Thomas J. Nechyba

Thomas J. Nechyba is professor of economics at Duke University in Durham, North Carolina, where he also serves as director of undergraduate studies for the Department of Economics. In addition, he is a research associate at the National Bureau of Economic Research, and he serves as associate editor for the *American Economic Review* and the *Journal of Public Economic Theory*. His research and teaching focus on the field of public economics, in particular primary and secondary education, federalism and the function of local governments, and public policy issues relating to disadvantaged families.

Professor Nechyba has lectured and taught in courses at the Lincoln Institute for several years, and he recently completed a working paper based on Institute-supported research, "Prospects for Land Rent Taxes in State and Local Tax Reform" (see page 15). This conversation with Joan Youngman, senior fellow and chairman of the Institute's Department of Valuation and Taxation, explores his interest in land taxation and his research findings.

Joan Youngman

How is a land tax different from a conventional property tax?

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It's really a question of tax efficiency. Any tax has two effects, which economists call the income and substitution effects. The income effect of a tax is the change in the choices made by the taxpayer because payment of the tax has reduced the taxpayer's real income. The substitution effect arises because the very existence of the tax changes the relative prices of the taxed goods, and therefore gives an incentive to taxpayers to substitute non-taxed goods for taxed goods. The income effect does not give rise to any efficiency problems; it simply implies that some resources are transferred from taxpayers to the government, and we hope the government will do something useful with the money. But, the change in behavior from the substitution effect causes an economic distortion that does not benefit anyone. That is, when the higher price of a taxed good causes me to substitute to a different non-taxed good purely because of the distorted prices, then I am worse off and the government gets no revenue. This is the source of the loss of economic efficiency from taxation, because people are worse off than they were previously, and by a larger amount than the tax collections themselves. This phenomenon is sometimes called a deadweight loss.

Once I asked my students to react to the following statement on an exam: "People hate taxes because of income effects, but economists hate taxes because of substitution effects." One student wrote that it was undeniably true because it showed that economists aren't people! Well, I think at least some economists are also people. However, it is true that people dislike taxes primarily because they don't like paying money to the government. Economists especially dislike those taxes that cause greater deadweight losses, i.e., taxes that have greater substitution effects.

A land tax is a very unusual tax. It does not carry this deadweight loss because it does not give rise to a substitution effect. No one can make a decision to produce more land or less land, and the fact that land is taxed will not distort economic decisions. If we think of the price of land as the discounted present value of future land rents, a tax that reduces expected future rents will cause the price of land to drop. But the total cost of the land, which is the purchase price plus the tax, remains unchanged. Those who are considering the purchase of land therefore face the same cost before and after the tax: before the tax, they sim-ply pay a single price up front; after the tax, they pay a lower price up front but they know they will also have to pay all the future taxes. There is no substitution effect, only an income effect for those who currently own land, because now they can sell it for less than before.

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Property taxes that tax both land and buildings, on the other hand, do give rise to substitution effects because they distort the cost of making improvements to the property.

A revenue-neutral shift to land value taxation would reduce other, distortionary taxes. A shift to a more efficient tax can improve economic welfare without a loss in tax collections. This much is well known. What is not well known is the magnitude of this benefit and of the cost to landowners in terms of lower land prices. Conventional wisdom predicts that a shift to an efficient land tax would increase income and output but reduce land prices. This kind of general statement isn't much help to policy makers. If one is suggesting major changes in a tax system, policy makers need to know whether the benefits and the costs are going to be large or small. My recent Lincoln Institute working paper, "Prospects for Land Rent Taxes in State and Local Tax Reform," constructs a model of state economies in the U.S. to help us think about the effects of such changes.

JY: How did you become interested in developing an economic model for land taxation?

TN: A few years ago, Dick Netzer, professor of economics and public administra-

tion at New York University, suggested that I look at the implications for the U.S. economy of replacing capital taxes with land value taxes. Most economists know of the Henry George Theorem and recognize that land taxation is efficient, but they associate his ideas with nineteenth-century economic thought. We assume that all the changes in the economy since then, and changes in the economic role of land, have left these ideas inapplicable to contemporary tax systems. So I was quite surprised that my model indicated that substituting a land value tax for capital taxes on a national level would not only be efficient, as expected, but would actually raise the value of many types of land. However, property taxes are state and local taxes, and the U.S. constitution places special impediments to a national property tax, so a land tax would not be possible on a national level. Further, since each state economy is different, the results of substituting land value taxes for other taxes will also vary from state to state.

JY: *How can a tax on land increase land prices?*

TN: In and of itself, a tax on land does not increase land prices; it actually reduces land prices, because it reduces the discounted present value of land rents. My research does not consider a land value tax in isolation, but as part of a revenue-neutral tax reform that replaces other, distortionary taxes with a land value tax. Lower taxes on capital will increase capital usage, and more intensive use of capital will raise land prices. For example, if constructing a building becomes more profitable because the tax on the building is lowered or eliminated, an investor may be willing to pay a higher price for its components, including the land.

JY: *How did you go about estimating the magnitude of these effects?*

TN: I developed a general equilibrium model of an economy that uses land, man-made capital and labor in production. A general equilibrium model is one that examines how changes in one kind of market affect all other markets. This model is then applied to different states, as well as

to one hypothetical "average" state, to see how various tax reforms that substitute land value taxes for taxes on capital or labor would affect prices and production. The division of capital into land and man-made capital is a departure from standard analysis, which generally looks at capital as a single category.

One critical element is the elasticity of substitution among these factors; that is, the ease with which one can be substituted for another. Technically, it is the percentage change in one factor that results from a 1 percent change in the other. This is the key to efficiency gains from reducing the tax on man-made capital and on labor and increasing the tax on land. A lower tax on man-made capital will increase the use of that capital, which in turn will produce greater output and more hiring of labor. The easier it is to substitute man-made capital and labor for land, the greater the benefit from a switch to land value taxation.

JY: *Where do the elasticity numbers come from?*

TN: I use a range of estimates drawn from the economic literature. For example,

most studies of the substitution between capital and land give elasticity estimates between 0.36 and 1.13. My paper uses the relatively conservative estimates of 0.75, 0.5 and 0.25 as high, medium and low values, and looks at the result under each assumption. This number is then adjusted to reflect the amount of land in the state devoted to farming, on the assumption that farmland is less easily substituted for capital in the production process. I also ask similar questions with regard to substitution between land and labor.

The elasticities of the actual supplies of man-made capital and labor are also crucial. If taxes on them are reduced, how much extra capital and labor will be available as a result of the increased after-tax return? Often in studies of this sort we make what is called a "small open economy assumption." We assume that the economy we are looking at is small in relation to the rest of the world, and that capital and labor flow freely into and out of the jurisdiction. In that case, the elasticity of supply is infinite. The opposite extreme would be an economy with the equivalent of closed borders, where no capital could enter or leave. In that case the elasticity of supply

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TABLE 1 Estimated Changes in Income and Land Prices for an Average State When Current State Taxes Are Replaced by Land Taxes

Change in State Income			
State Tax Replaced by Land Tax	**Responsiveness of Economic Variables[1]**		
	Low[2]	**Medium[3]**	**High[4]**
Sales Tax	0.51%	6.06%	7.85%
Personal Income Tax	0.30%	3.52%	4.51%
Corporate Income Tax	0.33%	1.13%	1.71%
Property Tax	1.61%	5.43%	8.65%
Change in Average Land Price			
State Tax Replaced by Land Tax	**Responsiveness of Economic Variables[1]**		
	Low[2]	**Medium[3]**	**High[4]**
Sales Tax	-246.47%	-78.40%	-66.99%
Personal Income Tax	-141.82%	-42.65%	-35.27%
Corporate Income Tax	-2594%	-2.27%	1.22%
Property Tax	-140.66%	-20.32%	-6.94%

1 "Responsiveness to Economic Variables" refers to different assumptions regarding the ease with which capital, land and labor can be substituted for one another (i.e., elasticities of substitution) and the degree to which the supply of capital and labor responds to changes in interest rates and wages (elasticities of supply).

2 Low elasticity assumptions essentially assume little to no response of behavior to tax changes. These are reported here simply for comparison and are generally viewed as highly unrealistic.

3 Medium elasticity assumptions correspond to reasonable estimates of short-run responsiveness of economic behavior.

4 High elasticity assumptions correspond to reasonable estimates of long-run responsiveness of economic behavior.

would be zero. In looking at U.S. states, the small open economy assumption is not completely accurate, and zero elasticity is not accurate either. The right number is somewhere in between. Neither capital nor labor is as mobile internationally as within the U.S., and labor in particular is less mobile across state boundaries than within a state or a small region. The small open economy assumption may be appropriate in some circumstances for smaller states, but we have to introduce more complex assumptions in other cases.

JY: How does your model compute taxes on land and labor and man-made capital? This isn't a standard classification of taxes.

TN: This is complicated, because it involves payroll taxes, federal and state corporate taxes, federal and state income taxes, property taxes, sales taxes, and so on. So the model looks at all these taxes and makes assumptions about who is paying them to estimate an overall tax rate on labor from all sources—federal, state and local. Similarly, the model estimates an overall tax rate on land and on man-made capital. This allows us to move from an illustrative example in which taxes on labor and capital are replaced by land value taxes to considering changes in real-world taxes, which of course are never based solely on labor or capital.

JY: How do you represent the shift in taxes from labor and man-made capital to land?

TN: This is a hypothetical policy experiment in the model. Suppose, for example, you wanted to eliminate all sales taxes in a revenue-neutral way, making up the lost collections through a land value tax. Sales taxes are the average state's largest revenue source, so this shift would be quite ambitious. The model shows what would happen under various elasticities of substitution and elasticities of supply, as described above. The tables in the paper show what land tax would be necessary to maintain revenue, and the changes in capital investment and land prices that would result.

JY: How do you move from the hypothetical average state to the 50 individual states?

TN: You have to begin by asking what factors might cause states to have different experiences with land value taxation. We consider each state's taxes, because the benefits of shifting to a more efficient system will vary according to how much current taxes distort economic choices. Some states have no income taxes. Some states tax property heavily, while others tax sales heavily. The other critical component concerns the state's sources of income —how they are divided among land, labor and man-made capital. The Bureau of Economic Analysis reports income from various sources by state, but does not account separately for income from land. For that information we draw on the Census of Agriculture data on the amount and market value of farmland to estimate an income figure.

JY: What kinds of results did you obtain?

TN: Since taxation of land is always economically efficient, and since taxation of other factors is always economically inefficient, a shift to land taxes always increases capital, income and labor use. For the "typical" state it seems that most of the simulated tax reforms are feasible, particularly those that reduce taxes on capital. A 20 percent cut in the sales tax, for instance, requires a nearly 24 percent increase in the tax on land, while a similar cut in property taxes requires virtually no change (0.2 percent) in the tax on land. Even a complete elimination of the state and local property tax calls for only a 23 percent increase in the tax on land, while an elimination of the sales tax would require a whopping 131 percent increase. Landowners would be deeply and adversely impacted by reforms that cut the sales tax (losing up to two-thirds of their wealth under a complete elimination of the sales tax), while they would barely feel the impact of most reforms focused on the property tax. They would experience at most a 7 percent decline in their wealth under

the complete elimination of the property tax, and an actual increase in their wealth for less dramatic property tax reforms.

But these results differ substantially by state. For instance, the percentage change in the tax on land required to maintain constant state and local government revenues as taxes on capital are eliminated ranges from -1.91 percent to over 104 percent. Similarly, the impact on land prices varies greatly, with prices barely declining (or even increasing) in some states while falling by as much as 85 percent in others. While the elimination of all state and local taxes on capital is therefore technically feasible in all states, it is clearly politically more feasible in some states than in others. Overall, of course, replacing distortionary taxes with non-distortionary taxes on land always brings growth in the employment of capital and labor and increases output —but the size of these impacts also varies greatly. Given that the main political hurdle to land taxation is the expected adverse impact on landowners, these results seem to indicate that, as in the case of the "typical" state, such reforms should emphasize the simultaneous reduction in taxes such as the corporate income tax or the property tax.

JY: What do you take as the central lessons of this work?

TN: Several broad lessons emerge from the analysis of a typical state. First, elasticity assumptions are crucial to the exercise of predicting the likely impact of tax reforms. Second, under elasticity assumptions that are both plausible and relatively conservative, this model predicts that some types of tax reforms are more likely to succeed than others. In particular, tax reforms that reduce taxation of capital in favor of land taxation will have more positive general welfare implications while minimizing the losses to landowners. So policy makers might consider reforming corporate income and property taxes rather than sales and personal income taxes. Third, since elasticities tend to be lower in the short run, it is likely that some of the positive gains of tax reforms that reduce dis-