] Maine Statutes, Title 36, Part 8, Chapter 822, Section 5215.

[3] General Laws of Massachusetts, Part 1, Title IX, Chapter 62C, Section 67D.

[4] Vermont Statutes, Title 32, Chapter 151, section 5930b; Vermont State Auditor, "Vermont Employment Growth Incentive Compliance Audit Pursuant to 32 V.S.A. Section 163(12)(B)," June 2008.

Notes:

(a) Except where otherwise noted, information is based on statutes available on state legislature websites as of the week of October 26, 2009. Credits may be subject to other statutory provisions not included in the table.

(b) DECD = Department of Economic and Community Development; FTE = full-time equivalent; VEPC = Vermont Economic Progress Council.

(c) The Vermont VEGI program and the Massachusetts Job Creation Incentive Payment program are technically cash incentives rather than tax credits. Both are included here because they contain credit-like features and are tied in some way to employment taxes. Other New England programs that I have not included are New Hampshire's Coos County Job Creation Tax Credit (which is restricted to one county) and Rhode Island's Jobs Development Act (which is a corporate tax rate reduction).

Table 5: Summary of film production tax credits offered by New England states

State	Credit name and description	Eligibility requirements	Exclusions or limitations	Selected key features
Connecticut[1]	**Film and Digital Media Production Tax Credit** 30% of production expenses or costs.	Production company must incur at least $50K in production expenses or costs.	Excludes compensation in excess of $15M paid to any individual.	Transferable; 3-year carry-forward; applies to expenses incurred in state and certain expenses incurred out of state but used in state.
	Digital Animation Production Credit 30% of digital animation production expenses or costs incurred in state.	Digital animation production company must incur at least $50K in production expenses or costs; company must maintain studio facilities and employ at least 200 full-time employees in the state.	Excludes compensation in excess of $15M paid to any individual; total credits capped at $15M per year; cannot be taken with film and digital media production tax credit.	Transferable; 3-year carry-forward.
Maine[2]	**Certified Media Production Credit** Applies to state income tax liability related to the production.	Production company must incur at least $250K in production expenses in Maine during a 12-month period.	Must be used in same year in which tax liability is generated.	
Massachusetts[3]	**Payroll Credit for Motion Picture Production** 25% of payroll that constitutes Massachusetts income.	Production company must incur at least $50K in production expenses in Massachusetts in a 12-month period.	Excludes salaries of any individual earning $1M or more.	Transferable; refundable at 90%; 5-year carry-forward.
	Production Expense Credit for Motion Picture Production 25% of other Massachusetts production expenses.	Production company must be eligible for payroll credit, and at least 50% of total production expenses or filming days must be in state.	Excludes production expenses eligible for payroll credit, but includes salaries of any individual earning $1M or more.	Transferable; refundable at 90%; 5-year carry-forward.

Table 5: Summary of film production tax credits offered by New England states (continued)

State	Credit name and description	Eligibility requirements	Exclusions/limitations	Selected key features
Rhode Island[4]	**Motion Picture Production Company Tax Credit** 25% of certified production costs directly attributable to in-state activity.	Production company must have minimum production budget of $300K, and at least 51% of filming days must occur in Rhode Island.	Total credits capped at $15M per year.	Transferable; 3-year carry-forward.

[1] General Statutes of Connecticut, Title 12, Chapter 208, Section 12-217jj and 12-217ll.

[2] Maine Statutes, Title 5, Part 18-A, Chapter 383, Subchapter 3, Article 5B, Section 13090-L and Title 36, Part 8, Chapter 822, Section 5219-Y and Part 9, Chapter 919-A, Sections 6901-6902.

[3] General Laws of Massachusetts, Part 1, Title IX, Chapter 62, Sections 6 and 6L, and Chapter 63, Sections 32E and 38T. Film tax credit legislation is also summarized in Massachusetts Department of Revenue Technical Information Release 07-15.

[4] State of Rhode Island General Laws, Title 44, Chapter 44-31.2.

Notes:

(a) Except where otherwise noted, information is based on statutes available on state legislature websites as of the week of October 26, 2009. Credits may be subject to other statutory provisions not included in the table.

(b) Connecticut's credits for film and digital media production and digital animation were modified in 2009. As of January 2010, the minimum expenditure for both credits will rise to $100,000, and production companies will have to conduct at least 50% of principal photography days in state. The credit rate will range from 10 to 30%, depending on total production expenses (with larger projects receiving a higher rate). Out-of-state expenses will no longer be counted toward the credit, and credit-eligible compensation for all star talent will be limited to $20 million per production. See Connecticut Public Act 09-03.

(c) Maine also offers a reimbursement of 12% for certified production wages paid to Maine residents, and a reimbursement of 10% for certified production wages paid to other employees, excluding wages in excess of $1M paid to any individual.

(d) Massachusetts also offers a sales tax exemption to production companies.

Table 6: Comparison of evaluations of film tax credits

	Connecticut	Massachusetts	Louisiana	
Study information:				
Author(s)	DECD	DOR	LFO	ERA
Publication year	2008	2009	2005	2009
Model used	REMI	REMI	REMI	IMPLAN
Does the study…				
Assume that all projects receiving a credit are induced by the credit?	Yes	No	Yes	Yes
Assume a state balanced-budget requirement?	Yes	Yes	Yes	No
Make any adjustments for earnings of non-resident workers?	Yes	Yes	Yes	No
Include effects of activities other than production spending?	No	No	No	No
Key findings:				
State revenue per credit dollar	$0.07	$0.16	$0.18	$0.13
Approximate net cost per job	$33,400	$38,200	$14,200	$16,100

	New Mexico		New York	Pennsylvania
Study information:				
Author(s)	Popp & Peach	E&Y	E&Y	DCED
Publication date	2008	2009	2009	2008
Model used	IMPLAN	IMPLAN	IMPLAN	IMPLAN
Does the study…				
Assume that all projects receiving a credit are induced by the credit?	Yes	Yes	Yes	Yes
Assume a state balanced-budget requirement?	No	No	No	No
Make any adjustments for earnings of non-resident workers?	No	No	No	No
Include effects of activities other than production spending?	No	Yes	Yes	No
Key findings:				
State revenue per credit dollar	$0.14	$0.94	$1.13	$0.24
Approximate net cost per job	$13,400	$300	($1,200)	$13,000

Notes:

(a) DECD = Department of Economic and Community Development; DOR = Department of Revenue; LFO = Legislative Fiscal Office; ERA = Economic Research Associates; E&Y = Ernst & Young; DCED = Department of Community and Economic Development.

(b) "Model used" represents the major input-output model used in the analysis; some results were estimated outside the model.

(c) The Massachusetts study examines the combined effect of the state's payroll and production credits.

(d) The New Mexico study by E&Y included the effects of film-related tourism and capital expenditures.

(e) The New York study included the effects of some film projects not receiving credits, but whose presence in New York the authors attributed to the credit, and some post-production activity. The approximate net cost per job presented here differs from the -$945 presented in my earlier memo (Weiner, April 2009). The memo relied on a rounded state revenue per credit dollar estimate of $1.10, while this calculation uses the more exact figure, $1.13.

(f) Reported findings are based on revenue and employment effects for a single year, in most cases, calendar year 2007 (Connecticut, Massachusetts, Louisiana [both], New Mexico [E&Y]) or FY 2008 (New Mexico [Popp & Peach] and Pennsylvania). The New York study estimated impacts for a hypothetical scenario in which the a 30 percent credit rate (enacted in 2008) was applied to actual production spending in 2007.

(g) The Connecticut, Massachusetts, and Pennsylvania studies explicitly state that that employment effects are based on full-time equivalents (FTEs). The Louisiana study by ERA notes that employment impacts are "annual average jobs." The other studies do not make clear whether their reported employment impacts represent FTEs or total number of full-time and part-time jobs.

Endnotes

[1] See Daniel J. Wilson, "Beggar Thy Neighbor? The In-State, Out-of-State, and Aggregate Effects of R&D Tax Credits," Working Paper 2005-08, Federal Reserve Bank of San Francisco, August 2007; Robert S. Chirinko and Daniel J. Wilson, "State Investment Tax Incentives: A Zero-Sum Game?" Working Paper 2006-47, Federal Reserve Bank of San Francisco, December 2006; and Daniel J. Wilson and Charles Notzon, "Tax Credits for Job Creation and Retention: What Can We Learn from the States?" Economic Letter 2009-08, Federal Reserve Bank of San Francisco, February 2009.

[2] P.J. Huffstutter and Richard Verrier, "Filmmaking Incentives Losing Glamour in Cash-Strapped States," *Los Angeles Times,* September 22, 2009.

[3] One exception is refundable tax credits, which do involve a cash outlay by state governments. A later section examines these types of credits in more detail.

[4] Because some tax expenditures may overlap or intersect, these totals may overstate the combined impact of all corporate tax expenditures to some degree. The combined estimate for film-related tax credits includes the state's three separate tax credits for film and digital media production, digital animation production, and motion picture infrastructure. See Connecticut General Assembly, Office of Fiscal Analysis, "Connecticut Tax Expenditure Report," January 2008.

[5] Connecticut Office of Policy and Management, Budget and Financial Management Division, *FY2008–FY2009 Governor's Budget,* Part I: Budget-in-Brief, 2007.

[6] Benjamin Forman, "Going for Growth: Promoting Business Investment in Massachusetts Gateway Cities," Boston: Massachusetts Institute for a New Commonwealth, 2008.

[7] William H. Oakland and William A. Testa, "State-Local Business Taxation and the Benefits Principle," *Economic Perspectives*, Federal Reserve Bank of Chicago, 1996.

[8] For more on the equity of business taxes, see Robert Tannenwald, "Massachusetts Business Taxes: Unfair? Inadequate? Uncompetitive?" Boston Series No. 04-4, Federal Reserve Bank of Boston, 2004.

[9] As customers, workers, and owners respond to these changes, the tax burden continues to shift, further complicating the task of evaluating the impact of business taxes.

[10] Jason Furman, "The Concept of Neutrality in Tax Policy," testimony before the U.S. Senate Finance Committee, hearing on Tax: Fundamentals in Advance of Reform, April 15, 2008.

[11] In the parlance of economics, R&D may be considered a positive externality. Katz and Rosen define an externality as a "direct effect of the actions of one person or firm on the welfare of another person or firms, in a way that is not transmitted by market prices." See Michael L. Katz and Harvey S. Rosen, *Microeconomics*, third ed., chapter 18, Boston: McGraw-Hill/Irwin, 1998.

[12] However, that may not always be the case. If firms are using R&D credits to maximize profits for shareholders, for example, this could lead to excess overall levels of R&D.

[13] The plaintiffs made similar arguments in *Cuno v. DaimlerChrysler*, which challenged the constitutionality of an Ohio tax incentive. Though the case reached the Supreme Court, the question of constitutionality was not resolved, as the Court found that the plaintiffs did not have standing to bring suit. See also Peter D. Enrich. "Saving the States from Themselves: Commerce Clause Constraints on State Tax Incentives for Business," *Harvard Law Review*, December 1996, pp. 377–468.

[14] Fisher (1997) reviewed the literature on the connection between public services and economic development. Acknowledging the conceptual and measurement challenges inherent in these types of analyses, he concluded that at least "*some* public services clearly have a positive effect on *some* measures of

economic development in *some* cases." See Ronald C. Fisher, "The Effects of State and Local Public Services on Economic Development," *New England Economic Review*, Federal Reserve Bank of Boston, March/April 1997, pp. 53–67.

[15] The decision to focus on these four types of tax incentives was made to keep this project manageable. While these credits represent some of the major incentives offered in the region, they are far from the only ones.

[16] Policymakers may target business tax incentives geographically as well—often to areas that are economically distressed. For example, New Hampshire created the Coos County job creation tax credit in 2008, available only to firms in the state's northernmost county. "Enterprise zone" incentives in many states (sometimes under different names) are another example. I have chosen to focus on credits that are available statewide.

[17] Budget legislation enacted in 2009 altered the structure of Connecticut's film tax credit. In 2010, the minimum expenditure will rise to $100,000, and film companies will also have to conduct at least 50 percent of principal photography days in state. See notes to Table 5 for a full description of the changes.

[18] States as well as municipalities may also offer firm-specific discretionary tax incentives. A classic example occurs when a state or city offers a generous tax incentive package to a large employer, such as an auto assembly plant, for locating—or in some cases remaining—in a particular area. These one-time deals can be the subject of intense interjurisdictional competition, sometimes referred to as "smokestack chasing."

[19] Congressional Budget Office, "Federal Support for Research and Development," Washington, DC, June 2007. Defining the base amount can be tricky, and may lead to unintended results if the firm had anomalous spending during the base period. A firm may also simply shift its spending from year to year (such as from the base period to the year in which the firm claims the credit) to maximize its credit without increasing its overall expenditures.

[20] The Massachusetts, New Hampshire, and Rhode Island credits define the base period much as the federal credit does. The sixth New England state, Vermont, recently enacted an R&D credit calculated as a percentage of the federal credit.

[21] Generally speaking, the size of the refund would equal 90 percent of the difference between the amount of the credit and the firm's pre-credit tax liability. In this example, the production company is assumed to start with zero tax liability—hence the refund equals 90 percent of the full credit amount.

[22] In Connecticut, for example, companies make take the film tax credit against the state tax on business corporations or on insurance premiums. However, most film production companies are limited liability corporations, which are not subject to either tax, but rather to a $250-per-year tax on business entities. See Shelley Geballe, "Fiddling while Rome Burns: Connecticut's Multi-Million-Dollar, Money-Losing Subsidy to the Entertainment Industry," New Haven: Connecticut Voices for Children, June 2009.

[23] This risk is exemplified by an Ohio study that found evidence that firms overstate the number of jobs they will create to win incentives. The authors found that economic development incentives offered in that state had a positive effect on announced job growth but no effect on actual job growth. See Todd M. Gabe and David S. Kraybill, "The Effect of State Economic Development Incentives on Employment Growth of Establishments, *Journal of Regional Science* 42(4):703–730.

[24] The size of the tax credit a firm receives is often tied to the total amount of the targeted activity rather than the induced amount. If the credit rate were 5 percent in this example, the firm's total credit would be $60,000 ($1.2 million x 0.05), rather than the $10,000 ($200,000 x 0.05) based on the induced investment alone. The difference ($50,000) is considered a windfall for the firm. A windfall may also occur if the state could achieve the same outcome—$200,000 in induced investment—with a lower credit rate.

[25] Consider a firm claiming a $100,000 credit against its state business tax liability. If the firm faces a marginal federal corporate tax rate of 35 percent, its federal tax liability will be $35,000 higher than it would have been absent the state credit. Thus the total combined tax savings for the firm is only $65,000, not the full $100,000.

[26] Some models refer to these types of spillovers as "induced" effects.

[27] Usually, the smaller the jurisdiction, the larger the leakages will be.

[28] Given widespread excess capacity across the nation, these types of cost increases are unlikely at the present time.

[29] Analysts interested in employment effects should ideally consider other issues besides the number of new jobs when assessing the effectiveness of a business tax credit or other economic development initiative. For example, are the new jobs full-time or part-time? Do they provide adequate pay and benefits? Do they go to state residents or non-resident commuters? Some have even argued that analysts should measure changes in the level and distribution of economic welfare rather than jobs. See Paul N. Courant, "How Would You Know a Good Economic Development Policy if You Tripped over One? Hint: Don't Just Count Jobs," *National Tax Journal*, 1994, pp. 863–881.

[30] Another aggregate measure that is sometimes used is economic output. Whereas GDP counts only the final value of a good or service, economic output includes the value of a good at each stage of production, which can lead to "double counting." For example, this approach would capture the value of a computer processor twice—first when it is sold from a processor manufacturer to a computer manufacturer, and again when the computer is sold to the end customer. Because of this, economic output tends to overstate increases in economic activity.

[31] Analysts can also enter into the model changes in public spending required to balance the budget.

[32] For example, in one well-known study, Greenstone and Moretti (2003) compared total employment growth and other outcomes in counties that attracted large plants through discretionary incentive packages with counties that competed for those same plants but lost. See Michael Greenstone and Enrico Moretti, "Bidding for Industrial Plants: Does Winning a 'Million-Dollar Plant' Increase Welfare?" Working Paper 9844, Cambridge, MA: National Bureau of Economic Research.

[33] Edmiston (2004) showed the potential magnitude of these indirect effects. His analysis linked new jobs at new plants to the net change in county-level employment. He found that for every 100 jobs created directly by a new plant, the county gained only 28.5 jobs on net over five years. This implies that negative spillover effects dominated. See Kelly D. Edmiston, "The Net Effects of Large Plant Locations and Expansions on County Employment," *Journal of Regional Science* 44(2):289–319.

[34] When measuring the fiscal impact of a state tax credit, most analysts consider only the effect on state revenues, and do not try to measure changes in public spending or local fiscal impacts. The failure to estimate the impact on public spending is an apparent shortcoming of almost all the studies measuring fiscal impact reviewed here. Only the studies by the Connecticut CCEA and DECD explicitly capture both revenue and spending changes. Analysts may choose to exclude local impacts because state government bears the original cost of the tax credit.

[35] 24 CFR 570.209, Subpart B. Many studies of state tax credits do not specify whether the employment impacts they report represent FTEs or both full-time and part-time jobs. To the extent that studies measure different things, estimates of employment effects and costs per job may not be comparable across studies. I have tried to specify cases where analysts were clearly measuring FTEs.

[36] Timothy J. Bartik, *Who Benefits from State and Local Economic Development Policies?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 1991.

[37] Michael Wasylenko, "Taxation and Economic Development: The State of the Economic Literature," *New England Economic Review*, Federal Reserve Bank of Boston, March/April 1997, pp. 37–52.

[38] One might expect the effects of tax changes in New England—or at least parts of New England—to fall somewhere between inter-metropolitan and intra-metropolitan, as much of the region's economic activity

occurs within a super-metropolitan area fanning out from Boston into multiple states, including southern Maine and New Hampshire, Rhode Island, and northern Connecticut.

[39] Timothy J. Bartik, "Discussion: The Effects of State and Local Public Services on Economic Development," *New England Economic Review*, Federal Reserve Bank of Boston, 1997, pp. 67–71.

[40] Timothy J. Bartik, "Solving the Problems of Economic Development Incentives," *Growth and Change*, 36(2) (2005):139–166.

[41] Robert G. Lynch, *Rethinking Growth Strategies: How State and Local Taxes and Services Affect Economic Development*, Washington, DC: Economic Policy Institute, 2004. For a recent review that takes a more positive view of the effectiveness of business tax credits, see Joshua Barro, "2009 State Business Tax Climate Index," Washington, DC: The Tax Foundation, October 2008.

[42] For a discussion and examples of studies showing conflicting results, see Therese J. McGuire, "Do Taxes Matter? Yes, No, Maybe So," *State Tax Notes*, June 2003, pp. 885–890.

[43] W. Robert Reed, "The Robust Relationship between Taxes and U.S. State Income Growth," *National Tax Journal* 61(1) (March 2008):57–80.

[44] Reed's analysis did not control for public expenditures.

[45] Chirinko and Wilson 2006.

[46] The capital demand model is based on the economic principle that a profit-maximizing firm will continue to add units of an input (such as capital or labor) until the revenue it earns on the resulting output exactly equals the cost of the last unit of the input—that is, until the marginal revenue associated with the last unit of input equals its marginal cost. The authors essentially arrived at their demand model by differentiating a production function with respect to capital, and setting this equal to the user cost of capital.

[47] This is a two-step process, because their model does not directly relate state investment tax credit rates to capital investment. The authors had to first calculate how a change in the credit rate would affect the user cost, and then calculate how that change in user cost would affect capital investment—the latter based on their regression results.

[48] Chirinko and Wilson computed their capital stock variable based on investment data from the Annual Survey of Manufacturers, so it does not necessarily represent a state's entire capital stock.

[49] Chirinko and Wilson support their findings with two additional models: the spatial discontinuity and "twin counties" models. Both exploit the idea that differences in non-tax factors diminish with the distance to state borders, meaning that tax credits are likely to play a more influential role in the decisions of firms near state borders. Hoyt et al. (2008) supports that idea, finding that Kentucky's incentives had the strongest impact on county-level employment in counties sharing a border with another state. See William H. Hoyt, Christopher Jepsen, and Kenneth R. Troske, "Business Incentives and Employment: What Incentives Work and Where?" Presented at The Economics of Geography: Cities, Growth, and Economic Development, Federal Reserve Bank of Cleveland, April 3–4.

[50] I discuss an evaluation of the Vermont VEGI program, which targets both investment and job creation, in a later section.

[51] William F. Lott and Stan McMillen, "The Economic Impact of Connecticut's Corporate Tax Policy Changes: 1995–2012," Storrs: Connecticut Center for Economic Analysis, University of Connecticut, December 2005.

[52] Based on my understanding, the CCEA methodology implies that only 1 percent of any investment qualifying for the state's fixed capital credit of 5 percent was actually induced by the credit (0.20 x 0.05). While that is not impossible, it may be overly conservative.

[53] The authors explain the relative success of the corporate tax cut in stimulating employment as follows: "[With the corporate tax cut] firms' spending was unrestricted, and we assume firms put their tax savings to their most productive uses. A lower corporate income tax is a competitive issue among the states, and greater business expansion in Connecticut may have resulted from this policy relative to the variety of credits and exemptions policies that primarily benefited firms already in place." See Lott and McMillen 2005.

[54] Ideally, one would want to consider the net cost per net job created after taking into account changes in public-sector employment. However, because the net effect on jobs is negative for these two credits, this type of calculation would not make sense.

[55] Ernst & Young, "The Economic and Fiscal Effects of the Massachusetts Investment Tax Credit," Boston: AIM Foundation, April 2003.

[56] The user-cost approach attempts to capture changes in investment that result from a decline in the cost of investing owing to the credit. Hence the authors do not make any explicit assumption about what level of investment would occur without the credit.

[57] Put another way, the "return on investment" for this credit would be –46 percent, or ($0.54 – $1.00)/$1.00.

[58] Except where otherwise noted, estimates of net cost per job do not consider any changes in state spending resulting from new economic activity, only changes in state revenues. Specifically, I calculated net cost by subtracting new state revenues generated by the credit from the total amount of credits claimed, and dividing by the number of jobs created.

[59] Office of Tax Policy Analysis, "The Effectiveness of the ITC: An Evaluation of New York's Investment Tax Credit," Albany: New York State Department of Taxation and Finance, February 1996.

[60] See, for example, Michael I. Luger, "2001 Assessment of the William S. Lee Tax Act," Chapel Hill, NC: Office of Economic Development, July 2001; and Michael I. Luger, "2003 Assessment of the William S. Lee Act," Chapel Hill, NC: Office of Economic Development, July 2003. In the 2001 assessment, the author used the REMI and IMPLAN models to estimate the combined impact of all Lee Act tax credits, including both direct and indirect effects.

[61] Michael I. Luger and Suho Bae, "The Effectiveness of State Business Tax Incentive Programs: The Case of North Carolina," *Economic Development Quarterly* 19 (4) (November 2005):327–345. This paper also estimated induced activity for the other tax credits under the Lee Act.

[62] Because the M&E credit is tiered based on county characteristics, one might expect to see larger effects at the county level than at the state level. For example, a Tier 1 county might attract activity that would otherwise have occurred in another North Carolina county. Analysts would capture this when measuring the credit's impact in that Tier 1 county, but not when measuring the credit's overall impact in the state.

[63] Wilson 2007. As in his study with Chirinko on investment tax credits, Wilson did account for the federal deductibility of state taxes when calculating user cost.

[64] Wilson did not translate this effect to show the impact of specific changes in the effective tax credit rate on R&D spending.

[65] Yonghong Wu, "The Effects of State R&D Tax Credits in Stimulating Private R&D Expenditure: A Cross-State Empirical Analysis," *Journal of Policy Analysis and Management* 24(4) (2005):785–802. Unlike Wilson's analysis, Wu's analyses do not rely on a user-cost approach. Instead, his methodology exploits variation in when states introduced R&D tax credits, and variation across credit rates.

[66] According to Wu, the number of high-tech establishments may reflect actual R&D activity better than expenditures, because firms may reclassify other types of expenditures as R&D spending to maximize their

tax credit. See Yonghong Wu, "State R&D Tax Credits and High-technology Establishments," *Economic Development Quarterly* 22(2) (2008):136–48.

[67] Angela Gullickson and Amy Rehder Harris, "Iowa's Research Activities Tax Credit: Tax Credits Program Evaluation Study," Des Moines: Iowa Department of Revenue, January 2008.

[68] Lott and McMillen 2005.

[69] The implied net cost per net job is calculated by multiplying the net cost per private-sector job by the number of private-sector jobs gained, and dividing by the difference between private-sector jobs gained and public-sector jobs lost: [$81,876 x 249]/[249–227] ≈ $900,000.

[70] Ernst & Young, "The Economic and Fiscal Effects of the Massachusetts Research Credit," Boston: AIM Foundation, August 2003.

[71] The authors conducted the study before the state enacted an R&D credit. Ross Gittell and Edinaldo Tebaldi, "Are Research and Development Tax Credits Effective? The Economic Impacts of an R&D Tax Credit in New Hampshire," *Public Finance and Management* 8(1) (2008):70–101.

[72] This assumption represents an average of elasticity estimates reported by Daniel Wilson in his multi-state econometric study of R&D tax credits. In that study, Wilson estimated an average *user-cost* elasticity of -1.8, implying that a 1 percent decrease in *user cost* would yield a 1.8 percent increase in R&D investment. Gittell and Tebaldi applied Wilson's elasticity directly to the total credit amount.

[73] The estimated fiscal impact is based on new business taxes the state would collect for each new job. That estimate does not account for other revenues that expanded economic activity might generate, or any changes in state spending. The authors, who rounded differently, reported a net cost per job of about $14,000.

[74] Lolita Paff, "State-Level R&D Tax Credits: A Firm-Level Analysis," *Topics in Economic Analysis and Policy* 5(1) (2005):1–25.

[75] Missouri Office of the State Auditor, "Review of State Tax Credits Administered by the Department of Economic Development," Report No. 2002-33, Jefferson City, April 2002.

[76] Unlike the M&E tax credit, North Carolina's R&D credit is the same across all tiers.

[77] Vermont Economic Progress Council and Vermont Department of Taxes, "Vermont Employment Growth Incentive Program 2008 Annual Report," Montpelier, 2008. To qualify for VEGI, new jobs must be full-time.

[78] Because companies applying to the VEGI program must pass a "but-for" test, one might assume that all jobs created by credit recipients are credit-induced. However, in practice this may not always be the case. An audit of the program by the Vermont state auditor identified some issues with the Vermont Economic Progress Council's application of the "but-for" test and calculation of incentive payments. The audit suggests that the program may be subsidizing normal employment growth to some extent. If true, the new jobs created and the associated state revenues may be somewhat overstated. See Vermont State Auditor, "Vermont Employment Growth Incentive Compliance Audit Pursuant to 32 V.S.A. Section 163(12)(B)," Montpelier, June 2008.

[79] Dagney Faulk, "Do State Economic Development Incentives Create Jobs? An Analysis of State Employment Tax Credits, *National Tax Journal* 55(2) (2002):263–280.

[80] Like credits created under North Carolina's Lee Act, the Georgia job tax credit program divides counties into tiers, with more generous tax breaks going to firms in more disadvantaged counties. Faulk controls for the tier where a firm is located, to ensure that the model is not simply picking up the impact of county location on hiring.

[81] The amount and duration of MEGA credits is determined by program officials and tied to a variety of factors, including the number of jobs a firm creates or retains, and its level of capital investment. See Michael

D. LaFaive and Michael Hicks, "MEGA: A Retrospective Assessment," Midland, MI: Mackinac Center for Public Policy, 2005.

[82] The BEIP is actually a grant program for businesses that create and maintain jobs in the Garden State. However, it functions like a tax credit, in that awards are calculated as a percentage of annual income tax payments made on jobs created and maintained by recipient firms. See Joseph J. Seneca, James W. Hughes, and Will Irving, "The Characteristics and Economic Benefits of the Business Employment Incentive Program," prepared for the New Jersey Economic Development Authority, New Brunswick: Edward J. Bloustein School of Planning and Public Policy, Rutgers University, 2005.

[83] As with other measures of the cost-effectiveness of Lee Act credits, this per-job cost estimate does not include any offsetting government revenues from expanded economic activity, or any indirect effects on employment.

[84] Stanley McMillen, Kathryn Parr, and Troy Helming, "The Economic and Fiscal Impacts of Connecticut's Film Tax Credit," Hartford: Department of Economic and Community Development, February 2008.

[85] For a more detailed discussion of the DECD's analysis, see Jennifer Weiner, "Memorandum re: Cost-Benefit Analysis of Connecticut's Film Tax Credit, Boston: New England Public Policy Center, Federal Reserve Bank of Boston, January 19, 2009.

[86] The DECD authors did not exclude expenditures incurred out of state for goods and services used in Connecticut. By law, some of these expenditures are eligible for the Connecticut film tax credit. However, like salaries paid to non-residents, this out-of-state spending is unlikely to generate significant benefits for the state economy. A recent report by Connecticut Voices for Children found that only 11 percent of claimed expenditures actually occurred in the state. See Geballe 2009.

[87] Massachusetts Department of Revenue, "A Report on the Massachusetts Film Industry Tax Incentives," Boston, March 2008.

[88] See Massachusetts Department of Revenue, "Letter to Representative Steven D'Amico," Boston, May 19, 2008.

[89] Massachusetts Department of Revenue, "A Report on the Massachusetts Film Industry Tax Incentives," Boston, July 2009.

[90] This assumption may be conservative because most living expenses for non-resident cast and crew are covered separately in the film production budget.

[91] Using a slightly different set of assumptions, the DOR's May 2008 analysis estimated that each dollar of credit would lead to $0.18 in new state revenues, and that each *net* dollar of credit would yield $4.26 in new state GDP and $3.52 in new income. The estimated net cost per FTE job ranged from $22,443 to $34,380.

[92] The legislature did not adopt a credit by the end of its session in June because of a lack of funding.

[93] See Robert Whelan and Alec Josephson, "An Economic Impact and Rate of Return Analysis of the Film and Video Industry in Maine," Portland, OR: ECONorthwest, June 2008.

[94] Rhode Island Department of Revenue, "A Macro Analysis of the Return on Investment of the Rhode Island Motion Picture Production Tax Credits," Providence, 2008.

[95] Greg Albrecht, "Film and Video Tax Incentives: Estimated Economic and Fiscal Impacts," Baton Rouge: Louisiana Legislative Fiscal Office, March 2005; Economic Research Associates, "Louisiana Motion Picture, Sound Recording and Digital Media Industries," Baton Rouge: Louisiana Economic Development, February 2009.

[96] Anthony V. Popp and James Peach, "The Film Industry in New Mexico and the Provision of Tax Incentives," submitted to the Finance Committee of the New Mexico Legislature, Las Cruces: Arrowhead Center, New Mexico State University, August 2008; Ernst & Young, "Economic and Fiscal Impacts of the New Mexico Film Production Tax Credit," Santa Fe: New Mexico State Film Office and State Investment Council, January 2009.

[97] Ernst & Young, "Estimated Impacts of the New York State Film Credit," Albany: New York State Governor's Office for Motion Picture and Television Development and the Motion Picture Association of America, February 2009.

[98] Pennsylvania Department of Economic and Community Development, "Report to the General Assembly on the Film Production Tax Credit Program," Harrisburg, June 2008. Table 6 does not include information from a second analysis of the Pennsylvania film tax credit by Economic Research Associates, because that study did not separate the effects on state and local revenue. See Economic Research Associates, "Pennsylvania's Film Production Tax Credit and Industry Analysis," Harrisburg: Budget and Finance Committee, Pennsylvania General Assembly, May 2009.

[99] The Connecticut DECD authors also made this assumption.

[100] The Connecticut and Massachusetts studies explicitly state that reported employment effects represent FTEs. This is not always clear for studies from other states. To the extent that other studies are reporting total jobs (full-time plus part-time jobs, with each given equal weight), their cost-per-job estimates would be lower. This could be another reason for cross-study variation.

[101] For a more detailed discussion of the E&Y analyses and how they differ from other studies, see Jennifer Weiner, "Memorandum re: Ernst & Young Analyses of New Mexico and New York Film Tax Credits," Boston: New England Public Policy Center, Federal Reserve Bank of Boston, April 2, 2009.

[102] See Weiner, April 2009; and Norton Francis, "Memorandum re: Ernst & Young Film Study," Santa Fe: Finance Committee, New Mexico Legislature, February 27, 2009.

[103] Sustaining the credits may be unnecessary if a state develops a film industry cluster. In that case, film-related infrastructure such as sound stages and a specialized labor force could attract production companies to the state, even it does not offer generous tax incentives. However, some researchers have questioned whether that scenario would occur in many states. See Susan Christopherson and Ned Rightor, "The Creative Economy as 'Big Business': Evaluating State Strategies to Lure Filmmakers," Communities and Regions Working Paper Series, Ithaca, NY: Cornell University, October 2008.

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