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An Empirical Test

The Economic Effects of Land Value Taxation

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EVER SINCE it was popularized by Henry George over 100 years ago, the concept of the land value tax (LVT) has been supported by a broad range of economists. Although George first proposed the tax as a means of capturing some of the monopoly profits that were resulting from federal land policies, recent proponents of the LVT have advocated it on the basis of its potential for stimulating urban development and renewal. They regard it as an efficient tax that will ensure the highest and best use for scarce urban land.

The current real property tax in the United States is criticized for many reasons, one of which is its negative effect on investment decisions. The real property tax, based on the improvement value and land value of a particular site, is alleged to discourage improvements in a site by reducing the economic return from such improvements. This reduction, in turn, results in a disincentive to maintain and improve buildings; the substitution of land for capital, causing urban sprawl; the utilization of buildings beyond the point at which they should be replaced; and speculation in land by holding it off the market. Advocates of the LVT argue that removing the tax on improvements and taxing only the value of the land would result in a restoration of the incentive to develop land to its fullest potential.[1]

Land value taxation is not without its critics. In particular, the theoretical basis of the tax has come into question. George Peterson[2] has presented three challenges to the theory behind the LVT.

For one thing, Peterson notes that urban real estate markets are subject to a number of externalities and government influences. The externalities include neighboring property values, traffic levels, and air quality. Government influences include zoning rules, building codes, housing subsidies, and freezes on condominiums.

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All of these tend to mitigate some of the impact of land value taxation.[3]

Peterson also notes that any reduction in taxes on improvements would be merely a marginal subsidy, and its effect would depend upon the elasticity of demand. If the demand for improvements is inelastic, the reduction of the tax on them will have little effect. In fact, in those depressed urban neighborhoods where there is currently no investment activity, no new investment will be forthcoming unless the cost of improvements is lowered far more than can be achieved by the removal of the property tax.[4]

Finally, Peterson observes that the notion that property owners are reluctant to improve their properties because of the fear of reassessments has been overemphasized. In most cities, minor improvements have seldom led to reassessment, and when reassessments have occurred it has been after considerable delay. It is the larger investments that have been likely to lead to reassessments, but empirical studies have shown that property owners rank property reassessments relatively low when considering making major improvements; the availability of financing is far more important.[5]

Raymond Richman attacks the conventional wisdom of the LVT theory by arguing that it is possible that a major portion of the tax on improvements is borne by the landowner through backward shifting.[6] Richman argues that in most cities zoning laws and building codes determine the types of improvements that can be made on a given piece of land. In effect, each piece of property has no alternative use. Because the value of land is determined by the use which government controls allow to be made of it, most of the urban real estate tax is shifted backward to the landlord.[7] If this is the case, very little of the burden of the real property tax will lie on improvements, and implementation of the LVT will have a negligible stimulative effect on improvements.

Finally, David Mills[8] has argued that an LVT is not neutral with respect to improvements, as its supporters have claimed. Mills notes that among properties with an equal present value, a tax on the capitalized value of land has a greater impact on properties whose income stream is skewed toward the distant future.

Mills then identifies two market distortions inherent in the real property tax: the traditional one that penalizes property improvements and another which favors properties with early payoff income streams. The implementation of an LVT eliminates the first distortion but enlarges the second. Mills concludes that "it is possible that the resource cost of the site value tax is actually greater than that of the property tax."[9]

With sound theoretical arguments both supporting and opposing the LVT, the question of its ultimate effect is an empirical one. There have been a number of studies performed on the LVT and on its variant, the differential (or graded) tax.[10] Although the results of these studies are mixed and the studies have reached different conclusions, they all have one thing in common—the authors arrived at their conclusions without the benefit of sound empirical testing. In most cases the conclusions were reached solely on the basis of a few comparative statistics. This study analyzes the issue of land value taxation by analyzing the differential tax through a theoretically sound empirical model tested by means of multiple regression techniques.[11]

Although most of the above discussion was centered on the general LVT, this study concerns itself solely with the variant of the LVT known as the differential tax. A differential property tax is imposed on both land and buildings, but it taxes buildings at a lower rate than land. One would expect to see at least some of the effects of an LVT in those cities utilizing a differential tax.

Pennsylvania is one state that allows certain cities to employ the differential tax. Specifically, legislation was passed that allows the state's two second-class cities, Pittsburgh and Scranton (53 P. S. 9634, 9635 and 53 P. S. 8772, 8774), and all of the state's third-class cities (P. L. 299) to assess land and buildings separately and to levy different tax rates on the two classes of property.

Both Pittsburgh and Scranton have taken advantage of the legislation (both since 1914) and currently employ the differential tax. However, only two third-class cities, Harrisburg (1974) and McKeesport (1979) have taken advantage of the legislation and are utilizing the differential tax.

The Model

For the purposes of this study, two different measures of the dependent variable are employed: the median per capita value of construction in the period 1976-78, and the mean per capita value of construction in the period 1976-78.

The model may be expressed as follows:

$$Qi = f(INCi, VACi, WAGi, ASSi, TRCi, CTRi)^{12}$$

where Qi is the value of the dependent variable in city, town, or borough i in Pennsylvania; $INCi$ is the median income level in city, town, or borough i in Pennsylvania in 1970; $VACi$ is the vacancy rate for rental units in city, town, or borough i in Pennsylvania in 1970; $WAGi$ is the average wage of construction workers in city, town, or borough i in Pennsylvania in 1977; $ASSi$ is the ratio (as a percentage) of assessed valuation to market value of real estate in city, town, or borough i in Pennsylvania in 1977; $TRCi$ is the ratio of the tax rate on land to the city tax rate on buildings in city, town, or borough i in Pennsylvania in 1977; and $CTRi$ is the ratio of the combined city and county tax rate on land to the combined city and county tax rate on buildings in city, town, or borough i in Pennsylvania in 1977.

Other things being equal, increases in the median level of income should increase both the quality and quantity of housing. Thus, a positive relationship between Qi and $INCi$ is anticipated.

The vacancy rate serves as a control variable for the elasticity of housing demand in the community. The more elastic the demand for improvements, the greater the effect of the implementation of the LVT. Increases in the vacancy rate for rental units could either increase or decrease the quantity and quality of housing. If the rate is sufficiently high, new units will not be built. On the other hand, if renovation will make the units more attractive, a positive relationship will exist.

Construction wages are included to control for the elasticity of supply. The more elastic the supply of improvements, the greater will be the effect of the LVT. Other things being equal, high construction wages will be associated with a low supply elasticity, and an inverse relationship between Qi and $WAGi$ is anticipated.

The percentage of assessed valuation is included to control for the strength of the community's real estate market. Other things equal, rising assessments would indicate a healthy real estate market and incentives for property improvements. However, the well-known problems associated with the assessment procedure make it difficult to predict the actual sign of this variable.

Finally, a positive relationship is anticipated between Qi and either $TRCi$ or $CTRi$ if one accepts the arguments supporting the differential tax and its effect on local development. In 24 of the 27 cities in the sample,[13] this ratio is unity since they do not employ a site value taxation system. In the other three, it exceeds one. The larger values of the ratio should be associated with larger values of Qi.

The Data

As mentioned above, the data cover 27 cities, towns, and boroughs in Pennsylvania.[14] Of these, three employ a modified site value taxation system. Data on the value of construction were gathered by questionnaires directed to appropriate city officials.

The data on median income were drawn from the *1970 Census of Population* and those on the vacancy rate, from the *1970 Census of Housing.* The remaining data were drawn from the *1979 Pennsylvania Abstract.*[15]

Empirical Results

Multivariate regression analysis was used to estimate the model. Two different functional forms were used: linear and double log. Table 1 displays the results of these efforts.

The coefficient of the income variable is positive and significant at the 1 percent level in all eight equations. This is consistent with the relationship expected.

The coefficient of the vacancy rate variable is positive and significant in all eight equations. As mentioned above, this could be indicative of a situation where it is believed that construction of new and more desirable rental units combined with the renovation of older units will reduce the vacancy rate in the long run.

The coefficient of the wage variable is negative and significant in four of the eight equations. This variable performs well in the double log model but not in the linear model. These results are consistent with the relationship expected.

The coefficient of the assessment variable behaves in a manner similar to that of the wage variable. This variable, too, is significant in the double log model but not in the linear model. The positive coefficient lends credence to the theory that rising assessments are usually associated with a healthy real estate market, which, in turn, is conducive to construction activity.

The coefficients of the tax ratio variables lack significance in all cases, a fact which supplies no support to the argument that differential tax rates have positive effects on local development. Thus, at least in the Pennsylvania case, the empirical analysis in this study is consistent with the theoretical arguments of Peterson, Mills, and Richman and with Richman's empirical findings that the differential tax has no significant impact on land development.

No Evidence

This study has analyzed the effect of a differential tax on cities in Pennsylvania. Because there are sound theoretical arguments both in favor of and opposed to the notion that land value taxation significantly stimulates urban development, the issue becomes an empirical one. Testing the differential tax for 27 Pennsylvania cities using multiple regression analysis, the authors found no evidence that the differential tax stimulates urban development. It is therefore recommended that

TABLE 1. REGRESSION RESULTS USING MEDIAN AND MEAN VALUES OF CONSTRUCTION AS THE DEPENDENT VARIABLE

	Median				Mean			
Variable	Linear[a]	Double Log[a]	Linear[b]	Double Log[b]	Linear[a]	Double Log[a]	Linear[b]	Double Log[b]
Constant	−747.6620	−54.3097	−742.7094	−56.8331	−590.0719	−49.7042	−593.1500	−51.7859
	(−3.4813)*	(−3,5438)*	(−2.0803)**	(−3.7230)*	(−2.5129)**	(−3.2293)*	(−1.5178)	(−3.3945)*
INCi	0.0832	6.1367	0.0829	6.4071	0.0760	5.7150	0.07516	5.9389
	(4.9935)*	(3.7092)*	(5.0342)*	(3.8833)*	(4.1707)*	(3.4393)*	(4.1715)*	(3.6018)*
VACi	32.4070	0.7282	32.5497	0.6977	35.9990	0.7875	36.2610	0.7607
	(2.9452)*	(2.2280)**	(2.9156)*	(2.1078)**	(2.9923)*	(2.3990)**	(2.9676)*	(2.2993)**
WAGi	− 47.2679	− 3.0482	− 46.1280	− 3.2945	− 82.3974	− 3.5984	− 79.7064	− 3.8063
	(−1.2127)	(−2.9927)*	(−1.2054)	(−3.2445)*	(−1.9335)	(−3.5175)*	(−1.9030)	(−3.7509)*
ASSi	2.1067	1.2862	2.0828	1.3649	1.9626	1.2401	1.9046	1.3049
	(1.6695)	(2.4002)**	(1.6690)	(2.5511)**	(1.4226)	(2.3041)**	(1.3944)	(2.4405)**
TRCi	8.1132	− 0.7328			24.3258	− 0.5180		
	(0.0915)	(−0.6226)			(0.2511)	(−0.4382)		
CTRi			4.2436	0.1090			30.4953	0.3933
			(0.0142)	(0.0338)			(0.0929)	(0.1220)
R bar squared	.5219	.4954	.5217	.4860	.4494	.5017	.4480	.4975
F	6.6767*	6.1025*	6.6724*	5.9163*	5.2448*	6.2356*	5.2204*	6.1484*

Note: Values in parentheses are *t* values.

[a]LVT is represented by the ratio of the city tax rate on land to the city tax on buildings.

[b]LVT is represented by the ratio of the combined city and county tax rate on land to the combined tax rate on buildings.

*Significant at the 1 percent level.

**Significant at the 5 percent level.

those third-class cities in Pennsylvania that are eligible to implement the differential tax do not do so. The practical difficulties in administering such a tax, along with its insignificant effect on urban development, make it no more attractive than the real property tax, and perhaps less so.

FOOTNOTES

1. Recently, Henry Aaron, in *Who Pays the Property Tax: A New View* (Washington, D.C.: Brookings, 1975), and others have challenged the traditional view of property tax incidence by arguing that the property tax should be viewed as an element in the cost of using capital goods, including land. According to this argument, all owners of capital share the burden of the property tax. The effects of an LVT under this new view would be consistent with those under the traditional view, although they would likely be of a smaller magnitude.
2. George F. Peterson, "Differential Taxation of Land and Improvement Values," mimeographed (Paper prepared for the District of Columbia Tax Revision Commission, June 1977).
3. Ibid., p. 16.
4. Ibid., p. 11.
5. Ibid., p. 33.
6. Raymond L. Richmond, "The Theory and Practice of Site Value Taxation in Pittsburgh," *National Tax Association Proceedings of the 57th Annual Conference on Taxation* (1965), pp. 259-73.
7. Ibid., p. 267.
8. David E. Mills, "The Non-Neutrality of Land Value Taxation," *National Tax Journal*, vol. 34, no. 1 (March 1981), pp. 125-29.
9. Ibid., p. 129.
10. For example, see Albert T. Henley, "Land Value Taxation by California Irrigation Districts," Daniel M. Holland, "A Study of Land Taxation in Jamaica," and A. M. Woodruff and L. L. Ecker-Racz, "Property Taxes and Land-Use Patterns in Australia and New Zealand," all in *Land and Building Taxes: Their Effect on Economic Development*, ed. Arthur P. Becker (Madison: U. of Wisconsin Press, 1969), pp. 137-45, 239-86, and 147-86, respectively.
11. The authors are grateful to two anonymous referees for their comments on an earlier version of this paper. The usual caveat applies.
12. The model as presented represents a distillation of the many different combinations of independent variables that were tried. Among those variables that were eliminated, due to lack of significance in all models tested, were total expenditures by the localities and various subsets of total expenditures such as public safety and streets and highways.
13. Because the data employed relate to that time period before McKeesport implemented the differential tax, only Pittsburgh, Harrisburg, and Scranton represent differential tax cities in this test.
14. The 27 cities employed in the study represent all local entities for which a consistent data set exists. These entities are concentrated in four areas in the state: the southeastern region around Philadelphia, the western region around Pittsburgh, the northeastern region around Scranton, and the south-central region around Lancaster.
15. The large difference in data years is an obvious problem. However, these were the best available data.