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The Rise and Spread of State R&D Tax Credits

Tax credits for spending on research and development (R&D) were first enacted into federal law in the U.S. in 1981. In the ensuing quarter century, many states have adopted such tax credits, often using the federal tax credit as a model.

This *Economic Letter* reports on recent research (Wilson 2005a) that quantifies the development of state tax credits for R&D, a challenging task because historical information is not readily available in a single data source and because of the variations in each state's law regarding deductibility and other specifics. Wilson finds that state tax credits are almost as important, in terms of the cost of conducting R&D, as federal tax credits. In addition, he finds that cross-state differences in the R&D cost are overwhelmingly due to differences in the effective value (to firms) of the state R&D tax credits. The results of these cost measurements also reveal a striking twin pattern of a rise in the average generosity of state R&D tax credits and a rapid spread of their availability across states.

This article begins with a description of the general structure of state R&D tax credits, and then explains how their true value can be measured, and how the average value as well as the availability of R&D tax credits have evolved over time. It concludes with a discussion of the implications of this evolution in terms of tax competition among states.

How the federal R&D tax credit works

Before discussing the ins and outs of state R&D tax credits, with their myriad variations across states, it is useful first to understand how the federal R&D tax credit works, especially considering that many states model their credits on the federal credit. On their federal corporate income tax returns, corporations are allowed to take a credit against their (precredit) tax liability equal to 20% of their cur-

rent year's "qualified R&D" expenditures in excess of some base amount. (There also is a less commonly claimed credit for contract payments to other institutions for performing basic, rather than applied, research.) "Qualified R&D" consists of the salaries and wages, intermediate/materials expenses, and the rental costs of certain property and equipment incurred in performing research "undertaken to discover information" that is "technological in nature" for a new or improved business purpose (see Internal Revenue Code, Section 41). The federal credit is known as an "incremental" credit because it applies only to the incremental R&D above some base amount. The incremental design of the credit is meant to encourage firms to perform additional R&D, that is, beyond what they otherwise would be expected to perform, while limiting the cost to the government. The definition of the base amount has varied over time; currently it is defined for a given year as a "fixed-base" percentage of the average sales over the preceding four years. For most firms, this percentage is defined as the average ratio of R&D to sales over the five-year period 1984-1988 (there is a different formula for firms started up more recently).

How state R&D tax credits work

State R&D tax credits generally work in a similar fashion. Companies first figure out the taxable income they owe to each of the states. Companies pay corporate income or franchise taxes to states based on an apportionment of their total federal taxable income. The share apportioned to any particular state is based on the income generated by sales transactions occurring in the state (known as the "transactions test"). A transaction is said to have occurred in a particular state if the payment for the transferred good or service was received in that state. For example, a mail-order company in Virginia that ships goods to a buyer in California



but receives or processes payment (via check, credit card, etc.) in Virginia must pay corporate income taxes on that revenue to Virginia.

In some states, companies may take a credit against their state income or franchise tax equal to a percentage of their qualified R&D expenditures over some base amount (the credit typically can be carried forward or backward for a specified number of years). States generally use the federal definition of qualified R&D in their tax codes. The value of these credits varies from state to state depending on the credit rate, how the base amount of R&D is defined, and whether the credit itself is “recaptured” (i.e., taxed at the corporate tax rate).

The most transparent component of the value of a state’s tax credit is the credit rate. These credit rates currently range from a low of 1% to a high of 20%, equivalent to the federal rate. A number of states offer different credit rates for different levels of R&D spending, typically with the rate lower for higher tiers of R&D (in order to provide greater incentive to small businesses and start-ups to perform R&D).

Though the credit rate is the easiest feature of a credit for policymakers to trumpet and for companies to learn about, the definition of the base level often is much more important in determining the true value of a credit. There are basically three different ways in which states define the base level. The first way is to have no base at all. A credit with no base is referred to as a “nonincremental” credit. The second way is to use a moving-average of the firm’s R&D over the past few years (ranging from one to four years). The third way is to use recent sales times the average of the firm’s R&D-to-sales ratio over some fixed, past period; in fact, the 19 states with this type of base all follow the federal tax code in designating this fixed period as 1984–1988 (while also using the federal formula for more recent start-ups).

For a given credit rate, nonincremental credits are obviously the most valuable type of credit from a firm’s perspective, because *every* dollar of qualified R&D, not just the amount over some base, is eligible for the credit. Hawaii and West Virginia have nonincremental credits (Massachusetts and Connecticut have a combination of an incremental and nonincremental credit; Maryland offers a choice between a low-rate nonincremental credit and a high-rate incremental credit). Least valuable from a firm’s perspective are credits with a moving-

average type of base. This type of base can dramatically reduce the true value of a tax credit, since whatever R&D a firm chooses to do this year reduces the amount of creditable R&D in subsequent years. Ten states (including Connecticut and Maryland) have an R&D tax credit with this moving-average type of base.

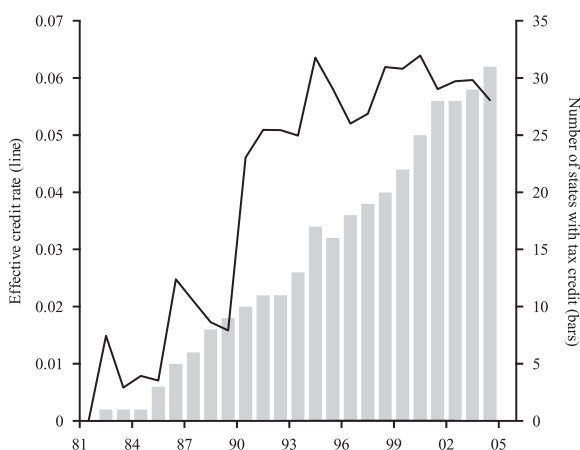
Evolution of state R&D tax credits

Over the past two decades, R&D tax credits offered by U.S. states have become widespread and increasingly valuable to firms, as shown in Figure 1. The process began when Minnesota became the first state to enact an R&D tax credit in 1982, one year after the introduction of the federal R&D tax credit. The number of states offering such a credit has risen steadily since then. Currently, 31 states provide a tax credit on general, company-funded R&D. (A number of other states offer narrowly targeted tax credits for R&D spending in specific fields, in particular geographic zones, or only by small or start-up companies).

Not only have more states introduced R&D tax credits over time, but the average generosity of these credits also has grown. The generosity or value of a tax credit to firms can be measured by calculating the *effective* credit rate for firms in a given state (see Wilson 2005a). The effective credit rate is determined by the statutory credit rate (i.e., the rate specified in the tax code), the base definition, and whether the credit itself is taxable (recaptured). The effective credit rate measures the present discounted value of the credit for the marginal dollar of R&D spent by a representative firm in the state. Wilson (2005a) assumes the representative firm’s current R&D spending is above any base amount. For nonincremental credits and credits with a fixed-period base, the effective credit rate simply equals the statutory credit rate. For credits with a moving-average base, the effective rate is well below the statutory rate and depends on the number of years in the moving-average and the interest rate during those particular years.

The line in Figure 1 shows the average effective credit rate across states for each year from 1981–2004; each year’s average is computed only over the states that had an R&D tax credit in that year. It is clear that not only have R&D tax credits been offered by an increasing number of states over the last 25 years, but also the average generosity of the credits that these states offer has grown greatly. Specifically, the average effective credit rate has grown approximately four-fold over this period.

Figure 1
Rising value and spread of state R&D tax credits



Source: Author's calculations.

A large part of the increase in value has been due to states increasingly switching from the moving-average base definition to the fixed-period base.

Implications for optimal public policy

The growing prevalence and generosity of state R&D tax credits raises the question: Are these trends socially beneficial or do they instead represent wasteful “tax competition”? Whenever different jurisdictions separately choose tax policies that may benefit their own jurisdiction at the expense of others, there is the potential for tax competition. Looking at data on private R&D by state from 1981–2002, Wilson (2005a) does, in fact, find evidence that a reduction in the after-tax cost of R&D for a given state has a detrimental impact on the average R&D spending in other states. Since companies appear to be willing to move R&D activities from one state to another (though at some cost), states do have an incentive to compete via R&D tax credits for that footloose R&D. Of course, this may be socially beneficial if the overall, national level of R&D subsidization is too low, as the competition provides an incentive for states to help make up the shortfall.

On the other hand, if there are substantial dead-weight losses caused by companies moving R&D from state to state, by companies calculating the tax implications of R&D in each of 50 states, or by state tax agencies administering R&D tax credits, then the tax competition may be socially wasteful. In addition, even if tax competition via R&D tax credits is a second-best solution to a suboptimally low level of federal subsidization of R&D, it is not clear that such competition is constitutionally valid. Other types of corporate income tax credits at the state level have recently been successfully challenged on the grounds that, because the credits effectively impose a tax penalty on companies engaging in economic activity in other states, they run afoul of the Commerce Clause of the U.S. Constitution. See Wilson (2005b) for a discussion of the issue of the constitutionality of state R&D tax credits in light of recent court decisions.

Nonetheless, the steady rise and spread of state R&D tax credits over the past 25 years shows no signs of abating in the near future. At what point states will collectively decide (or be forced) to end this trend remains to be seen.

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