NEW EVIDENCE ON THE EFFECTS OF SALES TAXES ON RETAIL ACTIVITY*

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Abstract

This paper examines the impact of the local option sales tax on volume of sales, number of establishments and level of employment in the retail industry of the counties and cities of the states of Ohio and Kansas. Unlike previous studies, I use instrumental variables to correct for the endogenous nature of the tax rate. The results suggest that the tax elasticity of retail activity may be larger than found so far in the literature.

I. Introduction

The public finance literature has offered numerous examples of the impact of the geographic diversity of tax levels on local economies (Trandel (1992), Trandel (1994), Holmes (1998), Goss and Phillips (1999), Mark et al. (2000), Bradbury et al. (2001), Haughwout et al. (2001), to mention just a few). One example of such an impact is the effect of the local option sales tax on retail activity.

There are three main ways in which sales taxes affect retail sales. First, they may increase the after-tax price of goods and thus they may have a negative wealth effect that reduces total sales. Second, selective taxation of goods induces substitution from the taxed goods towards the non-taxed goods. And

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third, if the tax rate varies across jurisdictions, it induces geographic substitution of purchases. This paper will consider the third of these effects.

Several factors can lessen the geographic substitution effect that I want to study. One is the role of population density and market dominance. Price elasticity is smaller in densely populated and market-dominant areas than in sparsely populated and non-market-dominant areas. Secondly, one may expect that the sales of everyday items such as groceries are hardly responsive to the imposition of a sales tax, as compared with the sales of big-ticket items such as automobiles or furniture, because the potential savings from geographic substitution of purchases for the former are small.

As a reply to the first caveat enumerated in the previous paragraph, one must keep in mind that large areas of rural states in the United States are very thinly populated and that in those areas the scale of operation of the retail sector in any given tax jurisdiction is not big enough for it to enjoy a sizable market dominance. With regard to the second caveat, the imposition of a sales tax may have significant effects on the sales of everyday items as there may be economies of scale in shopping, in at least to senses: first, when consumers commute to the tax-advantaged jurisdiction to make their purchases of big-price items, they may take advantage of the trip to purchase low-price items too; second, they may commute to the tax-advantaged jurisdiction to make occasional bulk purchases of everyday items.

A fundamental issue that so far has been ignored by the literature is that local tax rates are not exogenous. Local authorities, in their intent to maximize their fiscal revenue, will take into account the volume of sales, market-dominance and government expenditures in their jurisdiction when they set the sales tax rate[1]. As argued before, sales in market-dominant jurisdictions are less responsive to taxes than in non-market-dominant jurisdictions, and this should lead to higher tax rates in market-dominant areas. On the other hand, local governments in jurisdictions with a strong retail sector need a lower tax rate than their counterparts in jurisdictions with a weak retail sector, for a given level of desired revenues. Thus, a priori, the government tax-setting function could depend either positively or negatively on the strength of the retail sector. However, market-dominant jurisdictions are almost always the most densely populated ones too, and therefore the areas with the highest demand for local government services and a higher government expenditure. Therefore, it is likely that the government response to higher local sales per capita is a higher tax.

One implication of the latter hypothesis is that simple estimation techniques that do not account for the endogeneity of the tax rates are bound to produce biased coefficients. In particular if, as I assume, there exists a positive relationship between the strength of the local retail sector and the tax rate set by the local government, the estimates of the tax elasticity that previous studies have produced so far are biased downwards.

This paper examines the impact of the local option sales tax, at the level of counties and/or places in the states of Ohio and Kansas, on retail sales per capita, retail establishments per capita, retail sales per establishment, retail employees per establishment and retail employees per capita. In order to show the relevance of the endogenous nature of the tax, I estimate the tax elasticity both before and after correcting for endogeneity, and I show that in the latter case they are significantly higher in absolute value.

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[1] Another important factor is the level of the property tax and the revenue that local governments raise from that source. Krmenec (1991), Jung (2001) and Lewis (2001) provide evidence on the substitution between these two taxes.

The paper proceeds as follows: Section II presents a discussion of previous empirical research. Section III describes my conceptual framework and the empirical strategies used to estimate the tax elasticity. Section IV describes my data set and in Section V I show the results of the estimations. Section VI presents some conclusions, discusses the limitations of my study and outlines possible directions for future research.

II. Sales tax and business location in the literature

Empirical researchers have been interested in the question of how sales taxes affect the retail industry for a period of more than 30 years. Mikesell (1970) used cross-sectional data from the 1963 Census of Business on 173 central cities to test the hypothesis that per capita retail sales are lower in cities with ‘an adverse tax differential’. He used per capita city income, the ratio of city population to its Standard Metropolitan Statistical Area population, the area of the central city and regional dummies as control variables. He found the expected negative relationship between per capita sales and the differential tax rate, with a coefficient ranging between -1.69 and -10.97.

In a second paper, Mikesell (1971), Mikesell analyzed the existence of a border effect in the state of Illinois. Using the differential tax rate between border counties within Illinois and border counties within adjacent states, he found that total sales and number of stores were lower in border counties than in non-border counties whenever the border counties had an adverse tax differential.

Fisher (1980) estimated an elasticity of -7 on the tax differential of the Washington D.C. sales tax compared to their neighbors, using only food sales.

Fox (1986) used consumption data series for three metropolitan areas along the Tennessee border to test the joint effect of differences in the sales tax and in the income tax on the location of retail sales and employment. The results indicate that a one percent sales tax rate increase would have reduced sales by a percentage between 0.44 percent and 3.73 percent, depending on the area. No evidence was found on the significance of the income tax.

Walsh and Jones (1988) demonstrate that sales tax differentials induce some shifting of sales from the high-tax area to the low-tax one if those areas are near each other. They also show the absence of a 'border effect' in locations that are distant from the border. Their estimate of the tax elasticity is around -5.9.

Most recently, Wong (1996) examined the impact of sales tax differentials in the state of Kansas on various indicators of retail activity. Among his findings there was a significant and negative relationship between the county tax rate and retail sales per capita, retail sales per store and employees per store. A negative link was found also at the level of cities, but only for the number of stores per capita. He also reports a significant border effect for counties. His estimates of the tax elasticity are: -0.11 for sales per capita, -0.09 for sales per establishment and -0.04 for employees per establishment. He found that county sales tax rates do not have a significant impact on retail employees per capita and on retail payrolls.

III. Theoretical model and empirical strategy

III.1 Conceptual framework

The idea of the paper is very simple. Individuals decide whether to shop in their location of residence versus in other locations based on the after-tax prices prevailing in each location. I assume that differences in after-tax prices across locations are entirely due to differences between their sales tax rates. This assumption, in turn, implies assuming that

a) After-tax prices increase one-for-one with the tax. This point has not yet been empirically rejected[2].
b) Pre-tax prices are the same across locations.
c) There is no tax evasion.

Controlling for their characteristics, the prediction is that individuals will be more likely to make their purchases in their location of residence if the sales tax there is lower than in other locations. Consequently, one should tend to observe higher sales (and, broadly defined, more retail activity) in low-tax areas than in high-tax areas.

III.2 Empirical strategy

The source of variation that will enable me to estimate the effect of the sales tax will be the differences in the level of the tax both across counties and places and over time. I will place more emphasis on the first source than on the second, but this is imposed by the availability of data: the Census of Retail Trade, which will be the source of data on the local retail industries, is conducted only every five years. Moreover, counties do not change their tax rates very frequently, so taking snapshots of the retail sector at intervals of five years as I did is likely to capture most of the effects of the sales tax on the retail industry. On the other hand, retail industry data are expected to be highly autocorrelated over time, which makes high frequency data not so valuable.

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[2] Haig and Shoup (1934) conducted a survey among retailers which showed mixed results across locations. Sidhu (1971) found evidence of overshifting. Poterba (1996) showed evidence that broadly supports the view that the after-tax price increases exactly by the amount of the tax. His results were actually mixed, though: for one of the subsamples of the study there appeared to be some overshifting; for the second one, less-than-complete shifting. More recently, Besley and Rosen (1998), using very narrowly defined categories of goods, found that for some commodities the increase in price is one-to-one, for some others, taxes are overshifted.

I will work with two specifications to show the effect of retail taxes on local retail industries. First I will run regressions of five indicators of retail activity (logarithm of the dollar volume of sales per capita, logarithm of the number of establishments per 1,000 inhabitants, logarithm of the dollar volume of sales per establishment, logarithm of the number of employees per 10,000 inhabitants and logarithm of the number of employees per establishment) on the sales tax rates and other controls. Second, I will use those same indicators, but relative to their value in the state[3], to run regressions on the sales tax rates and the same controls.

With regard to the estimation method, I will first estimate the parameter of interest using weighted least squares, for each of the selected dependent variables. The weights will be the population of the jurisdiction in 1982. My second estimation method will be instrumental variables, still using the same weights.

Finding valid instruments is a delicate issue. Under the hypothesis that financially strapped local governments, under pressure to supplement property tax revenue, will tend to set high sales tax rates, valid instruments might be found among exogenous local government revenues and expenditures or among the demographic variables that determine those. Various studies (see Brett and Pinkse (2000), Buttner (1999)) have shown that local taxes are higher in more populous jurisdictions. One interpretation, extracted from Brett and Pinkse (2000) is that, "in the context of tax competition among local governments, losses associated with the erosion of the tax base are lower for populous jurisdictions, as population provides an advantage in the battle to attract and retain businesses". Another interpretation is simply that the demand for local

[3] This relative measure, for the case of sales, has been dubbed 'pull factor' and used in several empirical studies of the retail sector. See, for instance, Yaganida et al. (1991), Gale (1996), Ebai and Harris (1997) and Barker et al. (2001).

government goods and services is higher in densely populated areas. In addition, Buttner (1999), for the case business taxation in West Germany, found that federally mandated expenditures are a determinant of local tax differences.

With the guidance of that evidence and of my own intuition, I tried several different instruments and combinations of them: logarithm of total population, proportion and logarithm of institutionalized population, proportion of population over 65 years old, proportion of population under 5 years old, number of local government employees, real value of property (total and per capita), logarithm of miles of roads (total and per capita), county land area and total external revenue. Except for the real value of property, all these variables are related in a way or another to local government expenditures. So, for instance, miles of roads and county land area are measures of public infrastructure, meant to capture fixed financing requirements of local governments. Later in the paper I will only report the results produced by four sets of instruments[4]: the first is the logarithm of total population and the proportion of institutionalized population; the second is the logarithm of external revenue for the county government and the logarithm of institutionalized population; the third is the logarithm of institutionalized population and the proportion of the population under the age of 5; finally, the fourth set of instruments is the proportion of the population under the age of 5 and the logarithm of external revenue for the county government. Population was included for reasons discussed in the previous paragraph. Institutionalized population and population under 5 years old are meant to capture financial burdens imposed on local governments due to exogenous demographic characteristics of the population in their jurisdiction. In the case of institutionalized population, these expenditures come in the form of

[4] Most of those combinations of instruments proved to be invalid, as they were firmly rejected by the test of overidentifying restrictions (more on this in Section VI).

construction and maintenance of penitentiary institutions, juveniles and homes for the elderly; for population under 5, in the form of kindergarten and pre-elementary schools. External revenue is included as a measure of the local government's dependence on its own revenues.

V. Data

Data on sales tax rates for the counties in the state of Ohio were obtained from the webpage of the Department of Revenue of the State of Ohio. For the state of Kansas, city and county tax rates were obtained from the Department of Revenue of the State of Kansas[5].

Not all the states in the US levy a sales tax, and even among those that do, not all of them authorize county and city governments to levy a local sales tax. In the state of Ohio, local sales taxes may be levied at the level of counties only. In the state of Kansas, both counties and cities can levy their own sales tax. In both states, the adoption and increase of the local option sales tax is subjected to a referendum.

In the state of Ohio, counties can levy a sales tax of up to a 1.5%. In Kansas, cities and counties may levy a sales tax at the rate of up to a 2.75%. In order to adequately measure the effective local tax rate, my data set for the state of Kansas considers all the towns and cities that levied the tax for which retail data were available, and also all the counties that did not contain any town or city that levied the tax; moreover, for the cities that levied the tax, I use the county

[5] See acknowledgements on the first page.

and city tax rates combined. In this manner I am always measuring the local effective tax rates prevailing in each location for both Ohio and Kansas[6].

The average rate and the number of local governments that levied the local option sales tax it is presented in table 1. The tax rates have been increasing almost monotonically since 1982 and, above all, the number of local governments that levied it has increased substantially over time.

Figure 1 provides a more detailed description of the evolution of the sales tax rate. There were not many changes between 1982 and 1987. The distribution of rates became more spread out in 1992, as some places and counties increased their rates and some others introduced a (low) tax for the first time. Between 1992 and 1997, the tax continued increasing, and the local governments that introduced the tax for the first time chose rates that were close to the mean.

All the data on retail trade activity were compiled from the Census of Retail Trade for years 1982, 1987, 1992 and 1997. This census publishes data on sales, number of establishments, annual payroll and number of employees, at the level of counties and places with 2,500 inhabitants or more.

A first problem of my data on retail activity is that they include both taxable and non-taxable sales, since the Census of Retail Trade does not report those separately. I do not expect this to be a major problem given that non-taxable sales represent only a small share of total sales (mainly food) and that, due to economies of scope and agglomeration economies on the part of retailers, and to economies of scale in shopping, non-taxable sales (as well as the rest of indicators of retail activity) are probably very correlated with taxable sales. A second problem of these data is that the NAICS code, used for the first time in the Census of Retail Trade in 1997, excluded some business activities from the

[6] I do not add up the state rate, but this has no consequence since all local governments in a state face the same state rate and individuals in one state do no make retail purchases in the other.

category of retail industry, and therefore the measures of retail activity for that year are not perfectly comparable with their counterparts in previous years. I remedy this problem by including a dummy variable for the year 1997 among the explanatory variables in the estimation. Finally, my data only include establishments with payroll. Since this characteristic of retail stores is expected to be very related to the size of the store, large establishments will be overrepresented in the data.

I control for income, education, presence of elderly population and self-employment in my estimations. Income is measured as real money income per capita. Education is the proportion of the population with elementary education (9th grade) or less. The presence of elderly population is measured as the fraction of the population 65 years old and over. Self-employment is measured as the proportion of the population aged 16 to 64 who are self-employed. These variables were obtained from the US Census of Population and Housing. Since the years when this census is conducted do not coincide with the years when the retail data are collected, I took data from the latest three (1980, 1990 and 2000, respectively) and imputed values for my variables in 1982, 1987, 1992 and 1997 by assuming a constant growth rate between censuses.

I also include a dummy for the state of Kansas to control for systematic differences in levels across states. Finally, for border counties and places in border counties I include a variable to capture the border effects that the previous literature has found. This variable was constructed by substracting the state sales tax rate prevailing in the neighboring state i from the state sales tax rate in the home state and multiplying the result by a dummy variable that takes the value 1 if the county borders state i. Ideally, one would like to use the local tax rates prevailing in neighboring counties, but such tax rates were not available to me, and information on them must be collected at the local level.

The Census of Governments is conducted the same year as the Census of Retail Trade and provides an excellent summary of local government finances at the level of states and counties. General revenue is divided in three categories: ‘From Federal Government’, ‘From State government’ and ‘General revenue from own sources’. External revenue was calculated as the sum of the former two. Population and institutionalized population were obtained from various issues of the Census of Population and Housing, and their values extra- or interpolated assuming a constant growth rate between censuses. Institutionalized population includes people in penitentiary institutions, juveniles and homes for the elderly, but not in other group quarters such as colleges.

Table 2 gives the mean and the number of observations for the variables in my data set and then I compare those same statistics for the areas with a local tax below and above 1%, respectively[7]. The two are very different in some measures: areas with a relatively high tax are characterized by higher retail sales per capita, establishments per 1,000 inhabitants, and employees per 10,000 inhabitants. Establishments seem to be larger in high-tax areas in term of sales but approximately equal in terms of employees. People living in areas with a relatively high tax are also wealthier, better educated and older. Self-employment is more common among individuals in low-tax areas.

VI. Estimation Results

VI.1 Baseline Estimation: Weighted Least Squares

The initial results from running a Weighted Least Squares (WLS) regression of sales, establishments and employment are presented in table 3. The

[7] Please note that these subsets are not exhaustive: a large number of jurisdictions face a tax rate exactly equal to one.

explanatory variables other than the local sales tax rate are the logarithm of income, education, elderly population, self-employment, dummies for the state of Kansas and for year 1997 and a set of variables that capture the state tax differential for counties on the border of each state or for places in those counties.

The results show that the sales tax does have a significant impact on sales, establishments and employment per capita, as well as on the size of establishments, as measured by the number of employees per establishment. Measured by sales per establishment, the sales tax does not seem to affect the size of establishments. The estimated coefficients suggest that, approximately, increasing the local tax rate by 0.1 decreases the logarithm of sales per capita by .006, the log of establishments per 10,000 inhabitants by .005, the log of employees per 10,000 inhabitants by .008 and the log of employees per establishment by .003.

Most of the other coefficients are significant and have the expected signs. Wealthier and better educated populations lead to large retail sectors. Areas with higher proportions of elderly people also have larger retail sectors, but the size of their stores tends to be smaller. Having a higher proportion of self-employed individuals also leads to smaller retail industries, but this probably reflects the fact that most of the self-employment in the states in Kansas and Ohio is found in farming, and thus self-employment serves as a proxy for unobserved characteristics of rural populations. Given the construction of the variables that capture the tax differential in the state borders, one would expect all the coefficients on those variables to be negative. The results only partially confirm this hypothesis since, on one hand, the coefficients that are significant are always negative, but on the other hand very few of them are statistically different from 0. Moreover, they are not significant for all the dependent variables. An explanation of this failure to capture border effects may be due to the fact that I only imperfectly observe the tax differential.

Table 4 presents the result of using the pull-factor specification (value of the dependent variable for the county or place relative to the value of the same variable for the state). The sign and the significance of the coefficients are broadly consistent with the results in table 3.

VI.2 Instrumental Variables Estimation

As argued in Section I, local governments may take local retail conditions into consideration when they choose the sales tax rate for their jurisdiction. If that is the case, the WLS estimation method produces biased estimates of the tax elasticity and it becomes necessary to correct for the endogeneity of the tax using, for instance, instrumental variables (IV).

Tables 5 to 9 show the results of using the IV method to estimate the same econometric model as in the previous section. I used four different sets of instruments, and each column corresponds to one set of instruments. The first of them is the logarithm of population and the proportion of institutionalized population.

The results in column 1 show that the coefficients on the tax rate and on income are consistent with the output of the WLS regressions[8]. The magnitude of the tax rate coefficient, however, is *much higher*: in all the regressions, it increases by at least one order of magnitude. Using establishments per 1,000 inhabitants as dependent variable yields a counterintuitive (but insignificant) positive tax elasticity.

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[8] For the sake of clarity of exposition I do no report the coefficients on the border-effect variables. Those were mostly insignificant and not always consistent with the results of the WLS regression.

I report the result of conducting a Hausman test of overidentifying restrictions[9] below the regression outputs. For all the dependent variables under consideration, the null hypothesis of non-overidentification was statistically rejected for the regressions with establishments and employment, but not for the regression with sales per capita. There are two possibilities. One is that the econometric equations are misspecified. The other is that some of the variables that are assumed to be exogenous are, in fact, correlated with the error terms.

Upon examination of the results of the regression of the estimated residuals from the 2nd-stage regression on the predetermined variables in the model (from this and from many other combinations of instruments), I observed that most of my candidate instruments, and specially population and roads, were very correlated with those estimated residuals. The use of the logarithm of institutionalized population and the logarithm of external government revenue as instruments proved to be more favorable, specially in combination with relative dependent variables. The result of such regressions is reported in column 2. As compared with the regressions that do not account for the endogeneity of the tax rate, tax elasticities still appear to be much larger, but the test of overidentifying restrictions still rejects the validity of the instruments.

Next I used the logarithm of institutionalized population and the proportion of population under 5 as instruments, in part to test the robustness of the results to the choice of instruments, in part because external revenue is measured at the level of counties, but many of the observations in the data set are places. The result, reported in column 3, turned out to be very similar to the one obtained in column 2.

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[9] For the statistic reported, N*R2, N corresponds to the number of observations in the IV regression, and R2 corresponds to the R squared in the regression of the estimated residuals from the 2nd-stage regression on all the predetermined variables in the model (the non-instrumented variables and the instruments). See Hausman (1983, p.433) for more details.

Finally, I estimated the same model with proportion of population under 5 and external revenue as instrument. The tax elasticities appear to be larger than in previous regressions, but still negative, significant and larger than in the WLS regressions.

VII. Conclusion

The main findings of this paper are two. First, it confirms that sales taxes play an influential role in the geographic distribution of retail activity within a state. Controlling for some characteristics of the population, places with higher tax rates are characterized by weaker retail industries in terms of sales and number of employees. Second, it suggests that the traditional approach to the measurement of the sales tax elasticity is biased. Using instrumental variables to correct for the endogeneity of the tax I obtain negative, generally significant and always much larger coefficients for the effect of the tax on retail activity. The sets of instruments passed the test of overidentifying restrictions for the case of sales as dependent variable, but not for the rest.

More research is needed to find out valid instruments (in the sense that they pass tests of overidentifying restrictions and of endogeneity) to accurately measure the size of the tax elasticity of retail actitivity. Future research might also study tax elasticities for finer subdivisions of retail trade, at the level of three-digit NAIC codes, for instance.

Appendix: Tables and Figures

TABLE 1. Summary statistics on tax rates

		1982	1987	1992	1997
Ohio	**Mean**	.6316	.6842	.6842	1.125
	Frequency	57	76	76	88
Kansas	**Mean**	1.159	1.156	1.233	1.435
	Frequency	107	110	115	120
Total	**Mean**	.976	.9634	1.014	1.304
	Frequency	164	186	191	208

TABLE 2. Summary statistics

		All	T<1	t>1
Sales per cap	**Mean**	7,433	6,838	8,839
	N	731	198	198
Estab. per 1,000	**Mean**	6.838	5.968	6.887
	N	745	200	202
Sales per estab.	**Mean**	1,209	1,225	1,455
	N	731	198	198
Empl. per 10,000	**Mean**	617.9	596.7	696
	N	734	198	200
Empl. per estab.	**Mean**	9.705	10.54	10.92
	N	734	198	200
Income	**Mean**	16,612	16,269	18,324
	N	749	200	204
Education	**Mean**	.3111	.3183	.2467
	N	749	200	204
Pop 65+	**Mean**	.1571	.1377	.1567
	N	749	200	204
Self-employed	**Mean**	.09	.1041	.0649
	N	749	200	204

FIGURE 1. Distribution of the sales tax rate over time

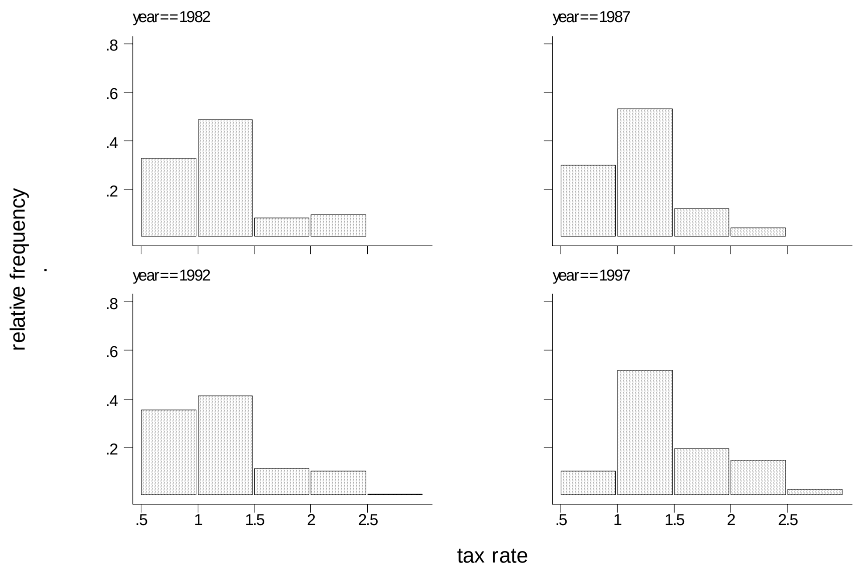

TABLE 3. WLS results[10]

	Sales per capita	**Estab. per 1,000 inhab.**	**Sales per estab.**	**Empl. per 10,000 inhab.**	**Empl. per estab.**
Tax	-.0633* (.0325)	-.046* (.0241)	-.0138 (.0202)	-.0779** (.0329)	-.0316* (.0182)
Income	.9655** (.0787)	.148** (.058)	.7767** (.049)	.922** (.0789)	.7725** (.0438)
Education	-.1076 (.0816)	-.0161 (.0606)	-.1049** (.0508)	-.2109** (.0825)	-.1939** (.0458)
Pop65+	1.062** (.3739)	3.41** (.2778)	-2.395** (.2328)	2.047** (.3785)	-1.374** (.2099)
Self emp	-.6057** (.1291)	-.3145** (.096)	-.2958** (.0803)	-.6122** (.1307)	-.2979** (.0725)
Year 1997	.0409 (.0319)	-.381** (.0237)	.4193** (.0199)	-.3558** (.0323)	.0243 (.0179)
Kansas	.1966** (.0365)	.2765** (.0271)	-.0817** (.0227)	.2247** (.0307)	-.0493** (.0205)
MItaxdiff	.078 (.0489)	.0488 (.0364)	.0273 (.0304)	.0734 (.0495)	.0243 (.0275)
PAtaxdiff	-.0753 (.0535)	.001 (.0398)	-.0733** (.0333)	-.07 (.0542)	-.0711** (.03)
WVtaxdiff	-.0325 (.0891)	-.0649 (.0663)	.0403 (.0555)	-.1055 (.0902)	-.0406 (.05)
KYtaxdiff	-.0345 (.0471)	-.0347 (.035)	-.0032 (.0293)	-.0641 (.0476)	-.0297 (.0264)
INtaxdiff	-.0126 (.1062)	.0281 (.079)	-.0364 (.0661)	.0404 (.1075)	.0117 (.0596)
COtaxdiff	-.2981 (.2138)	.1638 (.1404)	-.3888** (.1331)	-.3108 (.2165)	-.4026** (.12)
OKtaxdiff	.1277 (.1031)	.1173 (.0756)	.0157 (.052)	.1003 (.1043)	-.0124 (.0579)
MOtaxdiff	-.2966** (.0836)	-.324** (.0621)	.012 (.052)	-.3597** (.0845)	-.0397 (.0469)
NEtaxdiff	-.0977* (.0563)	-.0068 (.0419)	-.0914** (.035)	-.086 (.057)	-.0795** (.0316)
constant	-7.425** (.7871)	-.0971 (.5804)	-.0122 (.49)	-2.581** (.7898)	-4.771** (.4379)
N	731	745	731	734	734
R2	.2841	.5229	.727	.3592	.5415

[10] Standard errors in parentheses. An asterisk and a double asterisk indicate that the coefficient is significant at the 10% and at the 5% level, respectively.

TABLE 4. WLS results[11] with relative indicators as dependent variables

	Sales per capita	Estab. per 1,000 inhab.	Sales per estab.	Empl. per 10,000 inhab.	Empl. per estab.
Tax	-.0513** (.0248)	-.026 (.0177)	-.0085 (.0199)	-.0552** (.0238)	-.0247 (.017)
Income	.9771** (.0601)	.2014** (.0426)	.7541** (.0483)	.935** (.0573)	.7692** (.0407)
Education	.2003** (.0624)	.1326** (.0445)	.0597 (.0501)	.2011** (.0599)	.1088** (.0426)
Pop65+	.2945 (.2859)	2.987** (.2039)	-2.642** (.2295)	1.068** (.2746)	-1.657** (.1952)
Self emp	-.3433** (.0987)	-.229** (.0705)	-.1866** (.0792)	-.3908** (.0948)	-.2131** (.0674)
Year 1997	-.0433* (.0244)	.0011 (.0174)	-.0506** (.0196)	-.0305 (.0234)	-.0321* (.0167)
Kansas	.151** (.0279)	.0691** (.0199)	.1169** (.0224)	.1553** (.0268)	.1** (.0191)
MItaxdiff	.0816** (.0374)	.0474** (.0267)	.0311 (.03)	.068* (.0359)	.0249 (.0255)
PAtaxdiff	-.0749* (.0409)	-.0132 (.0292)	-.0662** (.0328)	-.0788** (.0393)	-.0696** (.0279)
WVtaxdiff	-.0573 (.0681)	-.0811* (.0487)	.013 (.0547)	-.1115* (.0655)	-.0399 (.0465)
KYtaxdiff	-.0336 (.036)	-.0358 (.0257)	.0026 (.0289)	-.0661* (.0346)	-.016 (.0246)
INtaxdiff	.045 (.0812)	.0566 (.058)	-.0107 (.0652)	.0924 (.078)	.0381 (.0555)
COtaxdiff	-.203 (.1635)	.2332** (.103)	-.2368* (.1312)	-.2315 (.1571)	-.2585 (.1117)
OKtaxdiff	.0764 (.0788)	.0816 (.0555)	-.0129 (.0633)	.0452 (.0757)	-.0389 (.0538)
MOtaxdiff	-.2795** (.0639)	-.3004** (.0455)	.0504 (.0513)	-.3238** (.0613)	-.0109 (.0436)
NEtaxdiff	-.0801* (.043)	-.0047 (.0307)	-.0453 (.0345)	-.0799* (.0413)	-.0501* (.0294)
constant	-8.602** (.6017)	-1.361** (.426)	-6.042* (.483)	-8.298** (.5729)	-6.331** (.4073)
N	731	745	731	734	734
R2	.3228	.3343	.4787	.3277	.4843

[11] Standard errors in parentheses. An asterisk and a double asterisk indicate that the coefficient is significant at the 10% and at the 5% level, respectively.

TABLE 5. IV results with sales per capita as dependent variable[12]

	(1)	(2)	(3)	(4)
Tax	-.8227* (.4544)	-.2893** (.095)	-.279** (.1)	-1.093** (.3132)
Income	1.135** (.1461)	1.084** (.0713)	1.088** (.069)	.7995** (.1255)
Education	-.1811 (.1324)	.1369** (.0673)	.1647** (.0638)	-.0306 (.1354)
Pop65+	2.141** (.6911)	.9432** (.3144)	.9099** (.3046)	1.435** (.6459)
Self emp	-.6995** (.1798)	-2.914** (.4821)	-2.886** (.4531)	-.5026** (.1946)
Year 1997	.4122* (.2428)	.0906 (.0562)	.0897 (.0584)	.4951** (.1673)
Kansas	.5693** (.2009)	.3326** (.0543)	.3159** (.0513)	.6496** (.1602)
N	697	631	692	668
Overidentification test				
N*R2	87.61	2.713	3.806	1.202
Critical value	3.84	3.84	3.84	3.84

[12] Standard errors in parentheses. An asterisk and a double asterisk indicate that the coefficient is significant at the 10% and at the 5% level, respectively. The instruments in column (1) are the logarithm of population and the proportion of institutionalized population. The instruments in column (2) are the logarithm of institutionalized population and the logarithm of the county revenue from federal and state transfers. The instruments in column (3) are the logarithm of institutionalized population and the proportion of the population under the age of 5. The instruments in column (4) are the proportion of the population under the age of 5 and the logarithm of the county revenue from federal and state transfers. The R2's reported in the overidentification tests correspond to the regression of the estimated residuals from the 2nd-stage regression on all exogenous variables, as described in the text.

TABLE 6. IV results with establishments per 1,000 inhabitants as dependent variable[13]

	(1)	(2)	(3)	(4)
Tax	.1309 (.2609)	.0591 (.0659)	.0852 (.0732)	.0196 (.1189)
Income	.3492** (.0835)	.3088** (.049)	.3279** (.0502)	.1962** (.0469)
Education	.0443 (.0752)	.1534** (.0462)	.1714** (.0464)	.1261** (.0507)
Pop65+	3.38** (.3913)	2.887** (.2155)	2.915** (.2212)	2.87** (.2405)
Self emp	-.2738** (.1018)	.4773 (.3287)	.5588* (.3281)	-.2231** (.0726)
Year 1997	-.4893** (.1395)	-.0697* (.0388)	-.0774* (.0427)	-.0299 (.0635)
Kansas	.2255* (.1155)	.0477 (.0374)	.0289 (.0375)	.0559 (.0607)
N	710	644	705	682
Overidentification test				
N*R2	44.38	39.86	78.82	59.88
Critical value	3.84	3.84	3.84	3.84

[13] Standard errors in parentheses. An asterisk and a double asterisk indicate that the coefficient is significant at the 10% and at the 5% level, respectively. The instruments in column (1) are the logarithm of population and the proportion of institutionalized population. The instruments in column (2) are the logarithm of institutionalized population and the logarithm of the county revenue from federal and state transfers. The instruments in column (3) are the logarithm of institutionalized population and the proportion of the population under the age of 5. The instruments in column (4) are the proportion of the population under the age of 5 and the logarithm of the county revenue from federal and state transfers. The R2's reported in the overidentification tests correspond to the regression of the estimated residuals from the 2nd-stage regression on all exogenous variables, as described in the text.

TABLE 7. IV results with sales per establishment as dependent variable[14]

	(1)	(2)	(3)	(4)
Tax	-.8995** (.421)	-.264** (.0718)	-.2763** (.0767)	-1.103** (.308)
Income	.7966** (.1354)	.804** (.0537)	.8031** (.0528)	.5766** (.1234)
Education	-.2149* (.1226)	-.0027 (.0506)	.0158 (.0489)	-.171 (.1331)
Pop65+	-1.312** (.6403)	-1.927** (.2365)	-1.989** (.2334)	-.1353** (.6352)
Self emp	-.4172** (.1666)	-3.358** (.3626)	-3.334** (.3472)	-.3559* (.1914)
Year 1997	.872** (.225)	.1136** (.0423)	.1206** (.0448)	.5195** (.1645)
Kansas	.323* (.1861)	.285** (.0408)	.2876** (.0393)	.6293** (.1576)
N	697	631	692	668
Overidentification test				
N*R2	132.8	76.16	81.66	81.55
Critical value	3.84	3.84	3.84	3.84

[14] Standard errors in parentheses. An asterisk and a double asterisk indicate that the coefficient is significant at the 10% and at the 5% level, respectively. The instruments in column (1) are the logarithm of population and the proportion of institutionalized population. The instruments in column (2) are the logarithm of institutionalized population and the logarithm of the county revenue from federal and state transfers. The instruments in column (3) are the logarithm of institutionalized population and the proportion of the population under the age of 5. The instruments in column (4) are the proportion of the population under the age of 5 and the logarithm of the county revenue from federal and state transfers. The R2's reported in the overidentification tests correspond to the regression of the estimated residuals from the 2nd-stage regression on all exogenous variables, as described in the text.

TABLE 8. IV results with employees per 10,000 inhabitants as dependent variable[15]

	(1)	(2)	(3)	(4)
Tax	-1.152** (.5635)	-.4277** (.1019)	-.4179** (.1071)	-1.23** (.3432)
Income	1.023** (.18)	.9914** (.1019)	.9843** (.0737)	.7314** (.1355)
Education	-.3296** (.1628)	.1002** (.0718)	.1348** (.0682)	-.0645 (.1468)
Pop65+	3.454** (.8526)	1.879** (.3354)	1.852** (.3257)	2.339** (.698)
Self emp	-.7532** (.2205)	-3.701** (.5142)	-3.638** (.4842)	-.5733** (.2101)
Year 1997	.1861 (.3012)	.183** (.06)	.1866** (.0625)	.5733** (.1831)
Kansas	.7315** (.2491)	.4131** (.058)	.3847** (.0549)	.7225** (.175)
N	699	633	694	671
Overidentification test				
N*R2	92.76	38.23	47.4	62.87
Critical value	3.84	3.84	3.84	3.84

[15] Standard errors in parentheses. An asterisk and a double asterisk indicate that the coefficient is significant at the 10% and at the 5% level, respectively. The instruments in column (1) are the logarithm of population and the proportion of institutionalized population. The instruments in column (2) are the logarithm of institutionalized population and the logarithm of the county revenue from federal and state transfers. The instruments in column (3) are the logarithm of institutionalized population and the proportion of the population under the age of 5. The instruments in column (4) are the proportion of the population under the age of 5 and the logarithm of the county revenue from federal and state transfers. The R2's reported in the overidentification tests correspond to the regression of the estimated residuals from the 2nd-stage regression on all exogenous variables, as described in the text.

TABLE 9. IV results with employees per establishment as dependent variable[16]

	(1)	(2)	(3)	(4)
Tax	-1.262** (.5512)	-.4213** (.0785)	-.4317** (.0842)	-1.192** (.3207)
Income	.6767** (.1761)	.7243** (.0586)	.7126** (.058)	.5771** (.1267)
Education	-.3695** (.1593)	.0011 (.0553)	.0253 (.0536)	-.1421 (.1372)
Pop65+	.041 (.8331)	-.8332** (.2584)	-.8896** (.2562)	-.3039 (.6523)
Self emp	-.4765** (.2157)	-4.058** (.3961)	-4.012** (.381)	-.3958** (.1963)
Year 1997	.664* (.2946)	.2173** (.0462)	.2268** (.0492)	.5728** (.1711)
Kansas	.4995** (.2437)	.3438** (.0446)	.3341** (.0432)	.6518** (.1636)
N	699	633	694	671
Overidentification test				
N*R2	118.1	60.89	59.13	88.1
Critical value	3.84	3.84	3.84	3.84

[16] Standard errors in parentheses. An asterisk and a double asterisk indicate that the coefficient is significant at the 10% and at the 5% level, respectively. The instruments in column (1) are the logarithm of population and the proportion of institutionalized population. The instruments in column (2) are the logarithm of institutionalized population and the logarithm of the county revenue from federal and state transfers. The instruments in column (3) are the logarithm of institutionalized population and the proportion of the population under the age of 5. The instruments in column (4) are the proportion of the population under the age of 5 and the logarithm of the county revenue from federal and state transfers. The R2's reported in the overidentification tests correspond to the regression of the estimated residuals from the 2nd-stage regression on all exogenous variables, as described in the text.

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