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The Effects of State Personal Property Taxation on Effective Tax Rates for Commercial Property

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Abstract

Commercial properties have considerably different amounts of personal property as part of their total parcel value, depending on the nature of the business situated on the parcel. Given the differences between and even within states in the tax treatment of various types of personal property, different types of businesses can experience very different effective tax rates on parcels with identical real property value. This research explores issues related to the development and application of a methodology to measure these differences and incorporate them into the *50-State Property Tax Comparison Study* jointly produced by the Minnesota Center for Fiscal Excellence and the Lincoln Institute of Land Policy. We find that there are considerable differences in effective tax rates between different types of commercial parcels. Rankings can also shift considerably between the results for commercial property as published in the *50-State Study* and the various alternatives we explored. Nevertheless, we conclude that the current study assumptions realistically model the property taxes payable on the most common type of commercial property, office property. We also suggest an approach to presenting more information and perspective on the influence of personal property within the *50-State Property Tax Comparison Study*.

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The Effects of State Personal Property Taxation on Effective Tax Rates for Commercial Property

Introduction

In comparing effective property tax rates and tax burdens experienced by property owners, how state property tax systems treat real property is often as influential, if not more so, than levy decisions themselves. The proportion of real property value subject to tax, exemptions and credits offered, assessment limitations, and other policy features have powerful influences on both absolute and relative tax burdens. Such structural features are the focus for the *50-State Property Tax Comparison Study (50-State Study)* that the Lincoln Institute of Land Policy and the Minnesota Center for Fiscal Excellence co-publish.

Personal property taxation amplifies the structural complexity of state property tax systems. Despite its less visible profile, personal property taxation is often an important and influential tax system feature with respect to business property taxes across the country. It adds extra complexity to comparative tax assessments for several reasons. First, there are several types of personal property potentially subject to taxation including machinery and equipment, inventories, motor vehicles, and furniture/fixtures. Second, different commercial enterprises will differ in the composition and shares of personal property potentially subject to taxation. Third, states differ significantly in their treatment of personal property including full exemptions, categorical exemptions, and partial exemptions based on value.

Currently, the *50-State Study* employs three different sets of assumptions for the treatment of personal property, two for industrial properties and one for commercial properties. For industrial property the two sets of assumptions include one in which 50 percent of the total parcel value is comprised of personal property, and another where personal property comprises 60 percent of the total parcel value. Even though manufacturing operations can vary significantly in their capital intensity and personal property make-up[1], according to our calculations the manufacturing subsectors that fall in this range generate nearly half of the nation's total value added through the manufacturing process.[2]

"Commercial property," however, presents a more complicated analytical challenge. This general descriptor represents a more diverse and dissimilar set of business activities, ranging from office administration to the warehousing of millions of dollars' worth of inventory to hotel and restaurant space. Such different types of commercial parcels are likely to have very different personal property profiles, and potentially very different tax treatment of that personal property.

[1] Personal property comprises the smallest proportion of total value in the apparel subsector (32.1% of the total) and the highest proportion of total value in the motor vehicle subsector (67.1% of the total).

[2] The Census Bureau defines "value added" the value of manufacturing shipments less the cost of materials, supplies, containers, fuel, purchased electricity, and contract work; adjusted by the addition of value added by merchandising operations and the net change in finished goods and work-in-process between the beginning and end of year inventories. According to the Census Bureau, it "is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas."

Since its inception, the *50 State Study* has modeled the property taxes payable on "office space," the most common form of commercial property, as the proxy for commercial property taxation. Based on input from business property tax practitioners over 20 years ago, the current study assumptions allocate five-sixths of the total commercial parcel value to real property and one-sixth to personal property split (i.e., personal property constitutes 17 percent of the total commercial parcel value).

In this working paper, we explore how a more detailed examination of personal property composition among different types of commercial property uses and personal property share of total property value influences commercial effective property tax rates and accompanying national rankings. Based on the methodology already in place for modeling the property profiles for manufacturing properties, we create six unique model commercial parcels that represent various types of commercial businesses. Using the results for the current *50-State Study* as a baseline, we:

- calculate effective tax rates for these six alternative commercial property uses,
- discuss the effects personal property taxation has on the differences between each example and the baseline study, and
- evaluate the reasonableness of the current assumptions in the *50-State Study* regarding commercial property.

Finally, we offer some recommendations for including additional analysis of commercial property taxation in future editions of the *50-State Study*.

Methodology

Our effort to model the amounts of real and personal property for various types of commercial property is grounded in methodology developed by the Minnesota Department of Revenue's Research Division, and used with their permission. This methodology estimates the amount of real property (land and buildings), machinery and equipment, motor vehicles, inventories, and furniture and fixtures different types of businesses can be expected to have. To estimate these amounts for taxes payable 2016, the model uses data from a variety of sources:

- Information on the value of structures, machinery and equipment, motor vehicles, and fixtures comes from the estimates for current-cost net capital stock of private nonresidential fixed assets, as published by the federal Bureau of Economic Analysis (BEA), as of August 31, 2015. We make two modifications to the data as presented. First, we eliminate the value of intangible assets, since the *50-State Study* does not incorporate them. Second, we eliminate the value of aircraft, ships, and boats since our hypothetical parcels would not include any of those types of assets.

- Information on the value of land is based on statewide assessments across Minnesota and provided by the Minnesota Department of Revenue. We assume that the ratio of value between land and structures is constant nationwide.

- Information on the value of inventories comes from table 5.85B, as published in the April 2015 edition of the BEA's *Survey of Current Business.* Specific inventory information for retail and wholesale trade is available; all other commercial inventory has been aggregated and is distributed to the individual commercial sectors based on their proportion of fixed assets.

Selection of Commercial Parcels for Examination

The BEA data is built around the North American Industry Classification System (NAICS), which provides the framework on which our modeling is built. The NAICS system constitutes a coding system with two-, three-, four-, five-, and six-digit codes that become more specific as the digits increase. The BEA data allows us to model the economy by sector (two-digit code). In some cases, the data also provides for modeling at the subsector (three-digit code) level.

For purposes of the *50-State Study*, we define the commercial sector as that portion of the economy outside of agriculture, forestry, mining, utilities, manufacturing, transportation, and government. While transportation is often considered part of the commercial sector, the tax treatment of transportation-related property, most notably aircraft, commercial trucks, pipelines, and rail property, is generally unlike the treatment of property in other commercial sectors. Such differential treatment suggests that any comparison of property taxes on transportation property requires its own set of assumptions.

We selected the following six commercial property types for analysis, representing a cross-section of different property mixes.

- **Office space**, comprising NAICS sectors 51 (Information), 52 (Finance and Insurance), 53 (Real Estate and Rental and Leasing), 54 (Professional, Scientific, and Technical Services), 55 (Management of Companies and Enterprises), 61 (Educational Services), and 81 (Other Services); and NAICS subsector 561 (Administrative and Support Services). This group of industries represents businesses where typical office activities take place and best matches the type of commercial space the *50-State Study* considers. In total, this group encompasses about 55 percent of total commercial sector property value (both real and personal property).

- **Retail trade**, comprising NAICS sector 44-45, which includes about 14 percent of the value of commercial sector property nationwide and has a high proportion of its total value in merchants' inventories.

- **Wholesale trade**, comprising NAICS sector 42, which includes about eight percent of the value of commercial sector property nationwide and has a high proportion of its total value in inventories being held for shipment elsewhere

- **Hospitals**, comprising NAICS subsector 622, which comprises about eight percent of the value of commercial sector property nationwide[3]

- **Restaurants**, comprising NAICS subsector 722, which comprises about two percent of the value of commercial sector property nationwide and has a high proportion of its total value in furniture/fixtures

- **Construction**, comprising NAICS sector 42, which comprises about two percent of the value of commercial sector property nationwide and has a high proportion of its total value in motor vehicles

Categories of Personal Property and Their Taxable Status

The methodology underlying our modeling allows us to study four categories of personal property:

- machinery and equipment (examples include computers, food preparation equipment, air compressors, and medical equipment),
- inventories (retailers' stock-in-trade or merchandise being stored for transport elsewhere),
- motor vehicles (those registered for highway travel),
- furniture/fixtures (examples include office furniture, shelving, and cabinets).

Of these four categories, machinery/equipment and furniture/fixtures feature the most consistent tax treatment for commercial properties across the country. In 36 of the 53 "urban" areas the *50-State Study* examines[4] both machinery/equipment and furniture fixtures are taxed, while in 15 other locations both types of property are exempt from property taxation. In only two locations, Wichita, Kansas and Portland, Maine, is one type of property (furniture/fixtures) taxed while the other (machinery/equipment) is exempt.

On the other hand, there are often considerable differences between states in commercial property tax treatment of inventories and motor vehicles. Motor vehicles are generally subject to registration taxes in each of the states, whereby vehicles are assessed a tax, generally based on their age and weight. These payments are almost always made to the state, rather than local governments, and dedicated to finance transportation needs. If we define "motor vehicle property tax" as a payment made to local government where there is a direct relationship between the vehicle's value and the tax imposed (a definition we will use consistently throughout the working paper), our research indicates 15 states provide for a motor vehicle property tax.[5] However, anomalies in two states bear mentioning. Personal property taxes on motor vehicles in Mississippi and Montana apply only to cars and "light trucks" (pickups weighing one ton or less,

[3] Our modeling assumes both that the hospital in question is subject to property taxation, and that there no fundamental differences in the property mix between for-profit and non-profit hospitals.
[4] "Urban" areas include the largest city in each state, Washington DC, and the second-largest cities in Illinois (Aurora) and New York (Buffalo) as the property tax system in the largest city differs from the system used elsewhere in the state. We encourage readers to interpret the study as comparing 53 unique property tax systems.
[5] Our research did not extend to issues of personal property taxes imposed on commercial trucks (primarily tractor-trailers) engaged in interstate commerce. The issue is beyond the scope of this working paper.

passenger vans, and sport utility vehicles). We assume this distinction affects only the calculations relating to our hypothetical construction parcel and that motor vehicles for all other parcels would be either cars or light trucks. With no immediately available information on the makeup of construction business-owned motor vehicles, for purposes of this working paper we assume 50 percent of the total value of the business' motor vehicles is made up of medium trucks or larger and therefore exempt from personal property taxes.

States' treatment of inventories also varies, although it is generally quite favorable to owners of such property. Most states exempt retailers' inventory from the personal property taxes; only 11 states provide for taxation in any cases at all. Merchandise held in a warehouse is treated even more favorably. Nine of the 11 states that do tax inventories have enacted a "freeport exemption," exempting inventories that are being stored temporarily in the state before being shipped to an out-of-state location.[6] Freeport exemptions are generally designed to avoid any tax-related disincentives that would otherwise be associated with a distribution center. With no immediately available information on the destination of inventories held in warehouse of transport elsewhere, for purposes of this working paper we assume 75 percent of the total value of wholesalers' inventories is destined for out-of-state locations and therefore exempt from personal property taxes.

The payable 2016 property tax calculations and comparisons for the six types of commercial parcels are all based on real property valued at $1 million and located in the *50-State Study's* "urban" cities.

Findings: Effects of Substituting Different Commercial Property Types on *50-State Study* Results

Table 1 summarizes the share of total taxable property across our six commercial subtypes. Both the division of total value between real and personal property and the composition of personal property share varies considerably across the commercial sector of the economy.

[6] Alaska and Vermont are the exceptions—neither state offers a blanket exemption for retailers' inventories nor a freeport exemption. However, both states do allow localities the option to exempt inventories from taxation; enabling local citizens to choose whether to offer these benefits.

Table 1: Proportions of Total Parcel Value Assigned to Real and Personal Property; Selected Commercial Property Types

Type of Commercial Property	Category of Property				
	Real Property	Machinery & Equipment	Inventories	Motor Vehicles	Furniture & Fixtures
Office Space	78.15%	12.68%	2.68%	5.25%	1.24%
Retail Trade	63.33%	5.40%	24.93%	0.82%	5.52%
Wholesale Trade	32.04%	12.51%	50.23%	2.62%	2.61%
Construction	42.28%	36.07%	0.84%	17.01%	3.81%
Hospital	81.48%	16.87%	1.22%	0.04%	0.40%
Restaurant	73.49%	20.42%	1.27%	0.66%	4.17%

Note: numbers may not add due to rounding.
Sources: various; as documented in Methodology section. Calculations by MCFE.

These differences demonstrate the considerable diversity that exists in the personal property associated with commercial property types. Unsurprisingly, such diversity among commercial property types is ultimately captured in their effective property tax rates ("ETR")[7]. Table 2 presents the national average total value of personal property, the national average ETR, and the national average tax payable associated with a parcel having land and buildings valued at $1 million for each commercial property type we studied. As the table indicates, the average ETR ranges from a low of 0.984 percent for wholesale trade (warehousing) to a high of 2.041 percent for hospitals. However, the average tax payable is highest for construction properties, at nearly $33,000, and lowest for office space at just over $24,000.

Table 2: Summary Findings: Average Effective Tax Rate and Tax Payable for Commercial Parcels with $1 Million in Real Property, Urban Cities, Payable 2016

Type of Commercial Property	Total Value of Personal Property	Average Effective Tax Rate	Average Tax Payable
Office Space	$279,600	1.927%	$24,656
Retail Trade	$579,030	1.629%	$25,724
Wholesale Trade	$2,121,495	0.984%	$30,710
Construction	$1,365,093	1.523%	$36,009
Hospital	$227,087	2.041%	$25,048
Restaurant	$360,816	1.980%	$26,950

These discrepancies between commercial property types in average taxes payable and average effective tax rates are generally driven by two factors. One factor involves differentials in the amount and composition of personal property between different commercial property types. The second factor has to do with differences in states' tax treatment of personal property exemptions. For example, not only do wholesale trade facilities have substantial amounts of inventory, those inventories are almost universally exempt from property taxation, creating substantial amounts of nontaxable property within the parcel. Conversely, while restaurants have relatively little

[7] Defined as property taxes as a share of total parcel value—both real and personal property.

personal property, whatever property is included on the parcel is far more likely to be in the tax base than warehouse inventories, creating very little nontaxable property within the parcel.

The following portion of this working paper compares each of the six alternative commercial property types we analyzed with a baseline—the $1 million urban commercial rankings from the payable 2016 edition of the *50-State Study*. For each alternative we calculate the change in the effective tax rate, net tax, and national ranking compared to the *50-State Study* baseline.

Unsurprisingly, in all examples the average effective tax rate declines since each alternative includes more personal property than the baseline, but that additional personal property is not always subject to property taxes. Occasionally, however, the effective tax rate in a specific location will be higher than for the baseline result. This outcome occurs for one of three reasons:

1) Some locations exempt a fixed amount of personal property from taxation, meaning that some or all the personal property in the baseline parcel is exempt. In these cases, a much higher proportion of the additional personal property value in the alternative scenario parcel is subject to taxation; meaning that the additional property value is subject to a higher effective tax rate than the pre-existing baseline.

2) Some locations have codified provisions that treat real property preferentially to personal property. In some cases, that preferential treatment is reflected in the assessment ratios, where personal property is assessed at a higher proportion of value than real property.[8] In other cases, that preferential treatment occurs when personal property is subject to higher nominal tax rates than real property. In either case, the additional property value is subject to a higher effective tax rate than the pre-existing baseline.

3) In some locations, real property is under-assessed (i.e., assessed values for properties involved in an arms-length transaction are consistently below the sales price, after adjusting for trends between the assessment and sale dates). Because the study generally assumes that assessed values of personal property accurately reflect market values, the additional property value is subject to a higher effective tax rate than the pre-existing baseline.

Office Space

Overall, the results for the commercial office space parcel generated by our modeling do not differ materially from the baseline results for the same type of property in the *50-State Study*. The alternate office space parcel we model does contain about 40 percent more personal property than the current set of assumptions. However, all this new value (and a portion of the pre-existing $200,000 personal property value) is in the relatively lightly-taxed motor vehicle and inventory categories. Although the personal property tax mix is weighted more toward machinery and equipment and less toward furniture/fixtures than in our study baseline, this has relatively little practical impact since 51 of the 53 urban locations in the study treat those two types of property identically for tax purposes.

[8] For example, in Oklahoma City real property is assessed at 11 percent of market value, while personal property is assessed at 13.75 percent of market value.

With these new personal property modifications, the modeled commercial office parcel has an average effective tax rate about eight percent lower than what is currently published in the *50-State Study*. However, as table 3 suggests, the decline in the effective tax rate is fairly consistent across all locations on a relative basis, with 49 of the 53 locations reporting a decline in the five percent to 10 percent range.

Table 3: Office Space Findings Relative to Baseline Results, $1 Million Commercial Parcel

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Birmingham, AL	(7.9%)	($317)	(1)	Billings, MT	(7.9%)	($225)	1
Anchorage, AK	(5.2%)	184	1	Omaha, NE	(8.1%)	(489)	1
Phoenix, AZ	(8.5%)	(653)	--	Las Vegas, NV	(7.9%)	(251)	1
Little Rock, AR	(5.3%)	174	2	Manchester, NH	(6.2%)	--	1
Los Angeles, CA	(7.9%)	(261)	1	Newark, NJ	(6.2%)	--	2
Denver, CO	(7.9%)	(496)	--	Albuquerque, NM	(8.0%)	(341)	--
Bridgeport, CT	(7.9%)	(833)	--	Buffalo, NY	(6.2%)	--	1
Washington, DC	(6.2%)	--	1	New York, NY	(6.2%)	--	--
Wilmington, DE	(6.2%)	--	--	Charlotte, NC	(8.2%)	(283)	1
Jacksonville, FL	(8.0%)	(390)	--	Fargo, ND	(6.2%)	--	1
Atlanta, GA	(6.6%)	(80)	(1)	Columbus, OH	(6.2%)	--	--
Honolulu, HI	(6.2%)	--	1	Oklahoma City, OK	(5.1%)	193	1
Boise, ID	(8.2%)	(358)	(2)	Portland, OR	(7.9%)	(500)	--
Aurora, IL	(6.2%)	--	--	Philadelphia, PA	(6.2%)	--	1
Chicago, IL	(6.2%)	--	--	Providence, RI	(8.8%)	(1,221)	--
Indianapolis, IN	(8.0%)	(662)	(2)	Columbia, SC	(9.0%)	(1,149)	--
Des Moines, IA	(6.2%)	--	--	Sioux Falls, SD	(6.2%)	--	1
Wichita, KS	(21.7%)	(5,395)	(5)	Memphis, TN	(7.6%)	(510)	1
Louisville, KY	(21.4%)	(2,592)	(5)	Houston, TX	(5.6%)	201	1
New Orleans, LA	(5.2%)	282	--	Salt Lake City, UT	(8.0%)	(328)	(1)
Portland, ME	(20.6%)	(3,887)	(4)	Burlington, VT	(6.9%)	(206)	1
Baltimore, MD	(9.8%)	(1,224)	0	Virginia Beach, VA	(28.2%)	(2,946)	(4)
Boston, MA	(6.2%)	--	1	Seattle, WA	(8.0%)	(203)	1
Detroit, MI	(9.7%)	(1,795)	--	Charleston, WV	(5.3%)	204	1
Minneapolis, MN	(6.2%)	--	--	Milwaukee, WI	(7.0%)	(274)	--
Jackson, MS	(5.3%)	343	1	Cheyenne, WY	(8.0%)	(150)	--
Kansas City, MO	(7.9%)	(584)	--	**AVERAGE**	**(8.1%)**	**(510)**	**0.9****

*Shows proportional change in ETR; not absolute change.
** Indicates that on average, each location moved approximately one place relative to the baseline results. The net of all changes in ranking (both up and down), would be zero.

Importantly, the rankings are also relatively unaffected, with an average rank change (on an absolute basis) of about one place relative to the baseline. The vast majority of locations (44 of the 53) report either no change in ranking or an increase of one or two places. The outliers, all of which have effective tax rate declines of over 20 percent, are Louisville and Wichita, KS, which both drop five places; and Portland, ME and Virginia Beach, which fall four places. Tax burdens and ETRs fall sharply for the alternative in these four locations because large amounts of

personal property shift from furniture/fixtures (which those locations tax) to machinery and equipment, which those locations either do not tax or tax at very low rates relative to furniture/fixtures.

Retail Trade

Unsurprisingly, retail trade outlets look significantly different than the baseline office parcel used in the *50-State Study*, featuring almost 200 percent more personal property, mostly retailer inventories, and a 32 percent higher total parcel value. Given that exemptions for retailer inventories are far more common than exemptions for furniture/fixtures (the basis for the baseline calculations), it is not surprising that personal property taxation creates major differences in the effective tax rates for the alternative relative to the baseline.

Although the average effective tax rate declines by a relatively large 22.3 percent when substituting retail outlets for the study baseline, results for individual locations are clustered around that average. In 37 of the 53 locations, we find the ETR falls by between 20 percent and 30 percent, primarily because adding inventories in these locations creates further parcel value but no further property tax.

Seven locations, all of which fully tax retailers' inventories, have a change in the effective tax rate of four percent or less. In four of these cities (Anchorage, Houston, New Orleans, and Oklahoma City) the effective tax rate on the $1 million retail property is higher than the office space baseline. This unusual result, in which personal property has a higher effective tax rate than does real property, results from one of two sets of conditions. In New Orleans and Oklahoma City, the assessment ratios for personal property are higher than those for real property.[9] Since both locations impose the same nominal tax rate on both kinds of properties, personal property ends up with a higher effective tax rate than real property. In Anchorage and Houston, this is a function of incorporating assessment error into the *50-State Study* methodology. Although measurements of assessment error are generally available for real property, they are almost never available for personal property, meaning that in almost every case we assume personal property is assessed at 100 percent of the appropriate value. While the nominal tax rates in Anchorage and Houston are the same for both real and personal property, the under-assessment of real property relative to personal property is substantial enough that the effective tax rates on personal property are noticeably higher.

Table 4: Retail Trade Findings Relative to Baseline Results, $1 Million Commercial Parcel

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Birmingham, AL	(25.7%)	($400)	(3)	Billings, MT	(25.8%)	($284)	1
Anchorage, AK	0.9%	5,451	7	Omaha, NE	(25.9%)	(616)	--
Phoenix, AZ	(26.3%)	(823)	(1)	Las Vegas, NV	(25.8%)	(316)	--

[9] Although buildings and personal property are both assessed at 15 percent of market value in New Orleans, land value is assessed at 10 percent of market value. The *50-State* Study assumes that 20 percent of the total commercial parcel value is land; creating a weighted assessment ratio of 14 percent for real property. See footnote 8 for information on the differential assessment ratios in Oklahoma City.

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Little Rock, AR	(1.4%)	5,132	5	Manchester, NH	(24.0%)	--	(2)
Los Angeles, CA	(25.7%)	(329)	--	Newark, NJ	(24.0%)	--	0
Denver, CO	(25.8%)	(625)	(1)	Albuquerque, NM	(25.8%)	(430)	(3)
Bridgeport, CT	(25.7%)	(1,049)	--	Buffalo, NY	(24.0%)	--	(1)
Washington, DC	(24.0%)	--	--	New York, NY	(24.0%)	--	--
Wilmington, DE	(24.0%)	--	--	Charlotte, NC	(26.0%)	(357)	--
Jacksonville, FL	(25.8%)	(491)	(5)	Fargo, ND	(24.0%)	--	1
Atlanta, GA	(12.8%)	2,954)	2	Columbus, OH	(24.0%)	--	(5)
Honolulu, HI	(24.0%)	--	1	Oklahoma City, OK	3.8%	5,710	8
Boise, ID	(26.0%)	(451)	(4)	Portland, OR	(25.7%)	(630)	(1)
Aurora, IL	(24.0%)	--	(1)	Philadelphia, PA	(24.0%)	--	--
Chicago, IL	(24.0%)	--	--	Providence, RI	(26.6%)	(1,538)	(1)
Indianapolis, IN	(25.9%)	(835)	(4)	Columbia, SC	(26.8%)	(1,448)	(2)
Des Moines, IA	(24.0%)	--	(2)	Sioux Falls, SD	(24.0%)	--	(2)
Wichita, KS	(31.7%)	(3,306)	(5)	Memphis, TN	(25.4%)	(643)	(2)
Louisville, KY	(19.3%)	985	1	Houston, TX	0.6%	9,145	11
New Orleans, LA	0.5%	8,335	12	Salt Lake City, UT	(25.8%)	(414)	(3)
Portland, ME	(31.2%)	(2,382)	(4)	Burlington, VT	(24.7%)	(260)	(1)
Baltimore, MD	(27.6%)	(1,542)	(2)	Virginia Beach, VA	(34.9%)	(1,805)	(3)
Boston, MA	(24.0%)	--	--	Seattle, WA	(25.8%)	(256)	--
Detroit, MI	(26.4%)	(1,547)	--	Charleston, WV	(0.8%)	6,040	8
Minneapolis, MN	(24.0%)	--	(2)	Milwaukee, WI	(25.3%)	(603)	(3)
Jackson, MS	(0.8%)	10,129	8	Cheyenne, WY	(25.8%)	(189)	--
Kansas City, MO	(25.7%)	(736)	(2)	**AVERAGE**	**(22.3%)**	**558**	**2.5****

*Shows proportional change in ETR; not absolute change.
** Indicates that on average, each location moved approximately two to three places relative to the baseline results. The net of all changes in ranking (both up and down), would be zero.

The clustering of the declines in the effective tax rate helps explain why the average ranking change is 2.5 places, which may seem small compared to the magnitude of the tax rate changes. 35 of the 53 locations studied have a ranking change in either direction of two places or less. However, the nine locations that tax retailers' inventories experienced much more substantial changes in ranking, averaging a seven-place increase. The group includes all seven of the locations where the rank increased by five places or more, led by New Orleans (up 12 places, from 24th to 12th) and Houston (up 11 places, from 19th to 8th).

Wholesale Trade

Wholesale trade businesses, with their focus on merchandise distribution, look very different from the traditional office-based business the *50-State Study* includes in its commercial rankings. However, wholesalers are also very different businesses than retail outlets. With a heavy focus on short-term inventory storage and distribution, their facilities are not intended to solicit walk-in traffic or to display inventories.

Our modeling reflects these differences. We find that wholesale trade parcels with $1 million in real property have $2.1 million in personal property, which is nearly 10 times more than the

study baseline. $1.6 million of this amount, half of the total parcel value, is made up of inventories. Nearly $400,000 is machinery and equipment, with the remaining $160,000 almost equally split between motor vehicles and furniture/fixtures.

From an effective tax rate perspective, wholesale traders look least like the study baseline than any of the other alternatives we studied. As table 5 shows, the average rate is 53.1 percent lower for owners of wholesaler property than the baseline (0.984 percent compared to 2.097 percent). As with other alternatives we modeled, there is a clustering effect, with 40 of the 53 locations experiencing a decline in the ETR of 50 percent to 70 percent relative to the baseline. However, the cluster is dispersed over a wider range of 20 percentage points than the five to 10 percentage points that is more typical. Note that even though the average effective tax rate falls by nearly half, the additional personal property still generates a $5,543 increase in the average net tax, some 22 percent above the baseline results.

From an effective tax rate perspective, Anchorage and Atlanta are the two outliers. Not coincidentally, they happen to be the two locations in this set of 53 cities that tax personal property and do not offer a complete freeport exemption; Anchorage lacks a freeport exemption altogether while Atlanta's freeport exemption does not extend to school taxes. Without this tax preference, the ETR for a wholesale property in Anchorage is slightly higher than that for the baseline traditional office property, which translates to a net property tax burden that is 2.6 times higher and a 30-place jump in rank, from 40th to 10th. Atlanta's effective tax rate falls by a relatively more modest 26 percent, and rises 15 places in rank from 32th to 17th.

The differences between the baseline rankings and the rankings for wholesale trade facilities are often substantial, with the average location moving 5.5 places. However, as table 5 indicates, ranking changes vary considerably among individual locations. We find there are more locations that move at least four places relative to the baseline (29) than there are that move three or fewer places (24).

Table 5: Wholesale Trade Findings Relative to Baseline Results, $1 Million Commercial Property

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Birmingham, AL	(52.8%)	3,941	(5)	Billings, MT	(52.8%)	2,796	2
Anchorage, AK	1.7%	27,391	30	Omaha, NE	(52.2%)	6,076	2
Phoenix, AZ	(50.2%)	8,112	2	Las Vegas, NV	(52.8%)	3,119	--
Little Rock, AR	(40.8%)	9,306	8	Manchester, NH	(61.6%)	--	(7)
Los Angeles, CA	(52.8%)	3,240	1	Newark, NJ	(61.6%)	--	(6)
Denver, CO	(52.8%)	6,158	1	Albuquerque, NM	(52.5%)	4,239	(3)
Bridgeport, CT	(52.8%)	10,345	1	Buffalo, NY	(61.6%)	--	(9)
Washington, DC	(40.4%)	8,391	11	New York, NY	(61.6%)	--	(5)
Wilmington, DE	(61.6%)	--	(1)	Charlotte, NC	(51.7%)	3,518	1
Jacksonville, FL	(52.5%)	4,844	--	Fargo, ND	(61.6%)	--	--
Atlanta, GA	(26.2%)	18,372	15	Columbus, OH	(61.6%)	--	(12)
Honolulu, HI	(61.6%)	--	--	Oklahoma City, OK	(36.1%)	10,352	12
Boise, ID	(51.5%)	4,451	(2)	Portland, OR	(52.8%)	6,210	--

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Aurora, IL	(61.6%)	--	(7)	Philadelphia, PA	(61.6%)	--	(6)
Chicago, IL	(61.6%)	--	(5)	Providence, RI	(48.5%)	15,167	4
Indianapolis, IN	(52.3%)	8,228	(1)	Columbia, SC	(47.4%)	14,278	3
Des Moines, IA	(61.6%)	--	(10)	Sioux Falls, SD	(61.6%)	--	(6)
Wichita, KS	(65.7%)	(3,473)	(13)	Memphis, TN	(54.4%)	6,336	(3)
Louisville, KY	(47.7%)	5,758	3	Houston, TX	(38.9%)	16,672	10
New Orleans, LA	(39.0%)	15,112	10	Salt Lake City, UT	(52.6%)	4,077	(4)
Portland, ME	(65.4%)	(2,502)	(10)	Burlington, VT	(58.0%)	2,565	(6)
Baltimore, MD	(43.4%)	15,199	10	Virginia Beach, VA	(67.4%)	(1,897)	(4)
Boston, MA	(61.6%)	--	(6	Seattle, WA	(52.4%)	2,519	3
Detroit, MI	(55.4%)	7,868	(1)	Charleston, WV	(40.3%)	10,951	8
Minneapolis, MN	(61.6%)	--	(10)	Milwaukee, WI	(51.9%)	8,604	(1)
Jackson, MS	(40.3%)	18,364	8	Cheyenne, WY	(52.6%)	1,864	--
Kansas City, MO	(53.1%)	7,253	(2)	**AVERAGE**	**(53.1%)**	**5,543**	**5.5****

*Shows proportional change in ETR; not absolute change.
** Indicates that on average, each location moved approximately five to six places relative to the baseline results. The net of all changes in ranking (both up and down), would be zero.

This effect is the result of changes that increase the total value of machinery/equipment, and furniture/fixtures associated with the parcel by about 150 percent. Although the changes regarding inventories have a much bigger impact on total parcel value, virtually none of that additional inventory is subject to taxation. Therefore, the effect on rankings would be fairly uniform. There is greater diversity among states in the tax treatment of machinery/equipment and furniture/fixtures (although as we noted before, individual states tend to treat the two similarly within their own property tax systems), and this diversity creates the more distinct movements in ranking.

Construction

Construction businesses' parcels look the most like a manufacturing operation than any of the other alternative commercial properties we analyzed, with roughly two-thirds of their personal property tax base in machinery and equipment. However, two major differences between manufacturing and construction parcels prevent the *50-State Study's* industrial tax comparisons from serving as a useful proxy for construction establishments. First, commercial machinery and equipment is less likely to be exempt from property taxes than that owned by manufacturers. Second, construction-related businesses have a high proportion, roughly one-third, of their personal property base in motor vehicles; unlike manufacturers, which have significant stocks of inventory but relatively few motor vehicles.

Given that a construction business has over six times as much personal property as our baseline example, the effective tax rates for this type of business property are again lower than the baseline in the *50-State Study*, in this case 27.4 percent lower on average. Unlike with other examples, here we see two clusters of change in effective tax rates—a group of 26 locations where the rate declines between 10 percent and 20 percent between the construction parcel and

the baseline, and a group of 15 locations where the rate declines between 40 percent and 50 percent.

This second group includes the 15 locations referenced earlier in the working paper that exempt commercial personal property from taxation entirely. Each of these locations experiences an identical 49.3 percent reduction in the ETR, since in each instance an identical amount of tax-exempt personal property is being added to the parcel's value. The 25 locations with the 10 percent to 20 percent decline include 15 of the 21 locations that exempt motor vehicles from the property tax but do tax other forms of personal property.

There are two noticeable outliers with regard to the effective tax rate change. In Washington, DC we find the rate increases by 32 percent, from 1.273 percent to 1.678 percent. The change is a function of the District's property tax exemption for the first $225,000 of personal property. Under the baseline assumptions, none of the personal property for a $1 million commercial parcel is subject to property tax. For the $1 million construction parcel, nearly 85 percent of the $1.37 million in personal property is taxable, creating considerable additional tax liabilities. The other outlier is Baltimore, where the effective tax rate increases from 2.678 percent to 3.116 percent because machinery/equipment, which makes up over one-third of the total parcel value, is taxed at a much higher effective rate (5.62 percent) than land and buildings (2.11 percent when accounting for the effects of assessment quality).

There are four locations where the net taxes payable decline relative to the baseline: Louisville, Wichita, Portland (ME) and Virginia Beach. These four were outliers with regard to the average office space alternative and are again outliers (on a net tax basis) here for the same reason: large amounts of personal property shift from furniture/fixtures (which these locations tax) to machinery and equipment, which these locations either do not tax or tax at very low rates relative to furniture/fixtures.

Table 6: Construction Findings Relative to Baseline Results, $1 Million Commercial Parcel

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Birmingham, AL	(17.8%)	10,775	3	Billings, MT	(17.7%)	7,643	4
Anchorage, AK	(14.6%)	11,359	6	Omaha, NE	(15.6%)	16,610	8
Phoenix, AZ	(8.2%)	22,175	11	Las Vegas, NV	(17.7%)	8,526	3
Little Rock, AR	(17.8%)	10,695	2	Manchester, NH	(49.3%)	--	(13)
Los Angeles, CA	(17.8%)	8,856	5	Newark, NJ	(49.3%)	--	(10)
Denver, CO	(17.7%)	16,836	7	Albuquerque, NM	(16.4%)	11,589	5
Bridgeport, CT	(17.8%)	28,281	1	Buffalo, NY	(49.3%)	--	(10)
Washington, DC	31.8%	24,414	23	New York, NY	(49.3%)	--	(11)
Wilmington, DE	(49.3%)	--	(2)	Charlotte, NC	(13.8%)	9,618	7
Jacksonville, FL	(16.6%)	13,243	7	Fargo, ND	(49.3%)	--	(1)
Atlanta, GA	(16.1%)	13,042	7	Columbus, OH	(49.3%)	--	(14)
Honolulu, HI	(49.3%)	--	(1)	Oklahoma City, OK	(10.6%)	11,898	6
Boise, ID	(13.1%)	12,168	7	Portland, OR	(17.8%)	16,976	6
Aurora, IL	(49.3%)	--	(13)	Philadelphia, PA	(49.3%)	--	(10)
Chicago, IL	(49.3%)	--	(11)	Providence, RI	(2.1%)	41,463	4

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Indianapolis, IN	(15.9%)	22,495	4	Columbia, SC	1.7%	39,033	5
Des Moines, IA	(49.3%)	--	(13)	Sioux Falls, SD	(49.3%)	--	(8)
Wichita, KS	(54.3%)	(3,221)	(15)	Memphis, TN	(23.5%)	17,321	2
Louisville, KY	(51.3%)	(650)	(7	Houston, TX	(14.9%)	19,177	7
New Orleans, LA	(15.1%)	17,368	7	Salt Lake City, UT	(17.0%)	11,147	3
Portland, ME	(53.9%)	(2,321)	(16)	Burlington, VT	(36.5%)	7,012	(3)
Baltimore, MD	16.3%	41,552	12	Virginia Beach, VA	(56.4%)	(1,759)	(5)
Boston, MA	(49.3%)	--	(12)	Seattle, WA	(16.4%)	6,886	6
Detroit, MI	(25.7%)	22,796	(4	Charleston, WV	(17.0%)	12,587	7
Minneapolis, MN	(49.3%)	--	(13)	Milwaukee, WI	(15.0%)	23,059	4
Jackson, MS	(17.0%)	21,106	5	Cheyenne, WY	(16.8%)	5,097	3
Kansas City, MO	(18.8%)	19,827	5	**AVERAGE**	**(27.4%)**	**10,843**	**7.2****

*Shows proportional change in ETR; not absolute change.
** Indicates that on average, each location moved approximately seven places relative to the baseline results. The net of all changes in ranking (both up and down), would be zero.

Construction parcels show the most difference vis-à-vis the baseline where the rankings are concerned; with any given location changing rank by an average of seven places. There are no locations where the ranking is unchanged, and as table 6 indicates in a quarter of the locations the ranking changes by 11 places or more. The biggest changes in rank are associated with outlier status. The locations with the most sizable ranking increases are Washington, DC (up 23 places, from 43rd to 20th) and Baltimore (up 12 places, from 16th to 4th); while the two locations which see the biggest drop in rankings are Portland (ME) (down 16 places, from 25th to 41st) and Wichita (down 15 places, from 15th to 30th).

Hospitals

Hospitals are the type of alternate property that most closely resemble the *50-State Study* commercial baseline property (where a parcel with $1 million of land and buildings has $200,000 of associated furniture/fixtures). Note that only the 19 percent of hospitals owned by for-profit corporations pay property taxes; the remaining 81 percent are owned by governments or not-for-profits.[10] As businesses engaged in direct service delivery to clients, hospitals have little need for inventories and motor vehicles, unlike other alternative parcels we studied. Instead, they have an extraordinary proportion of their personal property (91 percent) in often-specialized machinery and equipment, which for property tax purposes are almost always treated similarly to furniture/fixtures. Moreover, our modeling indicates that a $1 million hospital will have $227,000 in personal property, just 14 percent more than the baseline assumptions.

Table 7: Hospital Findings Relative to Baseline Results, $1 Million Commercial Parcel

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Birmingham, AL	(1.3%)	168	(1)	Billings, MT	(1.3%)	119	1

[10] American Hospital Association. 2018. "Fast Facts on US Hospitals, 2018." https://www.aha.org/statistics/fast-facts-us-hospitals

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Anchorage, AK	0.1%	396	1	Omaha, NE	(1.2%)	259	1
Phoenix, AZ	(1.0%)	346	2	Las Vegas, NV	(1.3%)	133	1
Little Rock, AR	(0.1%)	372	1	Manchester, NH	(2.2%)	--	1
Los Angeles, CA	(1.3%)	138	1	Newark, NJ	(2.2%)	--	1
Denver, CO	(1.3%)	262	1	Albuquerque, NM	(1.2%)	181	--
Bridgeport, CT	(1.3%)	441	--	Buffalo, NY	(2.2%)	--	1
Washington, DC	(2.2%)	--	1	New York, NY	(2.2%)	--	--
Wilmington, DE	(2.2%)	--	1	Charlotte, NC	(1.1%)	150	1
Jacksonville, FL	(1.2%)	206	--	Fargo, ND	(2.2%)	--	1
Atlanta, GA	(0.6%)	331	--	Columbus, OH	(2.2%)	--	--
Honolulu, HI	(2.2%)	0	1	Oklahoma City, OK	0.4%	414	1
Boise, ID	(1.1%)	190	--	Portland, OR	(1.3%)	265	--
Aurora, IL	(2.2%)	--	--	Philadelphia, PA	(2.2%)	--	1
Chicago, IL	(2.2%)	--	--	Providence, RI	(0.8%)	646	--
Indianapolis, IN	(1.2%)	351	--	Columbia, SC	(0.7%)	608	--
Des Moines, IA	(2.2%)	--	--	Sioux Falls, SD	(2.2%)	--	(1)
Wichita, KS	(19.4%)	(5,726)	(8)	Memphis, TN	(1.4%)	270	0
Louisville, KY	(22.2%)	(3,273)	(6)	Houston, TX	(0.3%)	560	1
New Orleans, LA	0.1%	605	--	Salt Lake City, UT	(1.2%)	174	--
Portland, ME	(18.1%)	(4,125)	(4)	Burlington, VT	(1.8%)	109	1
Baltimore, MD	(0.2%)	648	1	Virginia Beach, VA	(26.5%)	(3,127)	(4)
Boston, MA	(2.2%)	--	1	Seattle, WA	(1.2%)	107	1
Detroit, MI	(3.8%)	(807)	--	Charleston, WV	0.0%	438	--
Minneapolis, MN	(2.2%)	--	--	Milwaukee, WI	0.0%	778	--
Jackson, MS	0.0%	735	--	Cheyenne, WY	(1.2%)	79	--
Kansas City, MO	(1.3%)	309	--	**AVERAGE**	**(2.7%)**	**(118)**	**0.9****

*Shows proportional change in ETR; not absolute change.

** Indicates that on average, each location moved approximately one place relative to the baseline results. The net of all changes in ranking (both up and down), would be zero.

Given these similarities, the small difference in the average effective tax rates between hospitals and the study baseline shown in table 7 is probably predictable. The 2.7 percent difference in rates (2.041 percent for hospitals and 2.097 percent for the baseline) is the smallest we measure between the baseline and any of the alternatives. The clustering effect is pronounced, with the effective rate in 49 of the 53 locations changing by five percent or less. The changes also have a relatively minor effect on rankings, with all locations reporting an average change of approximately one place. Once again Louisville, Wichita (KS), Portland (ME) and Virginia Beach are outliers, for the reasons we have already discussed related to their favorable tax treatment of commercial machinery/equipment relative to furniture/fixtures.

Restaurants

Our model finds that the personal property profile for restaurants is, like hospitals, quite similar to the *50-State Study* baseline, with 93 percent of the total personal property value in the combined machinery and equipment and furniture/fixtures categories. However, unlike hospitals, restaurants have considerably more personal property—80 percent, or roughly $160,000 more—

than the baseline currently used in the *50-State Study*. Understandably, given the nature of the business, restaurants have the highest proportion of personal property in furniture/fixtures (16 percent) than any of the other alternatives we studied.

On average, restaurant parcels have an effective tax rate about five percent below the baseline. This decline is relatively modest because, although the total amount of personal property is 80 percent higher, most of the additional personal property is in the largely interchangeable machinery/equipment and furniture/fixtures categories, meaning that for property tax purposes the proportions of restaurant personal property are very similar to the baseline. The data for the 53 individual locations indicates two large clusters of change. The ETR falls by 10 percent to 15 percent for a cluster of 15 locations that exempt personal property as a matter of course and fall by zero percent to five percent for a cluster of 25 locations, most of which exempt inventories while taxing either all other personal property or all personal property except motor vehicles.

The restaurant alternative does stand out as having the largest number of individual locations (seven) where the effective tax rate is higher than for the baseline. These higher ETRs result from one of three sets of circumstances. The first set of circumstances involves locations that exempt a fixed amount of business personal property. Additional personal property is subject to a higher effective tax rate than the existing base, which includes some exempt property. For example, in the baseline calculations for the $1 million commercial parcel located in Phoenix approximately $47,000 of the $200,000 of associated personal property is subject to property tax, with an effective tax rate on all personal property of 0.70 percent. In comparison, about half the personal property in the restaurant alternative is subject to property tax, with an ETR on all personal property of 1.50 percent, more than two times the baseline.

The second and third sets of circumstances involve differential treatment of real and personal property. In one group of cities, the assessment ratios for personal property are higher than those for real property. This is the case in Columbia (SC), where personal property is assessed at 10.5 percent of market value, as opposed to the real property assessment ratio of six percent. In the other group of cities, nominal tax rates on personal property are higher than those for real property—witness Providence (RI), where the 55.8 mill tax rate on business personal property compares unfavorably with the 36.7 mill tax rate on real property.

Table 8: Restaurant Findings Relative to Baseline Results, $1 Million Commercial Parcel

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Birmingham, AL	(1.9%)	1,951	(1)	Billings, MT	(1.9%)	1,384	2
Anchorage, AK	0.2%	2,261	--	Omaha, NE	(1.2%)	3,008	1
Phoenix, AZ	1.1%	4,016	4	Las Vegas, NV	(1.9%)	1,544	1
Little Rock, AR	(0.9%)	2,129	1	Manchester, NH	(11.8%)	--	--
Los Angeles, CA	(1.9%)	1,604	1	Newark, NJ	(11.8%)	--	--
Denver, CO	(1.9%)	3,049	3	Albuquerque, NM	(1.5%)	2,099	--
Bridgeport, CT	(1.9%)	5,122	1	Buffalo, NY	(11.8%)	--	(3)
Washington, DC	9.7%	3,725	4	New York, NY	(11.8%)	--	(2)
Wilmington, DE	(11.8%)	--	(1)	Charlotte, NC	(0.7%)	1,742	1
Jacksonville, FL	(1.5%)	2,398	3	Fargo, ND	(11.8%)	--	1

City, State	Change, Results vs Baseline			City, State	Change, Results vs Baseline		
	ETR*	Net Tax	Rank		ETR*	Net Tax	Rank
Atlanta, GA	(0.8%)	2,481	2	Columbus, OH	(11.8%)	--	(3)
Honolulu, HI	(11.8%)	--	--	Oklahoma City, OK	1.5%	2,368	1
Boise, ID	(0.4%)	2,204	--	Portland, OR	(1.9%)	3,074	2
Aurora, IL	(11.8%)	--	(1)	Philadelphia, PA	(11.8%)	--	1
Chicago, IL	(11.8%)	--	(2)	Providence, RI	3.0%	7,509	3
Indianapolis, IN	(1.3%)	4,074	1	Columbia, SC	4.2%	7,069	1
Des Moines, IA	(11.8%)	--	(6)	Sioux Falls, SD	(11.8%)	--	(3)
Wichita, KS	(23.2%)	(4,198)	(9)	Memphis, TN	(3.7%)	3,137	--
Louisville, KY	(23.7%)	(2,163)	(5)	Houston, TX	(0.2%)	3,728	3
New Orleans, LA	(0.0%)	3,457	2	Salt Lake City, UT	(1.7%)	2,019	--
Portland, ME	(22.3%)	(3,025)	(6)	Burlington, VT	(7.8%)	1,270	(3)
Baltimore, MD	8.8%	7,525	8	Virginia Beach, VA	(27.9%)	(2,293)	-4
Boston, MA	(11.8%)	--	1	Seattle, WA	(1.5%)	1,247	2
Detroit, MI	(5.7%)	3,388	--	Charleston, WV	(0.7%)	2,505	1
Minneapolis, MN	(11.8%)	--	(6)	Milwaukee, WI	(0.4%)	4,442	1
Jackson, MS	(0.7%)	4,201	2	Cheyenne, WY	(1.6%)	923	--
Kansas City, MO	(2.2%)	3,591	1	**AVERAGE**	**(5.6%)**	**1,784**	**2.1****

*Shows proportional change in ETR; not absolute change.
** Indicates that on average, each location moved approximately two places relative to the baseline results. The net of all changes in ranking (both up and down), would be zero.

Importantly, these three sets of circumstances bring the effective tax rate for restaurant properties up because very little inventories or motor vehicles are added to the mix, unlike other alternatives. Motor vehicles and inventories are much more lightly taxed than machinery/equipment and furniture/fixtures, and in other examples enough value is generally added in these categories to outweigh the effects outlined above that tend to increase effective tax rates.

Ranking changes are relatively minor, with any given location changing two places in rank on average. 44 of the 53 urban locations report a ranking change of three places or fewer. Table 8 indicates that, from a ranking change perspective, there are two outliers where the ranking change is seven places or greater. One outlier is Wichita, Kansas, which takes advantage of the combination of Kansas' relatively unique exemption for commercial machinery and equipment (described earlier in the working paper) to fall nine places in the rankings. Conversely, Baltimore, Maryland's ranking climbs eight spots because the additional personal property is taxed at a higher effective rate than is real property.

Conclusions and Recommendations for *50-State Study* Modifications

The findings outlined in this working paper highlight the significance that the personal property assumptions can have on the *50-State Study's* findings. Differences in the total amount of personal property included in a parcel, along with how those amounts are allocated to the different types of property, create considerable variation in effective tax rates and rankings. Based on our modeling, average effective tax rates exceed 1.9 percent for hospitals, restaurants,

and office space while wholesale trade facilities encounter rates roughly half as large. When looking at how individual cities ranked across all six properties we modeled, we find that in 11 of the 53 locations the standard deviation among the rankings exceeds 5.0.[11]

However, we conclude that the existing assumptions provide a sensibly accurate representation of the property tax burdens on the commercial property type currently used in the *50-State Study*, office space, which constitutes well over half of total commercial sector property value. Substituting the modeled office space for the baseline assumptions results in an 8.1 percent decline in the average effective tax rate and an average change in ranking of less than one position relative to the baseline reported in the *50-State Study*. Moreover, individual results are tightly clustered around these averages, with 49 locations seeing effective tax rate declines of between five percent and 10 percent and an accompanying change in rank of two places or less. We believe any benefit gained from marginal improvements in the personal property assumptions with respect to office properties is more than offset by additional data collection requirements and the discontinuity the change would introduce on time trend comparisons.

Our findings do show that the existing assumptions regarding personal property in the baseline study are not representative of important types of commercial parcels, particularly retail outlets, wholesale traders, and construction businesses. As table 9 demonstrates, while there is some overlap between the set of cities in the top five, there are only two locations that are in the top five for all four groups (Detroit and Bridgeport) and the effective tax rates differ considerably.

Table 9: Comparison of Five Highest Effective Tax Rates, Selected Commercial Parcel Types

Rank	Location (Effective Tax Rate)			
	Current Assumptions	Retail Trade	Wholesale Trade	Construction
1	Detroit, MI (4.09%)	Detroit, MI (3.01%)	Providence, RI (1.91%)	Providence, RI (3.64%)
2	New York City (3.93%)	New York City (2.98%)	Detroit, MI (1.82%)	Columbia, SC (3.29%)
3	Chicago, IL (3.86%)	Chicago, IL (2.93%)	Bridgeport, CT (1.80%)	Bridgeport, CT (3.13%)
4	Bridgeport, CT (3.81%)	Bridgeport, CT (2.83%)	Columbia, SC (1.70%)	Baltimore, MD (3.12%)
5	Providence, RI (3.71%)	Jackson, MS (2.74%)	Jackson, MS (1.65%)	Detroit, MI (3.04%)

Although these findings suggest the *50-State Study* may benefit from additional commercial property tax analysis as it brings into sharper relief the influence state personal property tax policy can have on effective tax rates, state rankings and competitive position. The value of such an effort, however, must be weighed against the additional time and resources needed to conduct this analysis and, perhaps above all, the additional complexity it would introduce into an already very dense report.

[11] For example, the standard deviation for Baltimore is 5.9 places as it ranks 4th for construction, 6th for wholesale trade, 8th for restaurants, 15th for hospitals, 16th for average office space and 18th for retail trade.

The simplest way to add perspective on the influence personal property has on property tax comparisons going forward would be to compare the results for multiple property types at one value (see table 9). Given that effective tax rates for commercial property do not tend to change much as total value changes, users could quickly ascertain the influence of personal property taxation without having to wade into the considerable complexity and cause and effect relationships created by this issue. We believe that these advantages outweigh any drawbacks any additional data collection efforts would necessitate.

The full results of our modeling have been included in the appendix to this report. Addressing issues of commercial personal property will be important as we continue to keep the *50-State Study* relevant to policymakers and ensure that it represents as closely as possible the actual experience of property owners across the country.

References and Data Sources

Bureau of Economic Analysis, U.S. Department of Commerce. 2016. *Current-Cost Net Capital Stock of Private Nonresidential Fixed Assets*. https://www.bea.gov/national/FA2004/Details/xls/detailnonres_stk1.xlsx

Bureau of Economic Analysis, U.S. Department of Commerce. April 2016. *Survey of Current Business: BEA Current and Historical Data, Table 5.8.5B.* https://www.bea.gov/scb/index.htm

Bureau of the Census, U.S. Department of Commerce. 2016. *Manufacturers' Shipments, Inventories, and Orders (M3) survey: Total Inventories as Originally Published and as Revised: 2008-2015*. https://census.gov/manufacturing/m3/bench/annualdata.xls

Lincoln Institute of Land Policy and Minnesota Center for Fiscal Excellence. 2017. *50-State Property Tax Comparison Study: For Taxes Paid in 2016*. http://www.lincolninst.edu/publications/other/50-state-property-tax-comparison-study-1

Tax Research Division, Minnesota Department of Revenue. 2016. Unpublished data.

Appendix: Modeling Results

Table 10: Effective Property Tax Rates for Baseline and Alternative Scenarios, $1,000,000-Valued Parcel, Largest City in Each State (Property Taxes Payable in 2016)

City, State	Baseline	Office Space	Retail Trade	Wholesale Trade	Construction	Hospital	Restaurant
Birmingham, AL	1.450%	1.335%	1.077%	0.684%	1.191%	1.432%	1.422%
Anchorage, AK	1.387%	1.315%	1.399%	1.411%	1.184%	1.388%	1.389%
Phoenix, AZ	2.281%	2.088%	1.681%	1.137%	2.095%	2.259%	2.306%
Little Rock, AR	1.436%	1.360%	1.416%	0.850%	1.181%	1.435%	1.423%
Los Angeles, CA	1.192%	1.097%	0.885%	0.562%	0.979%	1.177%	1.169%
Denver, CO	2.254%	2.075%	1.674%	1.064%	1.856%	2.226%	2.212%
Bridgeport, CT	3.806%	3.504%	2.826%	1.795%	3.127%	3.758%	3.732%
Washington, DC	1.273%	1.194%	0.968%	0.758%	1.678%	1.245%	1.397%
Wilmington, DE	1.113%	1.044%	0.846%	0.428%	0.565%	1.088%	0.981%
Jacksonville, FL	1.714%	1.577%	1.271%	0.814%	1.430%	1.693%	1.688%
Atlanta, GA	1.662%	1.553%	1.450%	1.228%	1.395%	1.653%	1.648%
Honolulu, HI	0.908%	0.851%	0.690%	0.349%	0.461%	0.888%	0.800%
Boise, ID	1.423%	1.307%	1.053%	0.690%	1.237%	1.407%	1.417%
Aurora, IL	3.435%	3.221%	2.610%	1.320%	1.743%	3.359%	3.029%
Chicago, IL	3.857%	3.617%	2.931%	1.483%	1.957%	3.772%	3.401%
Indianapolis, IN	2.848%	2.619%	2.112%	1.359%	2.396%	2.814%	2.811%
Des Moines, IA	3.013%	2.825%	2.289%	1.158%	1.529%	2.946%	2.657%
Wichita, KS	2.718%	2.127%	1.856%	0.933%	1.243%	2.191%	2.088%
Louisville, KY	1.333%	1.048%	1.076%	0.697%	0.649%	1.037%	1.017%
New Orleans, LA	2.150%	2.038%	2.162%	1.311%	1.825%	2.152%	2.150%
Portland, ME	2.111%	1.676%	1.453%	0.731%	0.973%	1.728%	1.639%
Baltimore, MD	2.678%	2.416%	1.938%	1.517%	3.116%	2.672%	2.915%
Boston, MA	1.921%	1.802%	1.460%	0.739%	0.975%	1.879%	1.694%
Detroit, MI	4.088%	3.693%	3.009%	1.824%	3.038%	3.932%	3.854%
Minneapolis, MN	3.002%	2.815%	2.282%	1.154%	1.523%	2.936%	2.647%
Jackson, MS	2.767%	2.621%	2.744%	1.652%	2.296%	2.766%	2.749%
Kansas City, MO	2.756%	2.539%	2.048%	1.292%	2.237%	2.721%	2.694%
Billings, MT	1.025%	0.944%	0.761%	0.484%	0.843%	1.012%	1.006%
Omaha, NE	2.088%	1.920%	1.548%	0.998%	1.762%	2.063%	2.063%
Las Vegas, NV	1.142%	1.051%	0.848%	0.539%	0.940%	1.128%	1.120%
Manchester, NH	1.872%	1.756%	1.423%	0.720%	0.950%	1.831%	1.651%
Newark, NJ	2.668%	2.502%	2.028%	1.026%	1.354%	2.609%	2.353%
Albuquerque, NM	1.491%	1.372%	1.106%	0.709%	1.247%	1.473%	1.469%
Buffalo, NY	2.485%	2.331%	1.889%	0.955%	1.261%	2.430%	2.191%
New York, NY	3.926%	3.681%	2.983%	1.509%	1.992%	3.839%	3.462%
Charlotte, NC	1.146%	1.053%	0.849%	0.553%	0.988%	1.133%	1.139%
Fargo, ND	0.999%	0.937%	0.759%	0.384%	0.507%	0.977%	0.881%
Columbus, OH	1.747%	1.638%	1.328%	0.672%	0.886%	1.708%	1.541%
Oklahoma City, OK	1.303%	1.237%	1.351%	0.832%	1.164%	1.308%	1.323%
Portland, OR	2.285%	2.103%	1.696%	1.077%	1.877%	2.256%	2.241%
Philadelphia, PA	1.951%	1.830%	1.483%	0.750%	0.990%	1.908%	1.721%
Providence, RI	3.714%	3.388%	2.725%	1.914%	3.638%	3.685%	3.827%
Columbia, SC	3.240%	2.949%	2.371%	1.703%	3.294%	3.218%	3.377%
Sioux Falls, SD	1.410%	1.322%	1.071%	0.542%	0.715%	1.378%	1.243%
Memphis, TN	2.838%	2.622%	2.116%	1.294%	2.172%	2.798%	2.733%
Houston, TX	2.358%	2.227%	2.371%	1.440%	2.007%	2.351%	2.353%
Salt Lake City, UT	1.460%	1.344%	1.083%	0.692%	1.212%	1.442%	1.436%
Burlington, VT	2.329%	2.168%	1.754%	0.978%	1.478%	2.287%	2.147%
Virginia Beach, VA	1.048%	0.752%	0.682%	0.342%	0.457%	0.770%	0.755%
Seattle, WA	0.886%	0.815%	0.657%	0.421%	0.741%	0.875%	0.873%
Charleston, WV	1.650%	1.563%	1.636%	0.985%	1.369%	1.649%	1.639%
Milwaukee, WI	2.848%	2.650%	2.126%	1.371%	2.420%	2.849%	2.838%
Cheyenne, WY	0.664%	0.611%	0.493%	0.315%	0.552%	0.656%	0.653%
AVERAGE	**2.097%**	**1.927%**	**1.629%**	**0.984%**	**1.523%**	**2.041%**	**1.980%**

Table 11: Net Property Tax Burdens for Baseline and Alternative Scenarios, $1,000,000-Valued Parcel, Largest City in Each State (Property Taxes Payable in 2016)

City, State	Baseline	Office Space	Retail Trade	Wholesale Trade	Construction	Hospital	Restaurant
Birmingham, AL	$17,400	$17,083	$17,000	$21,341	$28,175	$17,568	$19,351
Anchorage, AK	16,640	16,824	22,091	44,031	27,998	17,035	18,901
Phoenix, AZ	27,368	26,715	26,545	35,480	49,544	27,714	31,384
Little Rock, AR	17,231	17,404	22,363	26,536	27,926	17,603	19,360
Los Angeles, CA	14,302	14,041	13,974	17,542	23,158	14,440	15,906
Denver, CO	27,052	26,557	26,428	33,211	43,888	27,315	30,101
Bridgeport, CT	45,671	44,838	44,622	56,016	73,951	46,112	50,792
Washington, DC	15,279	15,279	15,279	23,670	39,693	15,279	19,004
Wilmington, DE	13,354	13,354	13,354	13,354	13,354	13,354	13,354
Jacksonville, FL	20,566	20,176	20,075	25,410	33,809	20,773	22,965
Atlanta, GA	19,948	19,868	22,902	38,321	32,991	20,280	22,430
Honolulu, HI	10,892	10,892	10,892	10,892	10,892	10,892	10,892
Boise, ID	17,079	16,721	16,627	21,530	29,247	17,269	19,282
Aurora, IL	41,217	41,217	41,217	41,217	41,217	41,217	41,217
Chicago, IL	46,288	46,288	46,288	46,288	46,288	46,288	46,288
Indianapolis, IN	34,178	33,516	33,344	42,407	56,673	34,529	38,252
Des Moines, IA	36,151	36,151	36,151	36,151	36,151	36,151	36,151
Wichita, KS	32,611	27,216	29,305	29,138	29,390	26,885	28,413
Louisville, KY	15,999	13,407	16,984	21,757	15,349	12,726	13,836
New Orleans, LA	25,803	26,085	34,137	40,914	43,170	26,407	29,260
Portland, ME	25,332	21,445	22,950	22,830	23,011	21,207	22,307
Baltimore, MD	32,139	30,915	30,597	47,338	73,690	32,786	39,663
Boston, MA	23,057	23,057	23,057	23,057	23,057	23,057	23,057
Detroit, MI	49,057	47,262	47,510	56,925	71,853	48,250	52,445
Minneapolis, MN	36,026	36,026	36,026	36,026	36,026	36,026	36,026
Jackson, MS	33,201	33,544	43,330	51,565	54,307	33,936	37,402
Kansas City, MO	33,077	32,493	32,341	40,329	52,904	33,386	36,667
Billings, MT	12,303	12,020	12,078	15,099	19,946	12,422	13,687
Omaha, NE	25,061	24,445	24,572	31,137	41,672	25,320	28,070
Las Vegas, NV	13,703	13,387	13,452	16,822	22,229	13,836	15,247
Manchester, NH	22,469	22,469	22,469	22,469	22,469	22,469	22,469
Newark, NJ	32,020	32,020	32,020	32,020	32,020	32,020	32,020
Albuquerque, NM	17,898	17,468	17,557	22,137	29,487	18,079	19,997
Buffalo, NY	29,821	29,821	29,821	29,821	29,821	29,821	29,821
New York, NY	47,107	47,107	47,107	47,107	47,107	47,107	47,107
Charlotte, NC	13,757	13,400	13,474	17,275	23,375	13,907	15,499
Fargo, ND	11,984	11,984	11,984	11,984	11,984	11,984	11,984
Columbus, OH	20,964	20,964	20,964	20,964	20,964	20,964	20,964
Oklahoma City, OK	15,631	21,340	15,824	25,983	27,529	16,045	17,999
Portland, OR	27,415	26,785	26,915	33,625	44,391	27,680	30,489
Philadelphia, PA	23,418	23,418	23,418	23,418	23,418	23,418	23,418
Providence, RI	44,572	43,033	43,351	59,739	86,035	45,218	52,081
Columbia, SC	38,883	37,434	37,733	53,160	77,915	39,491	45,951
Sioux Falls, SD	16,915	16,915	16,915	16,915	16,915	16,915	16,915
Memphis, TN	34,061	33,418	33,551	40,396	51,382	34,331	37,197
Houston, TX	28,293	37,437	28,494	44,964	47,470	28,853	32,020
Salt Lake City, UT	17,521	17,108	17,193	21,599	28,668	17,695	19,540
Burlington, VT	27,949	27,689	27,742	30,514	34,961	28,058	29,219
Virginia Beach, VA	12,573	10,768	9,627	10,677	10,814	9,447	10,281
Seattle, WA	10,628	10,372	10,425	13,147	17,514	10,735	11,875
Charleston, WV	19,799	25,839	20,004	30,751	32,386	20,237	22,305
Milwaukee, WI	34,181	33,578	33,906	42,784	57,239	34,959	38,623
Cheyenne, WY	7,969	7,780	7,819	9,834	13,066	8,049	8,892
AVERAGE	**$25,166**	**$24,656**	**$25,724**	**$30,710**	**$36,009**	**$25,048**	**$26,950**

Table 12: Property Tax Rankings for Baseline and Alternative Scenarios, $1,000,000-Valued Parcel, Largest City in Each State (Property Taxes Payable in 2016)

City, State	Baseline	Office Space	Retail Trade	Wholesale Trade	Construction	Hospital	Restaurant
Birmingham, AL	36	37	39	41	33	37	37
Anchorage, AK	40	39	33	10	34	39	40
Phoenix, AZ	22	22	23	20	11	20	18
Little Rock, AR	37	35	32	29	35	36	36
Los Angeles, CA	44	43	44	43	39	43	43
Denver, CO	23	23	24	22	16	22	20
Bridgeport, CT	4	4	4	3	3	4	3
Washington, DC	43	42	43	32	20	42	39
Wilmington, DE	47	47	47	48	49	46	48
Jacksonville, FL	31	31	36	31	24	31	28
Atlanta, GA	32	33	30	17	25	32	30
Honolulu, HI	51	50	50	51	52	50	51
Boise, ID	38	40	42	40	31	38	38
Aurora, IL	6	6	7	13	19	6	7
Chicago, IL	3	3	3	8	14	3	5
Indianapolis, IN	11	13	15	12	7	11	10
Des Moines, IA	8	8	10	18	21	8	14
Wichita, KS	15	20	20	28	30	23	24
Louisville, KY	41	46	40	38	48	47	46
New Orleans, LA	24	24	12	14	17	24	22
Portland, ME	25	29	29	35	41	29	31
Baltimore, MD	16	16	18	6	4	15	8
Boston, MA	28	27	28	34	40	27	27
Detroit, MI	1	1	1	2	5	1	1
Minneapolis, MN	9	9	11	19	22	9	15
Jackson, MS	13	12	5	5	8	13	11
Kansas City, MO	14	14	16	16	9	14	13
Billings, MT	49	48	48	47	45	48	47
Omaha, NE	26	26	25	24	18	25	25
Las Vegas, NV	46	46	45	46	43	45	45
Manchester, NH	29	31	28	36	42	28	29
Newark, NJ	17	17	15	23	27	16	17
Albuquerque, NM	34	37	34	37	29	34	34
Buffalo, NY	18	19	17	27	28	17	21
New York, NY	2	2	2	7	13	2	4
Charlotte, NC	45	45	44	44	38	44	44
Fargo, ND	50	49	49	50	51	49	49
Columbus, OH	30	35	30	42	44	30	33
Oklahoma City, OK	42	34	41	30	36	41	41
Portland, OR	21	22	21	21	15	21	19
Philadelphia, PA	27	27	26	33	37	26	26
Providence, RI	5	6	5	1	1	5	2
Columbia, SC	7	9	7	4	2	7	6
Sioux Falls, SD	39	41	38	45	47	40	42
Memphis, TN	12	14	11	15	10	12	12
Houston, TX	19	8	18	9	12	18	16
Salt Lake City, UT	35	38	36	39	32	35	35
Burlington, VT	20	21	19	26	23	19	23
Virginia Beach, VA	48	51	52	52	53	52	52
Seattle, WA	52	52	51	49	46	51	50
Charleston, WV	33	25	32	25	26	33	32
Milwaukee, WI	10	13	10	11	6	10	9
Cheyenne, WY	53	53	53	53	50	53	53

Note: Average is not applicable.