

Indiana's County Motor Vehicle Excise Surtax and Wheel Tax

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Indiana Surtax/Wheel Tax Overview and Summary: If You Like This, Read On

The motor vehicle excise surtax and wheel tax are county option taxes on motor vehicles which provide revenue to counties, cities and towns for road maintenance and construction. They are sometimes known as Local Option Highway User Taxes (LOHUT). About half of the counties in Indiana have adopted the taxes since 1982. The excise surtax applies to passenger cars, motorcycles and light trucks weighing less than 11,000 pounds. It can be adopted as a flat rate per vehicle or as a percentage of the state motor vehicle excise tax. The wheel tax applies to larger vehicles such as trucks weighing more than 11,000 pounds, tractors, semi-trailers and recreational vehicles. The county council is responsible for considering surtax and wheel tax adoption. The two taxes must be adopted together. Revenues are distributed to counties, cities and towns based on the local road and street formula. The revenue must be used for construction, reconstruction, repair or maintenance of streets, roads and bridges.

Table 1 shows the adopting counties and the years they first received revenues, a selection of tax rates for the surtax and wheel tax, and the revenues collected in calendar year 2011. In 2011 the 47 counties with the surtax and wheel tax collected \$71.8 million in total. Almost 90% of this revenue came from the surtax on light vehicles.

The Indiana General Assembly first authorized counties to adopt the surtax and wheel tax with legislation in 1980. Allen, Dubois and Rush Counties were the first to adopt, with taxes first collected in 1982. As of 2012 47 counties have adopted the taxes. About half have adopted since 2000. The most recent adoption is by Clay County in 2012. Three counties, Clark, Hamilton and Madison, adopted the taxes and later rescinded them.

The excise surtax can be imposed either as a percentage of a vehicle owner's state motor vehicle excise tax (based on the pre-1996 tax schedule), or it can be imposed at a flat rate. The percentage ranges from two percent to ten percent with a minimum of \$7.50 per vehicle. The flat rate ranges from \$7.50 to \$25 per vehicle. Since 1996 most counties have adopted the flat rate. Most counties with a flat surtax rate charge the maximum \$25 per vehicle.

Wheel tax rates range from \$5 to \$40 per vehicle. They can vary by vehicle type and vehicle weight. Rates tend to be highest on trucks and lowest on trailers. Most counties vary the trailer taxes by weight and some vary truck taxes by weight, with heavier vehicles paying higher taxes.

If all counties adopted the taxes at maximum rates, total tax collections would be about \$175 million, an increase of about \$100 million over current collections. Most of the revenue is distributed to county governments in most counties. Less goes to cities and towns.

Adoption of surtax and wheel tax usually involves debate among public officials, taxpayers and community members. Proponents of the taxes usually seek increased funding for road construction and maintenance. Adoptions increased in the mid-2000's after state and Federal road funding diminished.

The need for more revenue may continue to be an argument for proponents, as motor fuel tax revenue is expected to grow slowly in coming years. Slow economic growth, high fuel prices

and increasing fuel efficiency diminished gasoline sales in the 2000's. These factors are likely to continue to inhibit gasoline sales growth over the next few years.

Debates about surtax/wheel tax adoption sometimes include proposals—or hopes—that the state will increase road funding, so local taxes will not be needed. State motor fuel tax rates and funding formulas have been extremely stable over past decades. The gasoline tax last increased in 2003, from 15 to 18 cents per gallon. Prior to that, the most recent fuel tax increases had been in 1988. The two formulas for distributing state revenue to counties, cities and towns have not changed in decades. This stability may reflect a political equilibrium supporting the status quo.

Distributions of state revenue comprised about two-thirds of county road revenue and half of city/town road revenue in 2012. Of the rest, about 20% of county revenue came from property tax cumulative funds, and 9% from the motor vehicle excise surtax and wheel tax. About 36% of city and town road revenue came from property taxes, and 9% from the surtax and wheel tax. Income taxes and other revenue sources accounted for the remainder.

Evidence is mixed on the effect of the surtax and wheel tax on economic development. Generally, higher taxes discourage development while added road mileage encourages development. But evidence from Indiana's surtax/wheel tax and local road mileage fail to show an impact on development, positive or negative.

County councils are responsible for adopting the surtax/wheel tax, but the revenue is distributed among counties, cities and towns. County councils may be reluctant to adopt when the onus of raising taxes falls on the council, but other units of government receive a substantial share of the revenue. Evidence shows that counties where the county government would retain a smaller share of the revenue are less likely to adopt the taxes, all else equal.

The surtax/wheel tax is a benefit tax or user fee, in general. Vehicle owners benefit from roads and pay the taxes to maintain them. The surtax/wheel tax is not a perfect benefit tax, however. In-commuters and other visitors who use local roads do not pay the taxes. The owners of heavy vehicles that place greater wear on roads may not pay higher tax rates consistent with this added wear. The tax rates do not vary with miles traveled, so those who use the roads more, and those who use them less, pay the same tax. The taxes are more likely to act as benefit taxes if the boundaries of the taxing unit include more of the people who use the service. This is more likely to be true in big counties, meaning those with more square miles.

The surtax/wheel tax does not qualify as a progressive tax, under the usual definition. A tax is progressive when people with greater ability-to-pay pay more tax. It is true that higher income people own more vehicles and so pay more in taxes. However, as a share of income, lower income people pay more. This is the definition of a regressive tax.

Vehicle sales usually fall a lot during recessions. Since the surtax and wheel tax are imposed on the stock of vehicles, both new and used, a 10% fall in current vehicle sales tends to cause only a 2% drop in surtax/wheel tax revenues. In most counties the taxes are flat rates per vehicle. The prices of the vehicles do not affect the tax payments, so inflation in vehicle prices would have no effect. The surtax and wheel tax are unlikely to keep up with inflation.

Table 1.

Surtax and Wheel Tax Rates and Revenues, Indiana Counties, 2011

	Year First Collected*	Surtax		Revenue	Wheel Tax				Revenue	Total Revenue
		Rates			Rates					
		Flat Rate or Min.	Pct. Of MVExcise		RVs	Light Trucks	Heavy Trucks	Semi-Trailers		
ALLEN	1982	20		5,974,427	30	40	40	40	812,590	6,787,016
BROWN	1988	25		415,828	30	35	40	35	63,195	479,022
CARROLL	2006	25		507,414	25	25	30	40	92,863	600,277
CASS	2007	25		851,705	30	30	35	35	92,274	943,979
CLINTON	2004	20		603,301	20	20	20	20	113,775	717,076
DAVIESS	1990	12.5	10	493,800	15	25	35	20	99,819	593,619
DECATUR	2004	20		507,199	25	25	35	35	73,737	580,936
DELAWARE	2010	25		2,252,853	40	40	40	40	187,822	2,440,675
DUBOIS	1982	8	10	678,247	25	25	25	25	121,589	799,836
ELKHART	2004	25		3,972,043	25	30	35	30	387,908	4,359,950
FAYETTE	1998	25		538,281	20	30	40	10	39,676	577,957
FOUNTAIN	1983	7.5	10	246,010	15	40	40	10	43,444	289,454
GIBSON	1984	7.5	10	514,870	5	5	5	5	33,421	548,291
GREENE	2004	25		803,420	30	30	40	30	92,771	896,191
HANCOCK	2004	25		1,677,550	40	40	40	40	213,792	1,891,342
HENDRICKS	2003	20		2,607,586	20	20	20	20	373,000	2,980,585
HENRY	2004	25		1,095,698	25	30	40	30	95,166	1,190,865
HOWARD	1984	7.5	10	1,253,468	10	15	15	15	75,350	1,328,818
JAY	1996	7.5	10	258,663	40	40	40	40	87,283	345,947
JOHNSON	2008	25		3,109,592	40	40	40	40	407,533	3,517,125
LAGRANGE	2004	10	2	246,253	10	15	20	20	51,788	298,040
LAWRENCE	2006	25		1,079,048	25	25	40	25	91,884	1,170,932
MADISON**	2009	25		2,756,502	40	40	40	40	241,286	2,997,788
MARION	1983	7.5	10	11,500,750	20	40	40	10	979,131	12,479,881
MONROE	1983	25		2,316,236	40	40	40	40	277,919	2,594,155
MONTGOMERY	1994	25		864,605	20	20	30	40	111,361	975,966
MORGAN	2005	10		695,459	20	20	30	25	115,389	810,848
NOBLE	1994	7.5	6	432,159	30	30	30	30	149,814	581,973
OWEN	1998	12.5		266,471	20	20	20	20	41,754	308,225
PARKE	1983	7.5	10	214,594	40	40	40	40	70,784	285,378
PERRY	1982	7.5	10	246,971	15	30	30	20	31,519	278,490
POSEY	1984	7.5	10	435,567	20	35	35	25	127,306	562,873
PUTNAM	1996	7.5	10	469,765	25	25	40	40	109,690	579,454
RANDOLPH	2006	15		365,987	25	25	40	40	81,104	447,092
RUSH	1982	25		411,144	40	40	40	40	103,947	515,092
ST JOSEPH	2004	25		5,233,400	20	30	35	30	374,389	5,607,789
SHELBY	2008	25		1,058,693	40	40	40	40	236,044	1,294,736
SULLIVAN	1998	7.5	10	303,251	40	40	40	15	80,463	383,714
TIPPECANOE	2005	20		2,431,772	20	25	40	25	147,413	2,579,185
TIPTON	2006	25		401,259	40	40	40	40	98,426	499,684
UNION	1998	25		174,602	40	40	40	40	64,145	238,747
VANDERBURGH	1985	7.5	2	1,168,139	15	10	19	5	133,389	1,301,528
VERMILLION	2002	10		159,116	40	40	40	40	72,760	231,876
VIGO	2000	15		1,251,516	5	30	30	5	84,431	1,335,946
WARRICK	1983	7.5	7	751,392	12.5	10	10	12.5	66,339	817,731
WELLS	2007	7.5	6	283,988	5	25	25	10	40,808	324,795
WHITLEY	2006	10		328,639	20	20	20	20	108,746	437,384
INDIANA				64,209,232					7,599,033	71,808,265

* Clay County adopted the taxes in 2012.

** Madison County rescinded the taxes in 2012.

Adoption, Rates and Revenues: News from the Indiana Code

The motor vehicle excise surtax and wheel tax are “local option highway user taxes” available to Indiana counties, cities and towns, to provide revenues for road maintenance and construction. Details about adoption, rates, revenue use and administration are contained in the Indiana Code, at IC 6-3.5-4 for the surtax and IC 6-3.5-5 for the wheel tax. Highlights from the code are included in this report in Appendix 1.

The motor vehicle excise surtax and wheel tax were created by the Indiana General Assembly during the 1980 legislative session. The law has been amended several times in the past thirty years.

The county council is responsible for considering and adopting the two taxes. The surtax and wheel tax must be adopted together. Counties cannot impose one without the other. If the county council passes the two ordinances between January and June of any year, the taxes are imposed in the following year. If the ordinance is adopted between July and December, the taxes are imposed in the year after that.

The motor vehicle excise surtax is imposed on the smaller vehicles that pay the motor vehicle excise tax. These are passenger vehicles, motorcycles and trucks weighing 11,000 pounds or less. Tax rates can be set in two ways. The rate can be a percentage of the motor vehicle excise tax payment at a rate ranging from 2% to 10%, with a minimum payment per vehicle of at least \$7.50. This is why the tax is called a surtax—it can be a proportional addition to the motor vehicle excise tax payment. However, the surtax percentages are calculated based on what motor vehicle excise tax payments would have been under the old rate schedule, which was used before the 1996 rate cut.

The surtax may also be imposed at fixed rates per vehicle, without reference to motor vehicle excise tax payments. The fixed rates can be set between \$7.50 and \$25. Fixed rates apply to all vehicles. They cannot be varied by vehicle type (that is, passenger cars cannot be charged different rates than motorcycles or light trucks).

Wheel taxes are imposed at rates varying from \$5 to \$40 per vehicle. Despite the name of the tax, the rates are per vehicle and not per wheel. An 18-wheeler is not automatically taxed at four-and-a-half times the rate on a 4-wheeler. The tax applies to heavier vehicles including buses, recreational vehicles, semitrailers, tractors, trailers and trucks. The county council can vary the tax rate by vehicle type and by vehicle weight. Church buses and government vehicles are exempt, as are lighter vehicles subject to the surtax.

The surtax and wheel taxes can be rescinded by county ordinance adopted between January and June. The taxes are rescinded in the year following the ordinance. The surtax and wheel tax must be rescinded together. The taxes cannot be rescinded if the revenue supports outstanding loan or bond repayments.

Surtax and wheel tax revenues are collected by the Bureau of Motor Vehicles license branches, or by the state BMV or Department of Revenue in special cases. Revenues are remitted to the

county monthly, in the month after the taxes are collected. The county treasurer deposits the money in the county surtax fund or the county wheel tax fund.

Later each month the treasurer must allocate the surtax and wheel tax revenue to the county, city and town governments within the county, based on the Local Road and Street (LRS) formula. In counties with more than 50,000 people, 60% of the revenue is distributed based on population shares, and 40% is distributed based on road and street mileage shares. In counties with 50,000 or fewer people, 20% is distributed based on population shares and 80% based on mileage shares.

The revenue must be used by the county, cities and towns to construct, reconstruct, repair or maintain the streets, roads and bridges under their jurisdiction.

Surtax and Wheel Tax Adoptions: Who's Got It, Who Doesn't

As of 2012, 47 of the 92 counties have adopted the motor vehicle excise surtax and wheel tax. Figure 1 shows a map with counties that have adopted by date. The dates show when the taxes were first collected, so adoptions would have taken place in the eighteen months before the dates on the map.

Six of the 15 adoptions during the 1980s took place in the southwestern corner of the state. These counties were offered a special incentive to adopt. Public Law 1981-88 authorized ten counties in southwestern Indiana to issue bonds for road and bridge repairs, if the surtax and wheel tax were adopted at maximum rates. Six counties in that region adopted, though they do not charge the maximum rates as of 2012.

Nine counties scattered in the east and west of Indiana adopted in the 1990s. Most adoptions since 2000 have been in the central region, and along the Michigan border. The northwestern and southeastern corners of the state still have few adopting counties.

Three counties have adopted and later rescinded the surtax and wheel tax. Hamilton County adopted the taxes for 1990 and rescinded for 1997. Clark County adopted for 2004 and rescinded for 2008. Madison County adopted for 2009 and rescinded the tax in the Spring of 2012.

Figure 2 shows the cumulative adoptions between 1982 and 2012, again showing the first year the tax was collected. By 1985 the initial wave of adoptions was complete, with 13 counties adopting. There were only three added adoptions over the next eight years through 1993, and ten more adopted over the next ten years. As of 2003 26 counties collected the taxes.

The years 2004 through 2009 saw a burst of 21 new adoptions. In 2004 alone the taxes took effect in nine additional counties; 2006 saw five counties added. Since 2009 one new county has adopted, and one has rescinded, so that 47 counties have the taxes as of 2012.

In 2012 Clay County adopted the surtax and wheel tax, and Madison County rescinded its taxes. These changes will be effective for taxpayers in 2013, meaning that there will still be 47 counties with the surtax and wheel tax.

Figure 1.

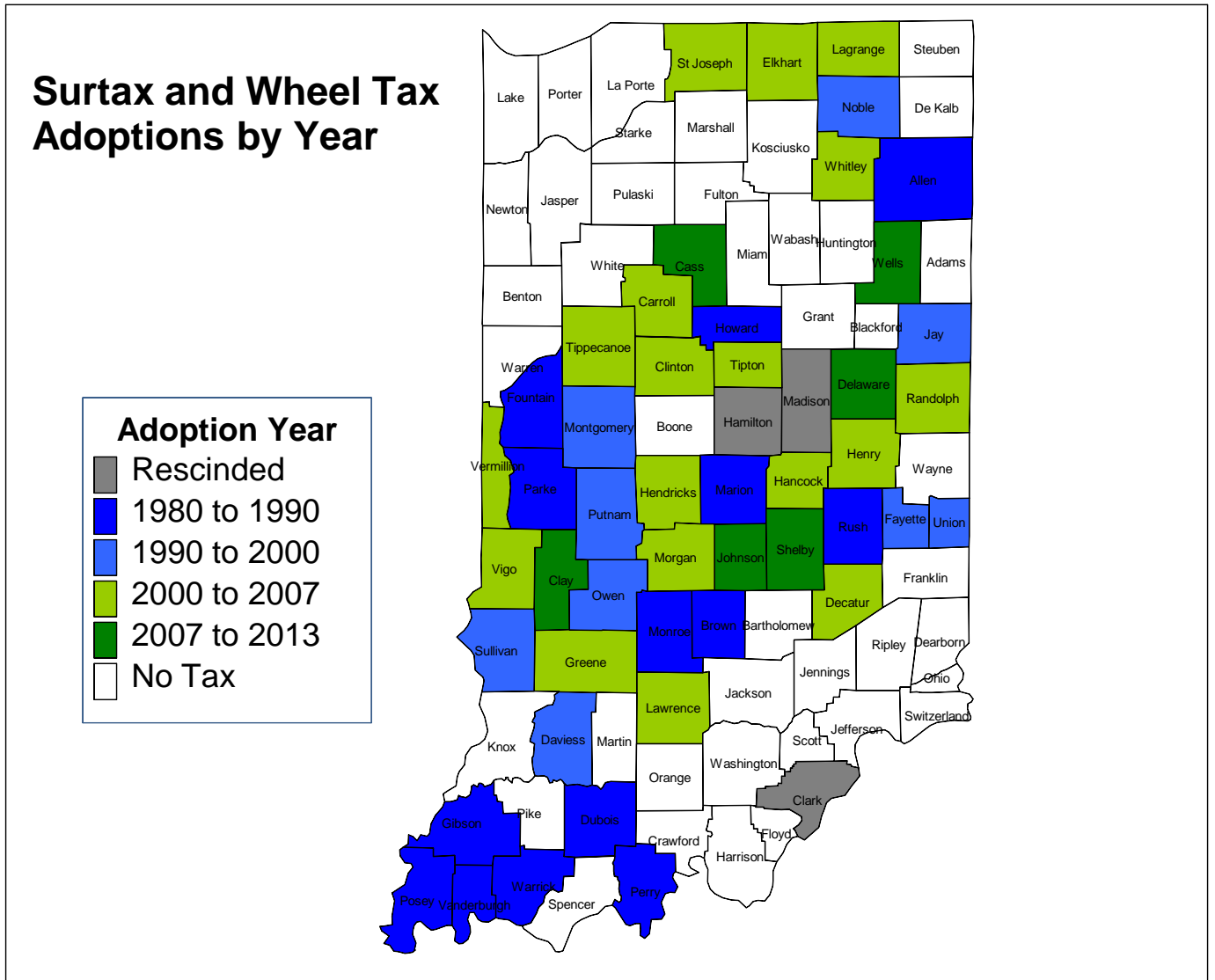
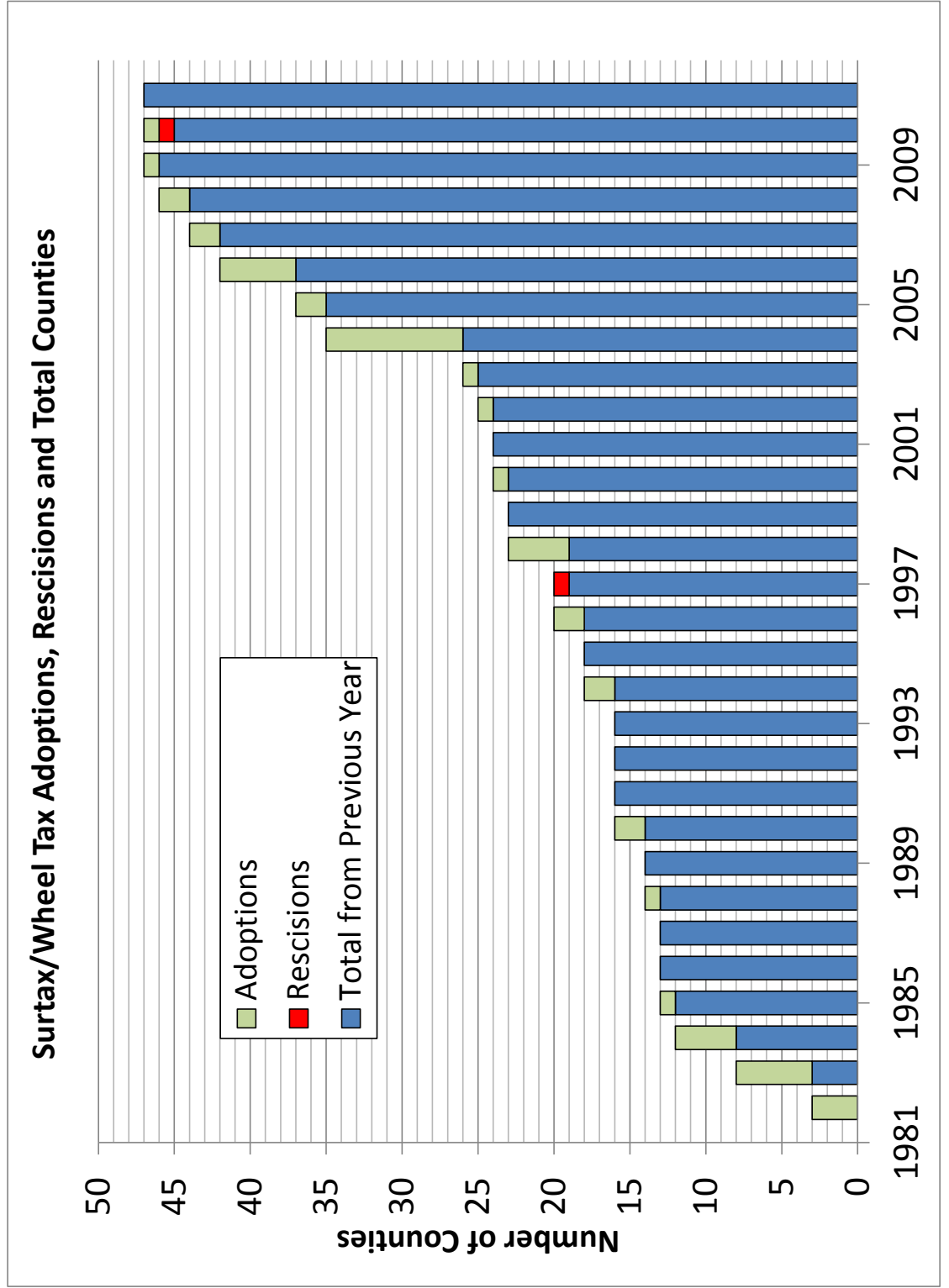


Figure 2.



Surtax and Wheel Tax Rates: Who Charges What?

Counties have wide latitude in setting the tax rates for the motor vehicle excise surtax and wheel tax. The Indiana code allows the surtax to be set at 2% to 10% of the motor vehicle excise tax payment (based on the pre-1996 tax schedule), with a minimum payment of \$7.50 per vehicle, or at a flat rate of between \$7.50 and \$25 per vehicle. The wheel tax rates may vary from \$5 to \$40 per vehicle. Different rates can be assigned to the various types and weight classes of vehicles. All of these options are in use by at least one county.

Figure 3 summarizes the surtax rate choices of the 47 adopting counties. Seventeen counties set the rate as a percentage of the motor vehicle excise tax. Thirty counties charge a flat rate. The surtax percentages range from the minimum of 2% (two counties) to the maximum of 10% (12 counties). Three counties use intermediate rates. Most counties that use surtax percentages set the minimum payment at \$7.50, but three of 17 use minimum payments between \$8 and \$19. No counties use a minimum of \$20 or more.

None of the 30 counties with flat per vehicle rates use the minimum \$7.50. Nineteen use the maximum \$25 rate. Five counties use \$20, and another six charge flat rates between \$8 and \$19.

There is one clear pattern in surtax rate adoptions. In 1996 and before, 14 of 19 adopting counties set their surtax rates as percentages of motor vehicle excise tax payments. After 1996, only three of 28 adopting counties set a percentage rate. The other 25 chose flat per-vehicle rates. In 1996 the state reduced motor vehicle excise tax rates, which added a complication to the percentage rate surtax payment calculation. The surtax payment would no longer be a percentage of the *actual* motor vehicle excise tax payment, but a percentage of what that tax payment *would have been* under the old higher rates. A flat rate surtax avoided this complication, and this may be why few counties have adopted percentage surtax rates since 1996.

Counties have adopted a wide variety of wheel tax rates. Figures 4 and 5 summarize these choices. Figure 4 shows the number of counties adopting the various tax rates between \$5 and \$40 for different vehicle types. For every vehicle type, there are counties charging the minimum \$5, the maximum \$40, and rates in between.

Details follow, but several patterns are evident. Rates tend to be highest on trucks and lowest on trailers. Farm vehicles are not taxed differently from other vehicles of the same type. Most counties charge a single rate for most vehicle types, without varying rates by weight. Many counties vary rates by weight for both trucks and trailers, but a majority vary rates by weight only for trailers. Where rates vary by weight, most counties use only two rates, a lower rate for lighter vehicles and a higher rate for heavier vehicles. Lawrence and Vanderburgh Counties vary wheel tax rates for several weight classes.

For recreational vehicles (RV's), the median rate is \$25. (The median is the rate in the middle of the 47-county ranking, with an equal number of counties charging more and less than \$25.) As shown in Figure 4, three counties set the rate at the minimum \$5 and 13 counties set the rate at

the maximum \$40. The most common rates are between \$20 and \$29 (19 counties). Twelve counties charge other rates. RV rates do not vary by weight.

The median rate on commercial buses is \$30 for all weight classes. Figure 4 shows the rates for a medium-weight bus of 30,000 pounds. One county charges the minimum \$5, and 15 counties charge the maximum \$40. All but two counties use the same rate for buses of all weight classes. Lawrence and Vanderburgh are the two exceptions; both charge higher tax rates for heavier buses. Wheel tax rates for buses are not listed for two counties (Fountain and Posey). The Indiana Code appears to require rates above zero for all wheel-taxed vehicles.

The median tax rate for semi-tractors is also \$30 for all weight classes. As shown in Figure 4, the most common rates are the maximum \$40 (used in 19 counties) and rates between \$20 and \$29 (used in 16 counties). Again, almost all counties charge the same rate for semi-tractors, regardless of weight. The three exceptions are Lawrence, Montgomery and Vanderburgh, which charge higher rates for heavier vehicles.

Trucks up to 26,000 pounds have a median tax rate of \$30 and trucks 42,000 pounds and over have a median rate of \$40. Trucks with weights in between have median rates between \$30 and \$40. Eighteen counties use higher tax rates for heavier trucks. Most of these counties have only two rates. Most commonly, lower rates apply to trucks at 26,000 pounds or less, and higher rates apply to trucks 30,000 pounds or more. Three counties have more than two rates for trucks (Lawrence, Putnam and Vanderburgh). The weight differences are summarized in Figure 4, which shows county rate counts for 23,000 and 48,000 pound trucks. Fourteen counties charge rates between \$20 and \$29 for lighter trucks, but only seven use such rates for heavier trucks. Likewise, 18 counties charge the maximum \$40 rate on lighter trucks, while 24 counties do so for heavier trucks.

Class A recovery vehicles (more than 16,000 pounds) have a median wheel tax rate of \$35. Class B recovery vehicles (16,000 pounds or less) have a median rate of \$30. Almost half the counties charge Class A recovery vehicles the maximum \$40 rate, while only 17 counties charge class B recovery vehicles the maximum rate. Brown County splits its rate for Class A recovery vehicles, charging \$35 for those under 26,000 and \$40 for those over that weight.

For trailers, 32 of 47 counties vary their wheel tax rates by weight. Of those 32, however, 28 have only two different rates. The weight that divides the two rates varies across the counties. Most common are counties with a low rate for 3,000 pound trailers and a higher rate for all others, and counties that charge lower rates for trailers under 12,000 or 16,000 pounds, and a higher rate for all others. Four counties use more than two rates by weight class (Allen, Montgomery, Putnam and Vanderburgh). Lawrence County, which varies so many of its other rates by weight, charges all trailers \$5.

Figure 5 shows the count of rates by trailer weight. The minimum \$5 rates are common for the lightest trailers. Rates for the heaviest trailers vary widely. The median rates for the lightest trailers are \$5 and \$10. The median rates for the heaviest trailers are \$15 and \$20. Less than a third of counties charge the heaviest trailers the maximum \$40 rate.

Figure 3.

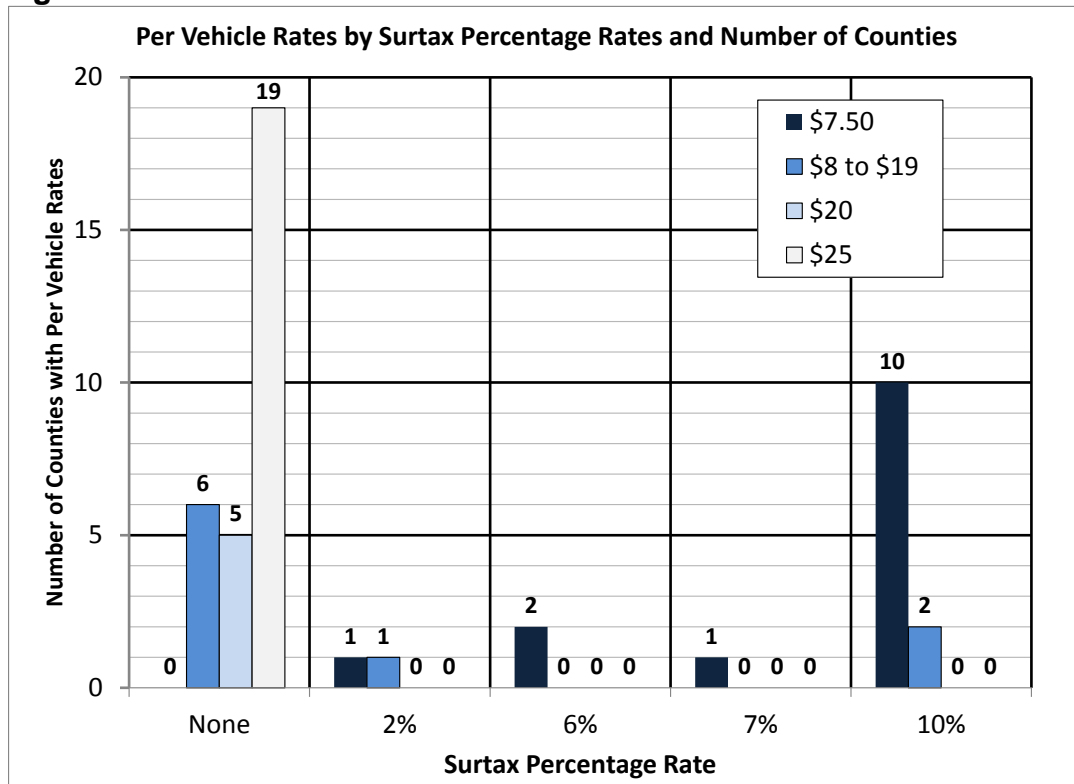


Figure 4.

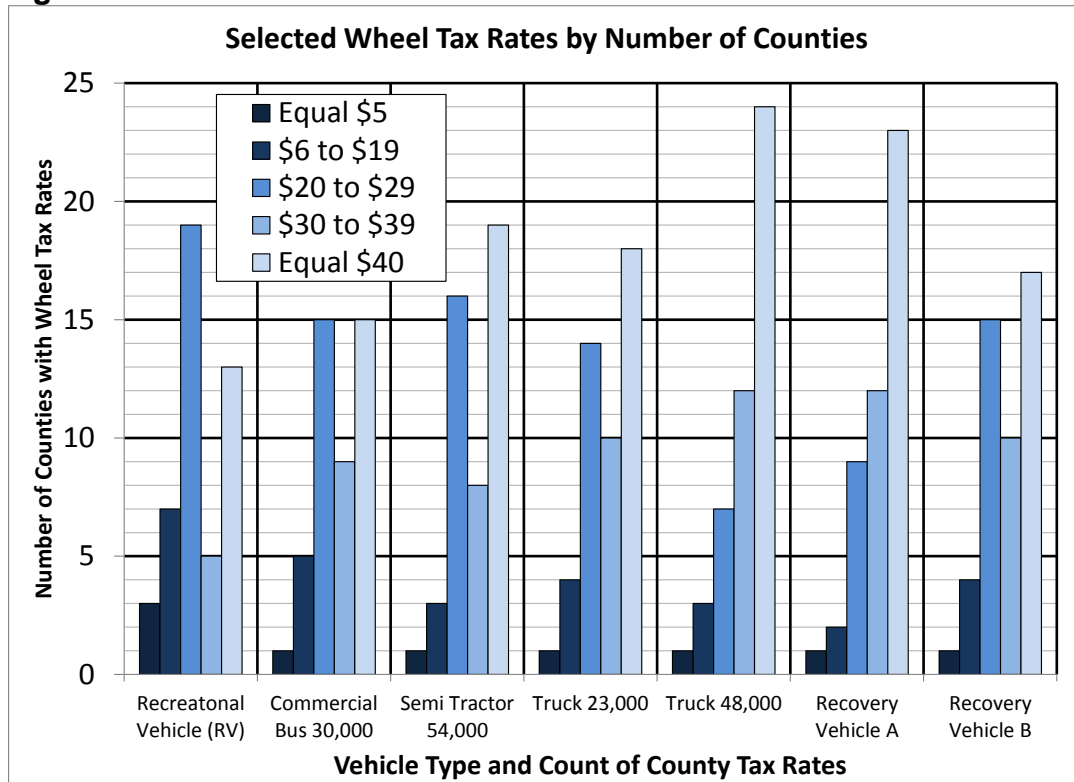
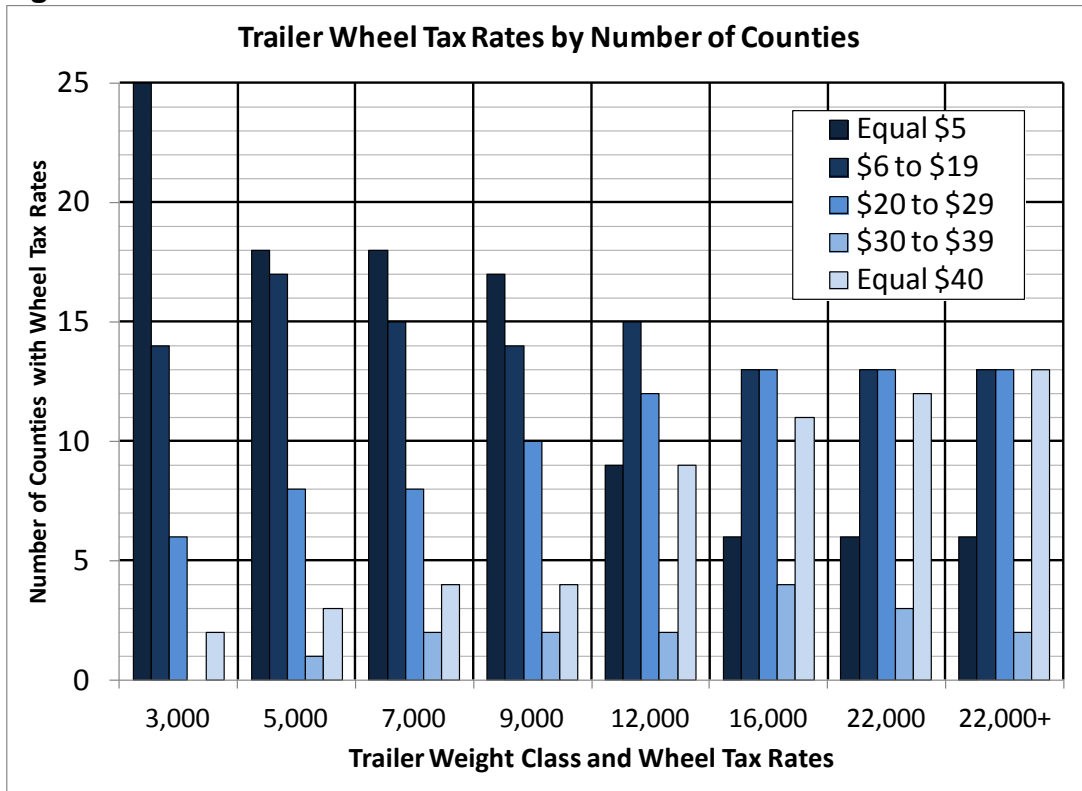


Figure 5.



Surtax and Wheel Tax Revenues and Estimates: Who Gets What? Who Could Get What?

The 47 counties with the motor vehicle excise surtax and wheel tax raised \$71.8 million from the taxes in 2011. By far the largest share of this revenue came from the surtax--\$64.2 million. The reason is simply that there are so many more automobile, motorcycle and light truck registrations than heavier vehicle registrations. In 2009 there were 5.6 million lighter vehicle registrations and 833,000 heavier vehicle registrations statewide. Lighter vehicles were 87% of registrations and the surtax was 89% of surtax/wheel tax revenue.

Table 2 shows the surtax, wheel tax and total revenues collected by the 47 adopting counties in 2011. It also shows estimates of revenues for all 92 counties, at the lowest and highest allowable surtax and wheel tax rates. Revenue estimates were calculated from 2009 motor vehicle excise tax registration data (the latest detailed numbers available). The lowest surtax estimates assume a 2% percentage rate with a \$7.50 minimum. Excise tax payments were recalculated based on the pre-1996 rate schedule. Two percent of this figure was then compared to the \$7.50 minimum, and the total revenue was summed for all the registrations in each county. The maximum surtax estimate is based on a \$25 per-vehicle rate times the number of lighter vehicle registrations. These figures were increased by 2% to account for registration growth since 2009. Wheel tax revenue was calculated by multiplying per-vehicle rates of \$5 and \$40 by the number of heavy vehicle registrations (again from 2009).

The actual revenues of the 47 adopting counties provide a test of the revenue estimates. For all 47 counties the actual surtax and the actual wheel tax revenues are within the minimum and maximum range of the estimates. The estimates appear to be reliable.

The maximum total for Indiana, for both the surtax and wheel tax, is estimated at \$175.2 million for 2011. The 47 adopting counties collected \$71.8 million in 2011. Were all counties to adopt at maximum rates, the surtax and wheel tax could raise about \$100 million more in revenue for road maintenance and construction. The cost, of course, would be higher tax payments for vehicle owners.

The surtax and wheel tax are adopted by the county council, but the revenue is distributed to cities and towns as well as the county government, using the local road and street (LRS) formula. Table 3 presents some general results of this distribution formula for all counties. The amount of revenue distributed does not affect the shares that each government unit receives, so the distribution results can be shown as percentages. In most counties by far the largest share of surtax and wheel tax revenue goes to the county government. The median county share is 81%. Ft. Wayne in Allen County and Evansville in Vanderburgh County are the only two cities that receive a majority of the revenue in their counties. The LRS formula used by the state includes municipalities that have been absorbed by Unigov, which accounts for the small share of Indianapolis in Marion County.

Tables 2 and 3 can be used to make rough estimates of the potential revenue from the surtax and wheel tax, for counties that have not adopted. Table 1 shows estimates of the minimum and maximum revenue that can be raised from the taxes. Multiply total revenue by the county percentage to estimate how much would be received by the county government. Multiply the

total by the largest city percentage for an estimate of revenue to that city. The remainder is an estimate of what would be divided among the other cities and towns in the county.

More detailed estimates of surtax and wheel tax revenues by county and unit are available from the Local Technical Assistance Program (LTAP).

Table 2.

Estimated and Actual Surtax and Wheel Tax Revenue, Indiana Counties, 2011

	Auto Excise Surtax			Wheel Tax			Total		
	2%, \$7.50 min	Flat \$25	Actual	\$5/Vehicle	\$40/Vehicle	Actual	Minimum	Maximum	Actual
1 ADAMS	211,288	708,594		27,830	222,640		239,118	931,234	
2 ALLEN	2,295,632	7,567,763	5,974,427	169,540	1,356,320	812,590	2,465,172	8,924,083	6,787,016
3 BARTHOLOMEW	560,530	1,843,599		53,490	427,920		614,020	2,271,519	
4 BENTON	69,232	230,291		13,065	104,520		82,297	334,811	
5 BLACKFORD	96,553	323,264		13,415	107,320		109,968	430,584	
6 BOONE	419,091	1,348,568		43,455	347,640		462,546	1,696,208	
7 BROWN	125,672	419,985	415,828	17,490	139,920	63,195	143,162	559,905	479,022
8 CARROLL	154,922	516,987	507,414	27,270	218,160	92,863	182,192	735,147	600,277
9 CASS	258,569	862,895	851,705	33,310	266,480	92,274	291,879	1,129,375	943,979
10 CLARK	748,955	2,493,314		71,530	572,240		820,485	3,065,554	
11 CLAY	200,070	669,044		26,535	212,280		226,605	881,324	
12 CLINTON	230,897	769,488	603,301	28,460	227,680	113,775	259,357	997,168	717,076
13 CRAWFORD	83,454	281,775		11,915	95,320		95,369	377,095	
14 DAVIESS	204,976	682,763	493,800	33,460	267,680	99,819	238,436	950,443	593,619
15 DEARBORN	378,264	1,259,573		39,630	317,040		417,894	1,576,613	
16 DECATUR	193,298	641,300	507,199	26,240	209,920	73,737	219,538	851,220	580,936
17 DEKALB	305,819	1,022,652		45,050	360,400		350,869	1,383,052	
18 DELAWARE	703,093	2,326,340	2,252,853	67,620	540,960	187,822	770,713	2,867,300	2,440,675
19 DUBOIS	334,870	1,112,540	678,247	46,690	373,520	121,589	381,560	1,486,060	799,836
20 ELKHART	1,210,705	4,028,822	3,972,043	131,645	1,053,160	387,908	1,342,350	5,081,982	4,359,950
21 FAYETTE	165,774	555,620	538,281	17,160	137,280	39,676	182,934	692,900	577,957
22 FLOYD	522,380	1,727,268		46,160	369,280		568,540	2,096,548	
23 FOUNTAIN	130,211	434,393	246,010	18,335	146,680	43,444	148,546	581,073	289,454
24 FRANKLIN	180,657	604,274		24,745	197,960		205,402	802,234	
25 FULTON	153,496	511,811		23,125	185,000		176,621	696,811	
26 GIBSON	249,628	827,399	514,870	33,255	266,040	33,421	282,883	1,093,439	548,291
27 GRANT	465,896	1,552,083		46,790	374,320		512,686	1,926,403	
28 GREENE	244,616	817,913	803,420	31,460	251,680	92,771	276,076	1,069,593	896,191
29 HAMILTON	2,086,251	6,484,166		110,510	884,080		2,196,761	7,368,246	
30 HANCOCK	514,947	1,694,144	1,677,550	53,920	431,360	213,792	568,867	2,125,504	1,891,342
31 HARRISON	307,311	1,029,078		43,070	344,560		350,381	1,373,638	
32 HENDRICKS	994,141	3,252,882	2,607,586	90,155	721,240	373,000	1,084,296	3,974,122	2,980,585
33 HENRY	338,257	1,127,177	1,095,698	41,180	329,440	95,166	379,437	1,456,617	1,190,865
34 HOWARD	571,975	1,882,155	1,253,468	54,980	439,840	75,350	626,955	2,321,995	1,328,818
35 HUNTINGTON	264,631	880,949		33,610	268,880		298,241	1,149,829	
36 JACKSON	314,082	1,049,810		43,725	349,800		357,807	1,399,610	
37 JASPER	250,094	831,989		43,310	346,480		293,404	1,178,469	
38 JAY	149,946	503,778	258,663	18,500	148,000	87,283	168,446	651,778	345,947
39 JEFFERSON	222,605	743,657		26,530	212,240		249,135	955,897	
40 JENNINGS	209,203	703,545		28,855	230,840		238,058	934,385	
41 JOHNSON	952,920	3,130,712	3,109,592	71,130	569,040	407,533	1,024,050	3,699,752	3,517,125
42 KNOX	259,185	860,243		43,705	349,640		302,890	1,209,883	
43 KOSCIUSKO	549,209	1,821,746		81,235	649,880		630,444	2,471,626	
44 LAGRANGE	185,810	622,608	246,253	35,810	286,480	51,788	221,620	909,088	298,040
45 LAKE	2,862,854	9,374,973		167,870	1,342,960		3,030,724	10,717,933	
46 LAPORTE	794,908	2,631,906		77,995	623,960		872,903	3,255,866	

Table 2 (continued).

Estimated and Actual Surtax and Wheel Tax Revenue, Indiana Counties, 2011

	Auto Excise Surtax			Wheel Tax			Total		
	2%, \$7.50 min	Flat \$25	Actual	\$5/Vehicle	\$40/Vehicle	Actual	Minimum	Maximum	Actual
47 LAWRENCE	333,453	1,112,948	1,079,048	43,085	344,680	91,884	376,538	1,457,628	1,170,932
48 MADISON	855,429	2,838,711	2,756,502	86,485	691,880	241,286	941,914	3,530,591	2,997,788
49 MARION	5,569,840	18,344,292	11,500,750	308,725	2,469,800	979,131	5,878,565	20,814,092	12,479,881
50 MARSHALL	329,538	1,098,260		46,725	373,800		376,263	1,472,060	
51 MARTIN	80,747	270,530		11,345	90,760		92,092	361,290	
52 MIAMI	244,132	816,281		33,605	268,840		277,737	1,085,121	
53 MONROE	709,425	2,335,494	2,316,236	54,305	434,440	277,919	763,730	2,769,934	2,594,155
54 MONTGOMERY	263,762	879,113	864,605	34,405	275,240	111,361	298,167	1,154,353	975,966
55 MORGAN	533,317	1,775,693	695,459	66,625	533,000	115,389	599,942	2,308,693	810,848
56 NEWTON	114,407	381,659		17,610	140,880		132,017	522,539	
57 NOBLE	319,549	1,071,077	432,159	44,165	353,320	149,814	363,714	1,424,397	581,973
58 OHIO	46,916	156,978		5,770	46,160		52,686	203,138	
59 ORANGE	148,566	498,372		25,675	205,400		174,241	703,772	
60 OWEN	161,323	542,309	266,471	22,225	177,800	41,754	183,548	720,109	308,225
61 PARKE	114,668	383,316	214,594	19,130	153,040	70,784	133,798	536,356	285,378
62 PERRY	140,224	470,246	246,971	17,985	143,880	31,519	158,209	614,126	278,490
63 PIKE	97,480	326,171		16,430	131,440		113,910	457,611	
64 PORTER	1,088,741	3,550,544		93,790	750,320		1,182,531	4,300,864	
65 POSEY	201,439	667,947	435,567	33,550	268,400	127,306	234,989	936,347	562,873
66 PULASKI	105,043	350,039		20,170	161,360		125,213	511,399	
67 PUTNAM	247,378	826,838	469,765	36,385	291,080	109,690	283,763	1,117,918	579,454
68 RANDOLPH	186,973	625,413	365,987	26,740	213,920	81,104	213,713	839,333	447,092
69 RIPLEY	221,446	741,260		32,940	263,520		254,386	1,004,780	
70 RUSH	128,659	429,828	411,144	22,380	179,040	103,947	151,039	608,868	515,092
71 ST JOSEPH	1,616,300	5,332,560	5,233,400	103,255	826,040	374,389	1,719,555	6,158,600	5,607,789
72 SCOTT	169,670	570,282		18,695	149,560		188,365	719,842	
73 SHELBY	323,754	1,080,027	1,058,693	40,115	320,920	236,044	363,869	1,400,947	1,294,736
74 SPENCER	165,566	552,356		26,885	215,080		192,451	767,436	
75 STARKE	179,861	602,820		24,920	199,360		204,781	802,180	
76 STEUBEN	245,868	818,142		39,745	317,960		285,613	1,136,102	
77 SULLIVAN	147,573	491,487	303,251	19,785	158,280	80,463	167,358	649,767	383,714
78 SWITZERLAND	68,983	232,560		10,465	83,720		79,448	316,280	
79 TIPPECANOE	944,306	3,074,918	2,431,772	65,810	526,480	147,413	1,010,116	3,601,398	2,579,185
80 TIPTON	123,301	408,995	401,259	18,275	146,200	98,426	141,576	555,195	499,684
81 UNION	56,196	188,241	174,602	8,895	71,160	64,145	65,091	259,401	238,747
82 VANDERBURGH	1,166,863	3,841,244	1,168,139	93,055	744,440	133,389	1,259,918	4,585,684	1,301,528
83 VERMILLION	122,477	407,975	159,116	15,595	124,760	72,760	138,072	532,735	231,876
84 VIGO	641,733	2,122,646	1,251,516	53,670	429,360	84,431	695,403	2,552,006	1,335,946
85 WABASH	238,611	797,819		36,300	290,400		274,911	1,088,219	
86 WARREN	70,851	234,855		12,970	103,760		83,821	338,615	
87 WARRICK	438,212	1,434,911	751,392	50,120	400,960	66,339	488,332	1,835,871	817,731
88 WASHINGTON	213,710	718,106		29,385	235,080		243,095	953,186	
89 WAYNE	451,704	1,508,045		42,380	339,040		494,084	1,847,085	
90 WELLS	206,129	689,240	283,988	32,215	257,720	40,808	238,344	946,960	324,795
91 WHITE	192,069	639,107		33,615	268,920		225,684	908,027	
92 WHITLEY	252,389	841,985	328,639	37,030	296,240	108,746	289,419	1,138,225	437,384
INDIANA	43,005,458	141,847,448	64,209,232	4,168,190	33,345,520	7,599,033	47,173,648	175,192,968	71,808,265

Table 3.

Local Road and Street Formula Percentages, Counties, Cities and Towns

County	Percent	Largest City/Town	Percent	All Other	County	Percent	Largest City/Town	Percent	All Other
				Cities/Towns					Cities/Towns
				Percent					Percent
1 ADAMS	82%	DECATUR	11%	8%	47 LAWRENCE	78%	BEDFORD	15%	6%
2 ALLEN	31%	FORT WAYNE	63%	6%	48 MADISON	44%	ANDERSON	36%	20%
3 BARTHOLOMEW	53%	COLUMBUS	43%	4%	49 MARION	53%	INDIANAPOLIS	38%	10%
4 BENTON	80%	FOWLER	7%	13%	50 MARSHALL	82%	PLYMOUTH	9%	9%
5 BLACKFORD	75%	HARTFORD CITY	19%	6%	51 MARTIN	87%	LOGOOTE	9%	4%
6 BOONE	73%	LEBANON	11%	16%	52 MIAMI	83%	PERU	13%	4%
7 BROWN	97%	NASHVILLE	3%	0%	53 MONROE	52%	BLOOMINGTON	44%	4%
8 CARROLL	90%	DELPHI	5%	6%	54 MONTGOMERY	81%	CRAWFORDSVILLE	13%	6%
9 CASS	79%	LOGANSPO	17%	3%	55 MORGAN	72%	MARTINSVILLE	13%	15%
10 CLARK	48%	JEFFERSONVILLE	22%	30%	56 NEWTON	88%	KENTLAND	4%	8%
11 CLAY	82%	BRAZIL	12%	6%	57 NOBLE	82%	KENDALLVILLE	8%	10%
12 CLINTON	79%	FRANKFORT	15%	5%	58 OHIO	86%	RISING SUN	14%	0%
13 CRAWFORD	89%	MILLTOWN	3%	8%	59 ORANGE	83%	PAOLI	7%	10%
14 DAVIESS	81%	WASHINGTON	14%	5%	60 OWEN	94%	SPENCER	4%	1%
15 DEARBORN	82%	GREENDALE	5%	13%	61 PARKE	89%	ROCKVILLE	5%	6%
16 DECATUR	81%	GREENSBURG	14%	5%	62 PERRY	81%	TELL CITY	15%	4%
17 DEKALB	75%	AUBURN	12%	13%	63 PIKE	90%	PETERSBURG	7%	3%
18 DELAWARE	46%	MUNCIE	44%	10%	64 PORTER	50%	VALPARAISO	16%	35%
19 DUBOIS	73%	JASPER	16%	11%	65 POSEY	85%	MOUNT VERNON	10%	5%
20 ELKHART	58%	ELKHART	23%	19%	66 PULASKI	91%	WINAMAC	5%	4%
21 FAYETTE	76%	CONNERSVILLE	24%	0%	67 PUTNAM	83%	GREENCASTLE	10%	7%
22 FLOYD	52%	NEW ALBANY	44%	4%	68 RANDOLPH	83%	WINCHESTER	6%	11%
23 FOUNTAIN	81%	ATTICA	6%	13%	69 RIPLEY	83%	BATESVILLE	8%	9%
24 FRANKLIN	93%	BROOKVILLE	4%	3%	70 RUSH	88%	RUSHVILLE	10%	2%
25 FULTON	87%	ROCHESTER	10%	3%	71 ST. JOSEPH	48%	SOUTH BEND	35%	17%
26 GIBSON	80%	PRINCETON	9%	12%	72 SCOTT	79%	SCOTTSBURG	12%	9%
27 GRANT	49%	MARION	32%	19%	73 SHELBY	83%	SHELBYVILLE	15%	2%
28 GREENE	83%	LINTON	7%	10%	74 SPENCER	87%	SANTA CLAUS	4%	9%
29 HAMILTON	26%	CARMEL	26%	49%	75 STARKE	88%	KNOX	6%	5%
30 HANCOCK	68%	GREENFIELD	21%	11%	76 STEUBEN	83%	ANGOLA	9%	8%
31 HARRISON	94%	CORYDON	3%	3%	77 SULLIVAN	84%	SULLIVAN	7%	9%
32 HENDRICKS	58%	PLAINFIELD	15%	27%	78 SWITZERLAND	93%	VEVAY	6%	1%
33 HENRY	77%	NEW CASTLE	15%	8%	79 TIPPECANOE	49%	LAFAYETTE	33%	18%
34 HOWARD	54%	KOKOMO	42%	3%	80 TIPTON	87%	TIPTON	9%	4%
35 HUNTINGTON	76%	HUNTINGTON	18%	6%	81 UNION	88%	LIBERTY	8%	3%
36 JACKSON	77%	SEYMOUR	17%	5%	82 VANDERBURGH	38%	EVANSVILLE	61%	1%
37 JASPER	87%	RENSELAER	6%	7%	83 VERMILLION	75%	CLINTON	12%	13%
38 JAY	81%	PORTLAND	10%	9%	84 VIGO	52%	TERRE HAUTE	45%	3%
39 JEFFERSON	79%	MADISON	16%	5%	85 WABASH	78%	WABASH	13%	9%
40 JENNINGS	90%	NORTH VERNON	9%	1%	86 WARREN	89%	WILLIAMSPORT	6%	4%
41 JOHNSON	44%	GREENWOOD	30%	26%	87 WARRICK	79%	BOONVILLE	9%	12%
42 KNOX	74%	VINCENNES	18%	8%	88 WASHINGTON	87%	SALEM	8%	4%
43 KOSCIUSKO	73%	WARSAW	12%	14%	89 WAYNE	48%	RICHMOND	41%	11%
44 LAGRANGE	93%	LAGRANGE	3%	3%	90 WELLS	82%	BLUFFTON	12%	5%
45 LAKE	14%	GRIFFITH	14%	73%	91 WHITE	85%	MONTICELLO	7%	8%
46 LAPORTE	53%	MICHIGAN CITY	22%	25%	92 WHITLEY	86%	COLOMBIA CITY	10%	4%
					Median	81%	Median	12%	7%

Adoption Decision Debates: Why We Should Have It; Why We Should Not

County Councils are responsible for debating and voting on the adoption of the motor vehicle excise surtax and wheel tax. These debates can serve as a guide to the issues of concern to officials, taxpayers and road users. This section assembles information from news articles and county council minutes about the issues debated in recent surtax/wheel tax decisions. Subsequent sections offer analyses of these issues.

Roads Need Fixing

Proponents of the surtax/wheel tax cite the need for additional road construction and maintenance funding in nearly every report about a tax debate. As just one example, in a 2007 Johnson County Council meeting about the taxes, the minutes report that the County Highway Director explained “why the county cannot maintain an adequate maintenance program for the county roads. He distributed and explained a graph showing the MVH and LRS funding from 1998 thru 2006. The county is experiencing infrastructure that is failing and costs that are rising and as Highway Director he supports the search for additional revenue” (Johnson County Council, May 30, 2007). MVH and LRS are the two state distributions to local governments for road maintenance (based on the motor vehicle highway formula and the local road and street formula). Some tax opponents during this debate acknowledged that more road revenue was needed, but argued that the surtax/wheel tax would “only give the county a small portion of funds when the county needs millions for the roads.”

The primary reasons offered by local officials and sometimes county residents for adopting the taxes are lagging state revenues, rising road maintenance costs and deteriorating roads. Whether the surtax and wheel tax will raise enough to address such problems may be a question.

State Policy

Both proponents and opponents of the surtax and wheel tax often hope for more funding from the state. Proponents argue that the state will not help counties until they demonstrate a willingness to tax themselves with the surtax/wheel tax.

The Mayor of the Lafayette spoke in favor of the taxes during the Tippecanoe County debate. He said “I went down to the Legislature to testify for more road money and when I finished, the first question they asked is, ‘Does your community have a wheel tax?’ The State Legislature thinks we ought to do all we can to help ourselves here” (*Indiana Economic Digest*, April 24, 2002). Proponents made similar arguments in Clinton County, where a County Commissioner said “Legislators imply that if a county is maxed out on (wheel tax), they may increase the gas tax,” (*Indiana Economic Digest*, May 11, 2011), and in Madison County, where a consultant said “When we go to the legislature and say local governments need help, the first thing they ask is, ‘Do they have a wheel tax? If not, don’t talk to us.’” (*Indiana Economic Digest*, May 6, 2012).

The Johnson County Council put its hopes for more state funding into its surtax/wheel tax ordinance. A councilman proposed that the state rebate six cents per gallon of motor fuel taxes back to the counties. He recommended that county officials organize a statewide movement in favor of such a proposal. After this discussion, the Johnson County Council added a clause to their ordinance, stating that “This Ordinance shall be immediately rescinded by the County Council if another source of income equal to or greater is made available for use” (Johnson County Council, June 11, 2007).

Proponents of the taxes agree with opponents that added state funding would be preferable to added local taxes. Opponents sometimes argue that counties should not pass the taxes and instead wait for (or work toward) state policy changes. Proponents argue in response that the state will not help counties that are unwilling to help themselves.

Other Road Revenues

Consideration of the surtax/wheel tax is sometimes associated with other local revenue sources. In particular, counties can adopt a property tax to support a cumulative bridge fund for bridge maintenance. Clark County established the surtax/wheel tax in 2003, reduced it in 2005, and eliminated it in 2007. When the taxes were adopted the County Council eliminated the property tax for the cumulative bridge fund. When the surtax/wheel tax was reduced, the property tax was re-established at a low rate. In the 2007 debate opponents of rescinding the tax said that the Council might raise the cumulative bridge fund rate. One Councilwoman noted the efforts of the Daniels administration to reduce property taxes, and said that “the wheel tax and the surtax are alternative taxes” (*New Albany Tribune*, February 13, 2007).

Other revenue sources sometimes enter the debate. When St. Joseph County considered cutting the taxes in 2011, a county councilman noted that part of the lost revenue could be replaced with revenue from the Economic Development Income Tax (EDIT) or with funds from Major Moves, the state distributed revenue from the lease of the Indiana toll road (*South Bend Tribune*, February 7, 2011).

Sometimes proponents point out that adopting the surtax/wheel tax can generate other revenues. A Commissioner in Madison County pointed out that surtax/wheel tax revenue is used “for leveraging state and federal money to pay for needed road and bridge repairs throughout the county” (*Anderson Herald Bulletin*, February 29, 2012). And, in some southwestern Indiana counties, the law allows bonding for roads if the taxes are adopted at maximum rates.

The surtax/wheel tax may be related to other revenue sources. Property taxes, local income taxes and state aid may substitute for the surtax/wheel tax. But surtax/wheel tax revenue may augment other revenue sources, or be used as matching funds for other sources.

Economic Development

Both proponents and opponents of the surtax/wheel tax offer justifications based on economic development. Those favoring the taxes argue that improved roads will attract business investment. The Madison County Chamber of Commerce objected when the County Council rescinded the surtax/wheel tax in 2012. A Chamber official said, “Infrastructure leads to economic development. (Officials) know potential employers look at infrastructure. If we let our streets and roads go, that’s a huge flag to potential employers.” (*Indiana Economic Digest*, May 6, 2012). A Delaware County councilman said that businesses “not only look at quality of roads but also a community that is willing to invest in themselves. . . .” (Delaware County Council, June 23, 2009). A Clay County councilwoman argued that “The roads we have now don't entice new businesses or help our local businesses now. If you don't spend money, you're not going to make money” (*Indiana Economic Digest*, May 8, 2012).

Opponents argue that higher taxes discourage business location and expansion. In the DeKalb County debate in 2002, a county commissioner said that a local trucking company strongly opposed the wheel tax. He said “if that goes through, they are looking at land in Oklahoma. They will move” (*Indiana Economic Digest*, June 4, 2002). In Tippecanoe County a Farm Bureau official said “there are numerous large corporations who could title their vehicles out of the county if this wheel tax is implemented,” (*Indiana Economic Digest*, June 6, 2002). A Clark County councilman argued that the 2005 cut in the surtax/wheel tax would serve as an economic development tool (*Indiana Economic Digest*, March 30, 2005).

Better roads may encourage development. Higher taxes may discourage development.

County vs. Cities and Towns

The County Council is responsible for adopting the surtax and wheel tax, but the revenue is divided among county, and the cities and towns within the county. This division of revenues sometimes enters the debate about the taxes. Sometimes county officials are concerned that they will take the political responsibility for passing the tax, while the cities and towns get political credit for improving roads.

During a 2011 debate in Lake County, a county councilwoman said “I know that (the county) needs these monies. I’m not sure every city and town does.” She said she would like to see resolutions in support of or against the measure from cities and towns (*Indiana Economic Digest*, April 20, 2011). Cities and towns offered such input during Tippecanoe County’s debate. The mayors of Lafayette and West Lafayette and town councils from Dayton and Clarks Hill sent letters of support. Town councils from Otterbein, Shadeland and Battle Ground wrote letters in opposition (*Indiana Economic Digest*, June 6, 2002).

Sometimes the equity of the distribution formula is questioned. In the Lake County debate, a councilman expressed concern about the distribution of revenues among the county, cities and towns. He said that “unincorporated areas of the county would receive about \$2,600 a mile annually while cities and towns would receive about \$4,500 a mile” (*Indiana Economic Digest*, April 20, 2011).

Occasionally local units agree to alter the distribution of funds. Such an agreement was made when Allen County increased its surtax/wheel tax rates in 2009. The debate included a controversy about whether the county had responsibility for maintaining bridges within city and town limits. After discussions lasting more than a year, the Ft. Wayne City Council agreed to return 65% of its share of the added revenue to the county, if the money was used to maintain bridges within the city limits. Smaller towns in Allen County also agreed (*Ft. Wayne Journal Gazette*, June 19, 2009).

Counties adopt the tax; counties, cities and towns benefit. The revenue distribution among local units is fixed by formula. Cooperation among local units is sometimes required before the taxes are adopted.

User Taxes

The motor vehicle excise surtax and wheel taxes are paid by vehicle owners and used for road maintenance and construction. They can be considered user taxes or benefit taxes: those who benefit from the public services pay the taxes to support them. The two taxes are sometimes called Local Option Highway User Taxes.

The surtax/wheel tax as a user tax sometimes comes up in debates. In Madison County, for example, a candidate for county council had this to say after Madison rescinded its taxes: “User taxes are the fairest taxes, and that’s the one we got rid of. Now we are depending on gas taxes and we are back to looking at property taxes, which is the opposite way the state governor is wanting counties to move” (*Anderson Herald Bulletin*, April 28, 2012).

Frequently, however, opponents cite the flaws of the surtax/wheel tax as user taxes. Taxes are fixed regardless of the mileage a vehicle drives. A Johnson County councilman argued that “the Wheel Tax has no equity because someone that drives 5,000 miles a year pays the same as someone who drives 30,000 a year on the same roads” (Johnson County Council, May 14, 2007). Taxes apply to vehicles registered in the county. Vehicles that use county roads but are registered elsewhere do not pay the tax. A Tippecanoe County farmer said “I’m concerned that a wheel tax does not apply to people from outside the county who are using our roads. A number of people from surrounding counties commute here to work” (*Indiana Economic Digest*, April 24, 2002). Heavy vehicles create more wear on roads than lighter vehicles. This wear varies more than the allowable variation in tax rates. A Lawrence County resident brought a semi-trailer tire and a small tire to a Council meeting to illustrate this point. He said he was against the inequities of paying the same amount for a motorcycle and a tractor truck, a small trailer and a semi-trailer (*Indiana Economic Digest*, June 29, 2005).

The surtax and wheel tax are user taxes or benefit taxes in a broad sense. Vehicle owners pay taxes that are used for road maintenance. But the taxes cannot vary with miles driven. They cannot be charged to vehicles from outside the county that use county roads. And they cannot vary enough to cover the extra wear placed on roads by heavier vehicles.

Ability to Pay

One measure of tax fairness is the benefit principle, which states that people who benefit from government services should pay for them. Another measure is ability to pay, which states that those who can afford to pay more for the community’s services should pay more. Both proponents and opponents of the taxes sometimes express concern about the burden the taxes place on lower income people, people on fixed incomes, and people stressed by economic recession.

A Lake County councilwoman who favored the taxes said “she understands residents are already financially stretched, but the roads have been long neglected due to the property tax cap and that cannot continue” (*Indiana Economic Digest*, April 20, 2011). A tax opponent in Randolph County argued “I don’t think this tax is fair to the average person. It’s especially unfair to older people on a really limited income” (*Indiana Economic Digest*, June 23, 2005). A Madison County councilman explained his vote to rescind the taxes, saying “When county residents are

struggling with job loss and are living on fixed incomes, the best thing government leaders can do is cut taxes” (*Anderson Herald Bulletin*, February 29, 2012).

Any tax increase can be a burden to those with limited means. The surtax/wheel tax, with its fixed rates, may be a particular hardship on lower income taxpayers.

Why Counties Adopt: Money for Roads

Almost surely the main reason that counties consider the surtax and wheel tax is the need for additional revenue for road maintenance and construction. When state revenues drop and costs increase, counties may look to the surtax/wheel tax for added revenue. Evidence that revenue and costs are important reasons for adoption can be seen in the pattern of adoptions since 2000.

Figure 6 shows the new adoptions by year, and both state and total state and federal appropriations in the Indiana budget for distribution for road maintenance and construction. These dollar amounts are adjusted for inflation, using the U.S. Department of Transportation's road construction cost index. Figure 7 shows that road construction cost index, again with new adoptions by year.

There was a burst of new adoptions in the 2000's. The number of counties with the surtax and wheel tax increased from 24 in 2000 to 47 in 2010. In the three years 2004 to 2006, 16 new counties began collecting the taxes.

Declining revenues from state and Federal sources may have been a reason. Revenues from state and Federal sources had declined from 2001 to 2006, in both nominal and real terms ("real" means adjusted for inflation). Likewise, highway construction costs trended upward during the 1990's and early 2000's, then climbed rapidly in 2003 through 2006.

State revenues exceeded forecasts in most years during the second half of the 1990s. State balances accumulated. As a result, in both 2000 and 2001 the General Assembly appropriated \$100 million from the state general fund as added local road and street distributions for counties, cities and towns. Total state revenues available for road maintenance and construction jumped in those years.

The 2001 recession reduced state revenues and eliminated excess balances. After 2001 there were no more general fund appropriations for local roads, so state funding fell. Many counties voted to adopt the surtax and wheel tax at that time. Recall that the taxes first collected in 2004 were debated and passed in 2002 or 2003. It may be that the sudden drop in state aid caused a large number of counties to consider the surtax and wheel tax as a source of revenue for roads.

Inflation-adjusted revenues recovered somewhat after 2006. Road construction costs fell. The state made a special \$75 million distribution for local roads as part of the Major Moves effort in 2008. Appropriations from Federal sources increased in 2010 and 2011 with the Federal stimulus program.

New adoptions dwindled with the newly available revenue and declining construction costs. From 2009 through 2011 there were only two new adoptions. The future of surtax/wheel tax adoptions may depend in part on road construction costs and on the availability of state and Federal revenues for roads. This revenue depends in large part on taxes on motor fuel.

Figure 6.

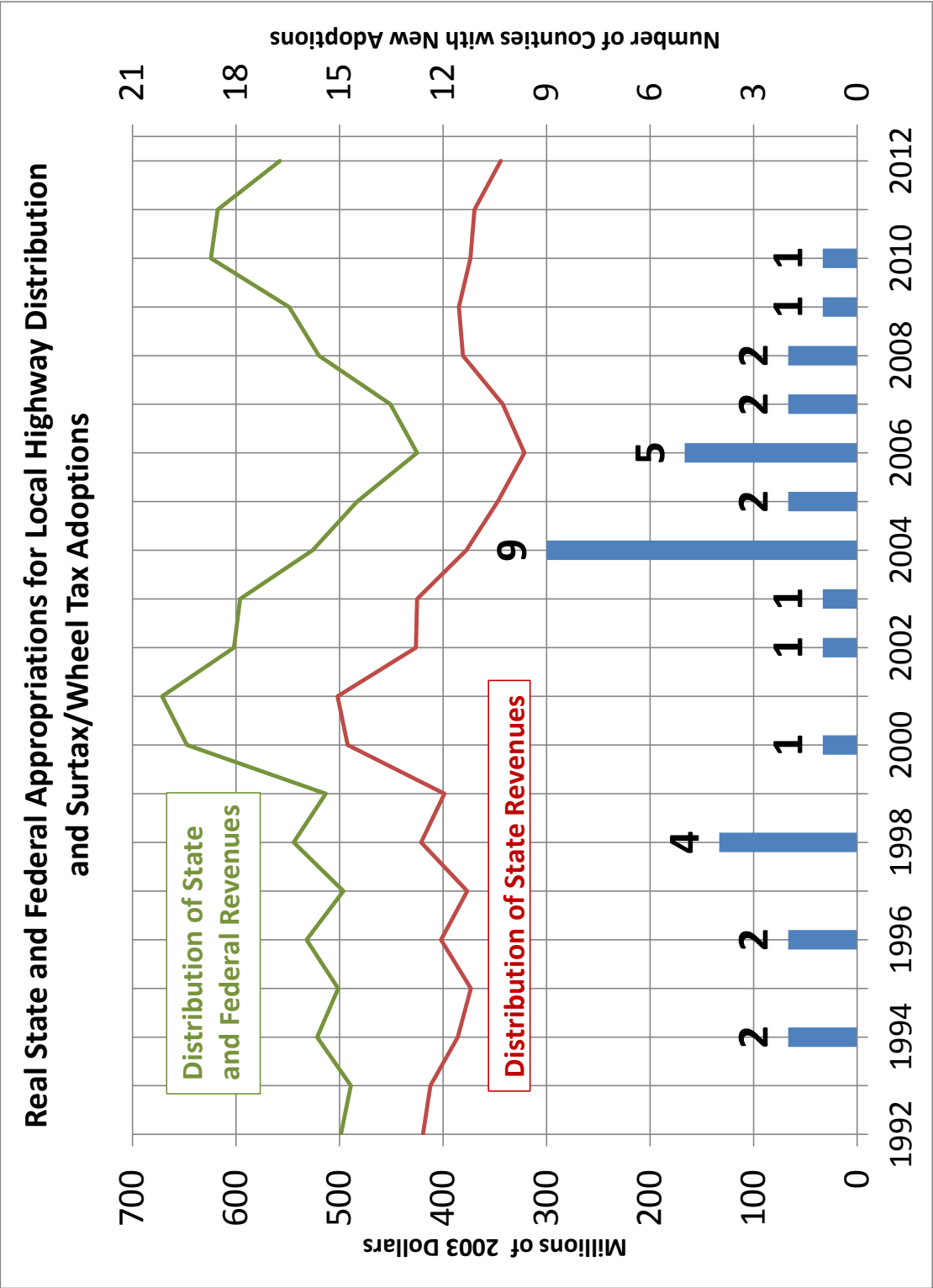
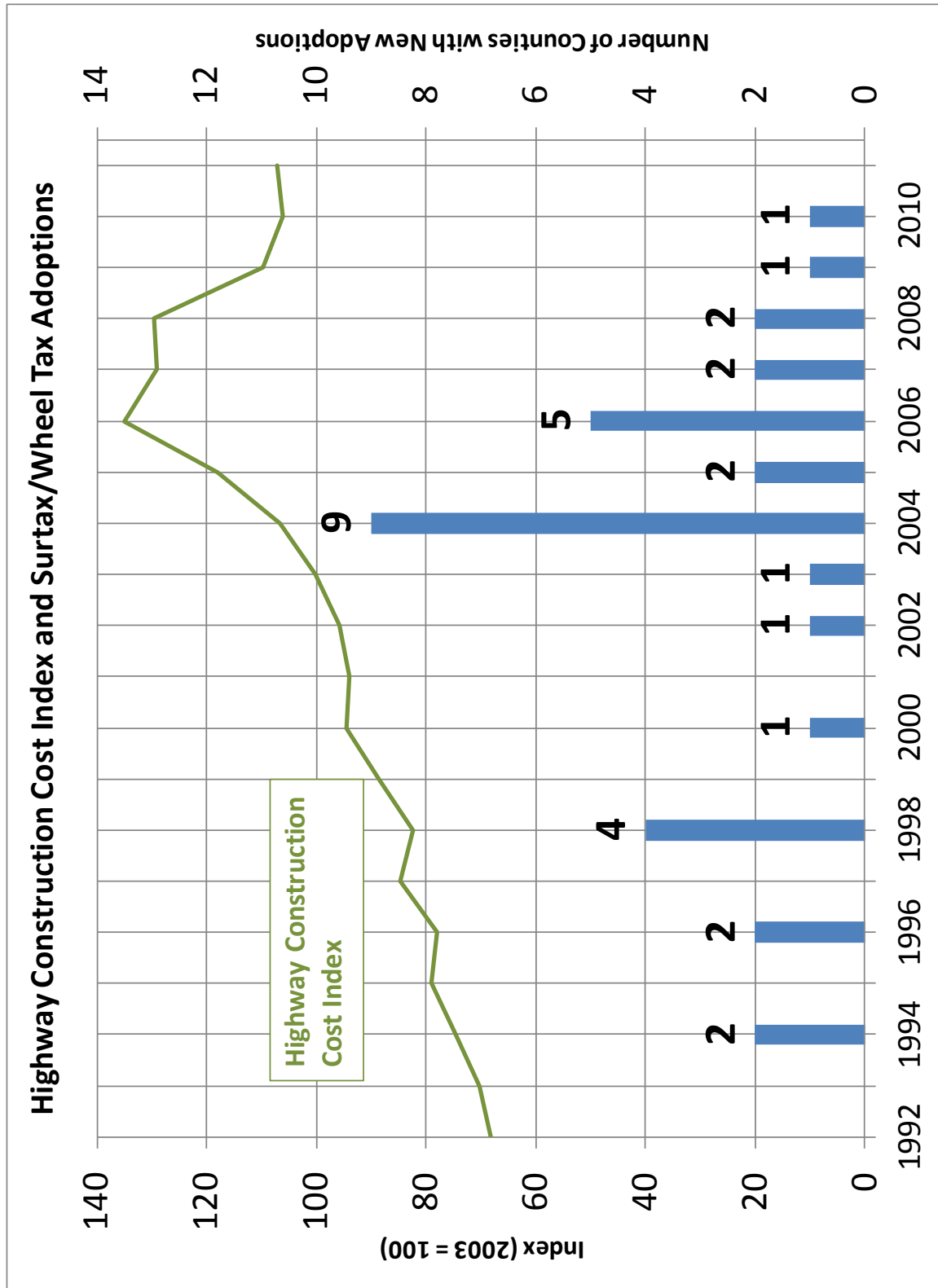


Figure 7.



Motor Fuel Tax Revenue: Why Aren't People Buying Gasoline?

The pattern of surtax/wheel tax adoptions by Indiana counties suggests that these taxes are adopted to supplement state funds. When state funds drop, counties may look for other sources of revenue for road construction and maintenance.

In fiscal 2011 Indiana budgeted \$397 million to distribute to counties, cities and towns for roads, mainly through the Motor Vehicle Highway (MVH) and Local Road and Street (LRS) funding formulas. The main sources of revenue for these distributions are the motor fuel taxes. About two-thirds of MVH and 90% of LRS funds come from taxes on gasoline and special fuels.

The gasoline tax is 18 cents per gallon and the special fuel tax is 16 cents per gallon. There is also a motor carrier surcharge tax of 11 cents per gallon. The gasoline tax raised \$543 million in fiscal 2011. The special fuel and surcharge taxes raised \$274 million in fiscal 2011.

Figure 8 shows the estimated gallons of gasoline sold in Indiana since 1973, derived by dividing gasoline tax revenue by the gasoline tax rate. In fiscal 2011, for example, \$543 million in revenue divided by 18 cents per gallon yields just over three billion gallons sold. Gasoline sales peaked in 2001 and have generally dropped in the past decade. This has reduced revenue from the gasoline tax. Had the tax rate been 18 cents in 2001, gasoline tax revenue would have been \$592 million. That's \$50 million more than was collected in 2011.

The vertical bars in Figure 8 show years of national recession. Clearly gasoline sales are affected by economic downturns. Gallons sold dropped in the recession of 1973-75, during the double-dip of 1980 and 1981-82, during the milder recessions of 1990-91 and 2001, and during our recent Great Recession of 2007-09. Sales increased during the expansions of the 1970's, 1980's and 1990's.

During the expansion of the 2000's, however, gasoline sales did not increase. Sales in 2007 were less than sales in 2002. The Great Recession then reduced gasoline sales again, and by 2011 sales were less than they had been in 1998.

What happened to gasoline sales in the 2000's? Three factors appear to explain the stagnation of gasoline sales in the past decade. First, gasoline prices increased. Figure 9 shows the rise in the annual average price of a gallon of unleaded gasoline, from \$1.33 per gallon in fiscal 2002 to \$3.17 per gallon in fiscal 2011. Figure 9 also shows the gasoline price adjusted for inflation. It is deflated with the consumer price index to show the gasoline price relative to the prices of other consumer goods. The inflation-adjusted price nearly doubled from 2002 to 2011. In both 2008 and 2011 the real price was near the peak over the whole four decade period.

Recall that the state gasoline tax is a tax per gallon, not a percentage of price. Price increases do not automatically increase gasoline tax revenue. In fact, to the extent that higher gasoline prices discourage gasoline sales, they reduce gasoline tax revenue.

People are notoriously slow to adjust their gasoline purchases to changes in price, but a sustained price increase over a decade undoubtedly had an effect. A statistical model estimates that each

10% increase in the inflation-adjusted price reduces Indiana gasoline purchases by 0.9% (see Appendix 2). With such a response, the near-doubling of the price from 2002 to 2011 would reduce purchases by almost 10%.

Automobiles are becoming more fuel efficient. The U.S. Department of Energy measures the average fuel efficiency of the U.S. automobile fleet in miles per gallon (MPG). Figure 10 shows this measurement. It is clear that miles per gallon increased most during the 1970's and 1980's. Improvements since then have been slow. Nonetheless, between 2002 and 2008 average MPG rose from 22.0 to 22.6, a 3% increase. The statistical model's results show that each 10% rise in MPG reduces gasoline sales by 4%, so sales since 2002 are probably down by about 1% due to rising fuel efficiency.

A third reason for the stagnation in gasoline sales in the 2000's was slow growth in Indiana income, adjusted for inflation. Those numbers are shown in Figure 11. "Real" income growth (that is, growth adjusted for inflation) averaged 3.0% per year during the expansion of the 1980's. Real growth averaged 2.8% per year during the 1990's expansion. The average was only 1.2% during the 2001-2007 period. The whole Great Lakes region grew slowly during the 2000's, partly the result of the loss of manufacturing jobs.

It's estimated that each 10% growth in real Indiana income results in a 6% increase in gasoline sales. Indiana income would be about 11% higher today had it grown 3% per year during the 2000's expansion. This accounts for a 7% reduction below sales growth that would have occurred had income grown faster.

Add it up. A 10% loss due to higher gasoline prices, a 1% loss due to improved fuel efficiency, and a 7% loss due to slow growth, sums to an 18% reduction in gasoline sales. Without these factors gasoline sales would have been about 500 to 600 million gallons more in 2011 than they were. That's a loss of perhaps \$100 million in gasoline tax revenue, and about \$40 million in local road distributions in 2011.

Perhaps Indiana income growth will improve, though manufacturing employment may remain a drag on Midwestern growth. Perhaps gasoline prices will fall, but with rising world demand they seem unlikely to fall to the levels of the late-1990's. It's safe to say that fuel efficiency will not decline. It may accelerate as new technologies become available.

Gasoline sales may increase as the economy recovers in the 2010's, but there are good reasons to think that growth will be slow. Gasoline tax revenue will grow slowly as a result. State road distributions to local governments may grow slowly too. This slow growth in state distributions may mean that more counties will consider adopting the motor vehicle excise surtax and wheel tax over the coming decade.

Figure 8.

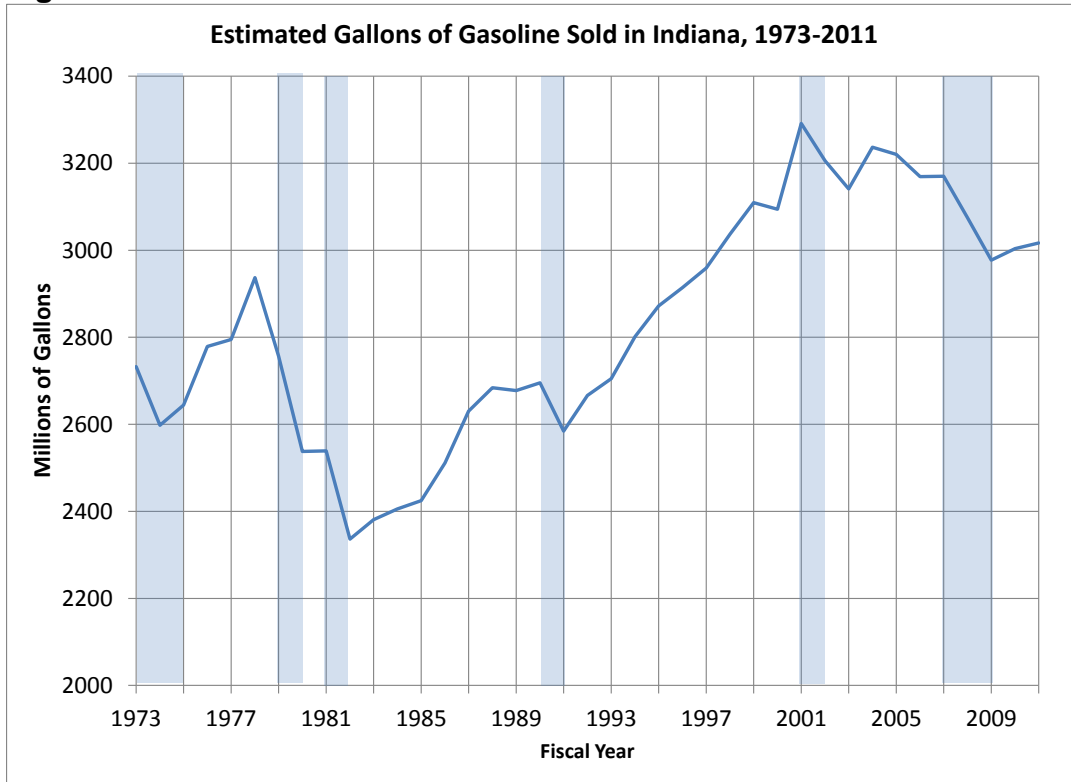


Figure 9.

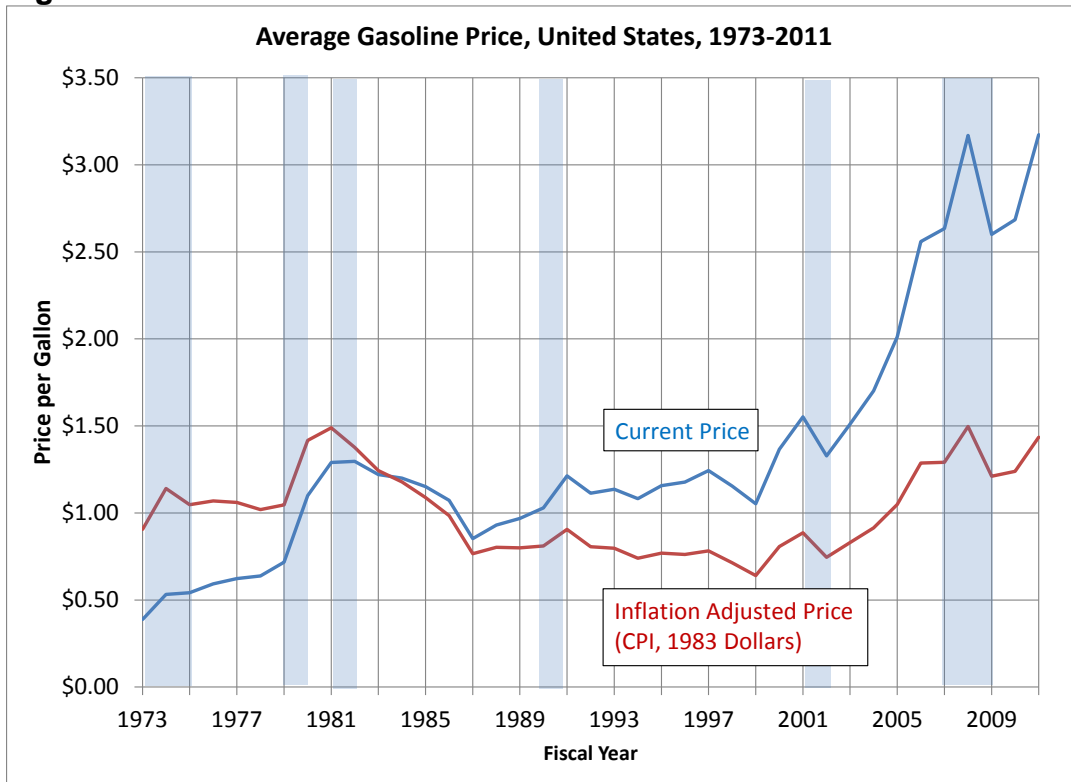


Figure 10.

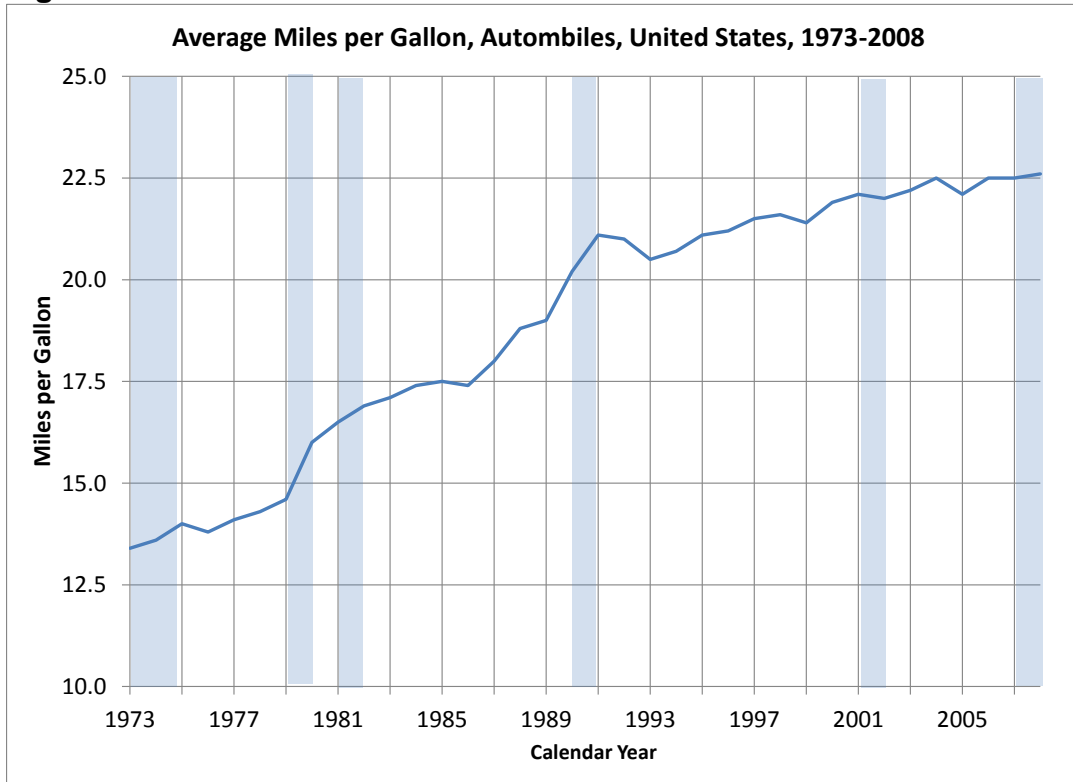
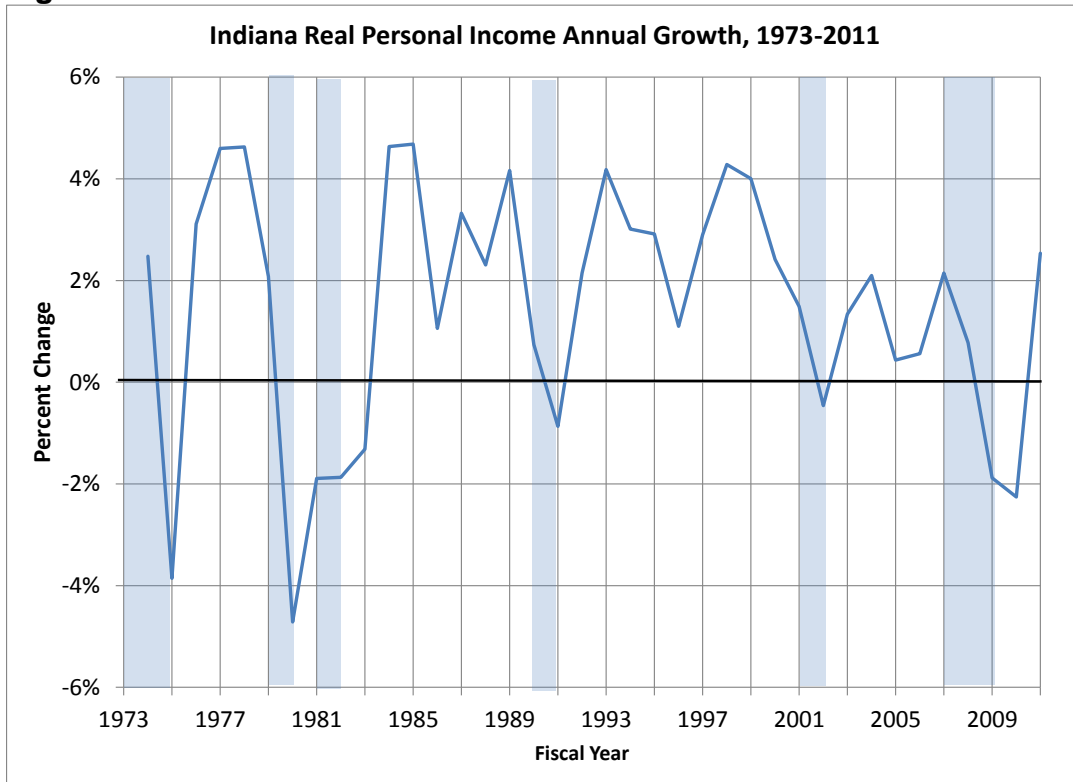


Figure 11.



State Policy: Maybe the State Will Pay

Both local officials and taxpayers usually would prefer to avoid adopting the local motor vehicle excise surtax and wheel tax. Both proponents and opponents during debates about tax adoption sometimes express hope that the state will provide more funding.

The Indiana gasoline excise tax is 18 cents per gallon. The special fuel tax (on diesel fuel) is 16 cents per gallon, and the motor carrier surcharge tax is 11 cents per gallon. In fiscal year 2011 total motor fuel tax revenues were \$819 million. The gasoline tax raised \$30.1 million per penny tax in fiscal 2011. The special fuel tax raised \$11.1 million per penny tax, and the motor carrier surcharge tax raised \$8.8 million per penny tax.

Motor fuel tax rates seldom change. The most recent increase in the gasoline tax was on January 1, 2003, when the tax rose from 15 to 18 cents per gallon. The increase from 14 cents to 15 cents occurred in 1988. The special fuel tax last changed in 1988 (from 15 to 16 cents), and the motor carrier surcharge tax also last changed in 1988 (from 8 to 11 cents).

The state distributes road maintenance revenues to local governments through the motor vehicle highway (MVH) and local road and street (LRS) formulas. The MVH allocated the larger amount, but it funds more than just road construction and maintenance. The MVH receives most of its revenue from the motor fuel taxes and vehicle registration fees. Net receipts in fiscal 2011 were \$636 million.

From this amount came a net appropriation to the state police of \$84 million, and administrative expenses for the Bureau of Motor Vehicles, Department of Revenue Motor Fuel Tax Division and other programs, totaling \$43 million. After other adjustments, the amount to be distributed was \$523 million. The state received half, \$262 million, counties received 34%, \$177 million, and cities and towns received 16%, \$83 million.

The LRS formula is simpler. Motor fuel taxes and a small amount of license fees totaled \$165 million in fiscal 2011. The State Department of Transportation received 55%, or \$91 million, and the remaining \$74 million was distributed to counties, cities and towns.

The formulas determine how much revenue each county, city and town in Indiana receives. Both formulas first distribute revenue among the counties, and then divide the county revenue among local units within the county. The MVH distributes 5% of its local revenue equally by county—each county receives $1/92^{\text{nd}}$ of 5% of the total distribution. Then 65% is distributed based on local road mileage as a share of the state total, and 30% based on county vehicle registrations as a share of the state total. Mileage includes county and city/town roads, and does not account for the number of lanes. Vehicle registrations include all vehicles registered in the county, passenger cars, motorcycles, pickup trucks and heavy vehicles. Within the county MVH revenue is divided among the county, cities and towns based on shares in county population, with the county receiving the share of population living in unincorporated areas (outside of cities and towns).

The LRS distributes state revenue to counties based on the county share of passenger car registrations in the state total. Road mileage and other vehicle registrations (such as pickup trucks) are not factors in this distribution.

Several policy proposals could increase revenue for local roads. Motor fuel tax rates could increase. The amount allocated to the state police, Bureau of Motor Vehicles or for fuel tax administration could be decreased. The share of the local distribution in the MVH or LRS formulas could increase. There could be special distributions from other state revenue sources. In addition, the MVH and LRS formulas could change to alter the distributions among counties, which would increase funding for some counties while decreasing funding for others.

Motor fuel tax rates seldom change. The gasoline tax rate has changed twice in the past 25 years; the other fuel taxes just once. The MVH and LRS formulas have been remarkably stable. The Legislative Services Agency *Handbook of Taxes and Appropriations* from 1981 lists the very same MVH and LRS distribution formulas as were used in 2012. These formulas have remained unchanged for at least 30 years.

A frequently proposed reform to the LRS formula illustrates one reason for this stability. The proposal is to add pickup trucks to the count of vehicles used to distribute revenue among counties. Only passenger cars are used in the formula now. Adding pickup trucks to the distribution formula would shift revenue from larger counties to smaller counties, because pickup trucks are a larger share of total registrations in rural areas. The amount of the shift would be small, however. An analysis of the LRS formula shows a total of \$3.1 million shifting among the counties, out of a total distribution of \$335 million. Revenue losses are concentrated in the 14 largest counties. All others gain revenue.

A quick analysis of Indiana House districts reveals that 48 members represent only counties that lose revenue if pickup trucks are included in the LRS distribution. Another 21 members represent some counties that lose and others that gain. Only 31 members represent only counties that gain revenue. It appears unlikely that this reform of the LRS formula could pass on a straight vote in the Indiana House. In a sense, the formulas have remained unchanged for so long because their design results in a political equilibrium. There do not appear to be enough votes to make any substantial change.

In recent years additions to local funding have come from special appropriations as much as from fuel tax hikes. The General Assembly appropriated \$100 million in both 2000 and 2001 for local roads, because revenues were exceeding projections during the long 1990's expansion. In 2008 \$75 million was appropriated from the Major Moves program. The gasoline tax rate was increased in 2003.

Circumstances may change. The General Assembly may respond to stagnant motor fuel tax revenues, tax cap restrictions on local property tax revenues, or additional adoptions of the surtax/wheel tax which demonstrate local effort to legislators. In recent decades, however, changes in state revenue distributions for local roads have been few and far between.

Other Road Revenues: Where Else Does the Money Come From?

It sometimes was suggested in the adoption debates that the surtax/wheel tax could be used instead of property taxes for road maintenance, or that property or local income tax revenues could be used instead of the surtax/wheel tax. Opponents asserted that the surtax/wheel tax could provide only a modest increase in road funding.

County and municipal budgets for 2012 were used to measure the sources of revenue used for roads. In Indiana's budgeting system a series of funds are reserved for appropriations and revenues for roads and bridges. (These are fund codes in the 700's.) These funds include the county highway fund, the city/town motor vehicle highway fund, the county cumulative bridge and major bridge fund, the county and city/town local road and street fund, and several smaller funds used mainly by cities and towns.

Budget information for 2012 is available from Indiana's new Gateway system, a collection of local government data available on the internet. Data from Budget Form 4-B (the "16 line" form) and the miscellaneous revenue form (Budget Form #2) were used. The results are shown in Figures 12 and 13. Almost two-thirds of county road appropriations are funded by the two state distributions from motor fuels taxes and other state sources. About 20% comes from cumulative bridge fund, mainly from property taxes. The surtax/wheel tax delivers between 8% and 9% of revenues, and a smattering of other sources make up the remaining fraction.

Cities and towns receive a smaller share (just less than half) from state sources than counties do. Cities and towns raise a much larger share of revenues from property taxes. Counties are legally restricted from using property taxes in their highway funds, but cities and towns raise almost \$80 million for their motor vehicle highway fund. Like counties between 8% and 9% of city/town road funds come from the surtax/wheel tax, and the remainder come from some smaller sources. Local income taxes play a small role in road funding for both counties and cities/towns.

The surtax/wheel tax is the third largest source of revenue for local roads, for both cities and towns. Still, it is a much smaller source than state aid or property taxes. If the surtax/wheel tax were adopted by every county at maximum rates, the share of the taxes in total funding would rise to between 20% and 25%.

A statistical model of county adoption decisions measures the factors counties are most likely to consider in their adoption decisions. This model is discussed in Appendix 3. The results show that the local income tax or the cumulative bridge property tax are *not* substitutes for the surtax/wheel tax. Counties with low local income tax rates or low (or no) cumulative bridge property tax rates are not more likely to adopt the surtax/wheel tax. In fact, the results provide some weak evidence that counties with higher cumulative bridge rates are *more* likely to adopt the surtax/wheel tax. It may be that such counties see the need for much more road revenue, and adopt both the surtax/wheel tax and higher cumulative bridge rates to cover those needs. It appears that the surtax/wheel tax is not usually adopted as a form of property tax relief.

Figure 12.

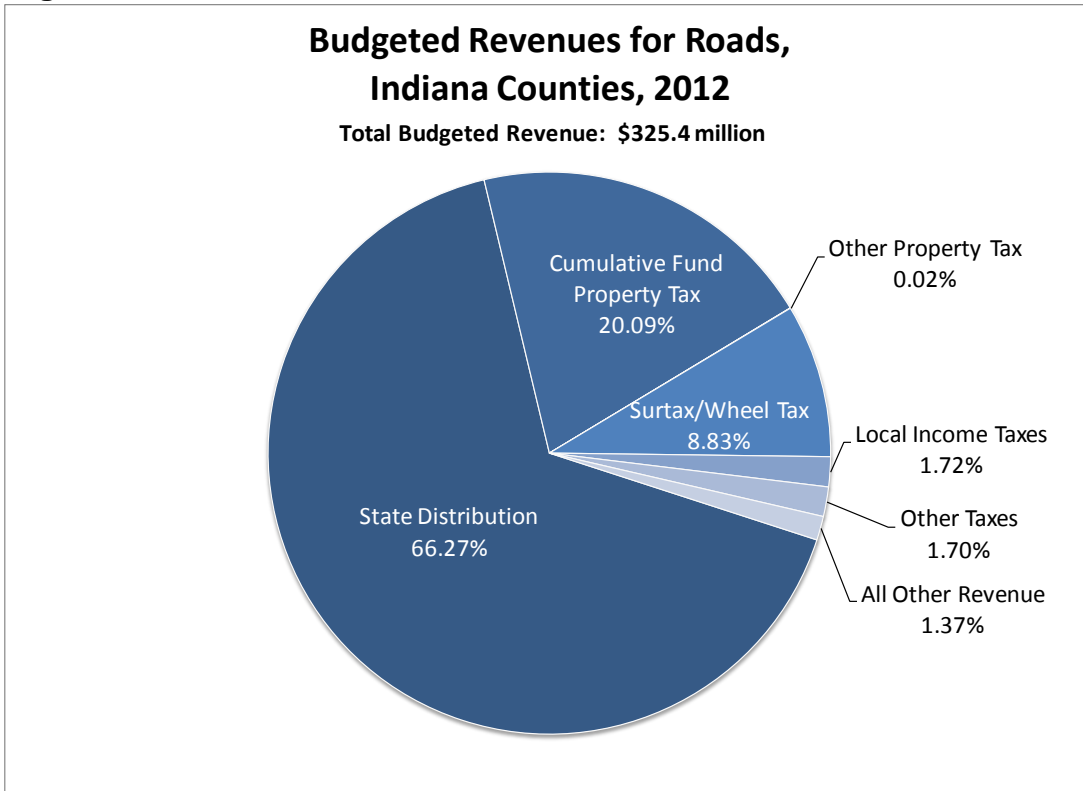
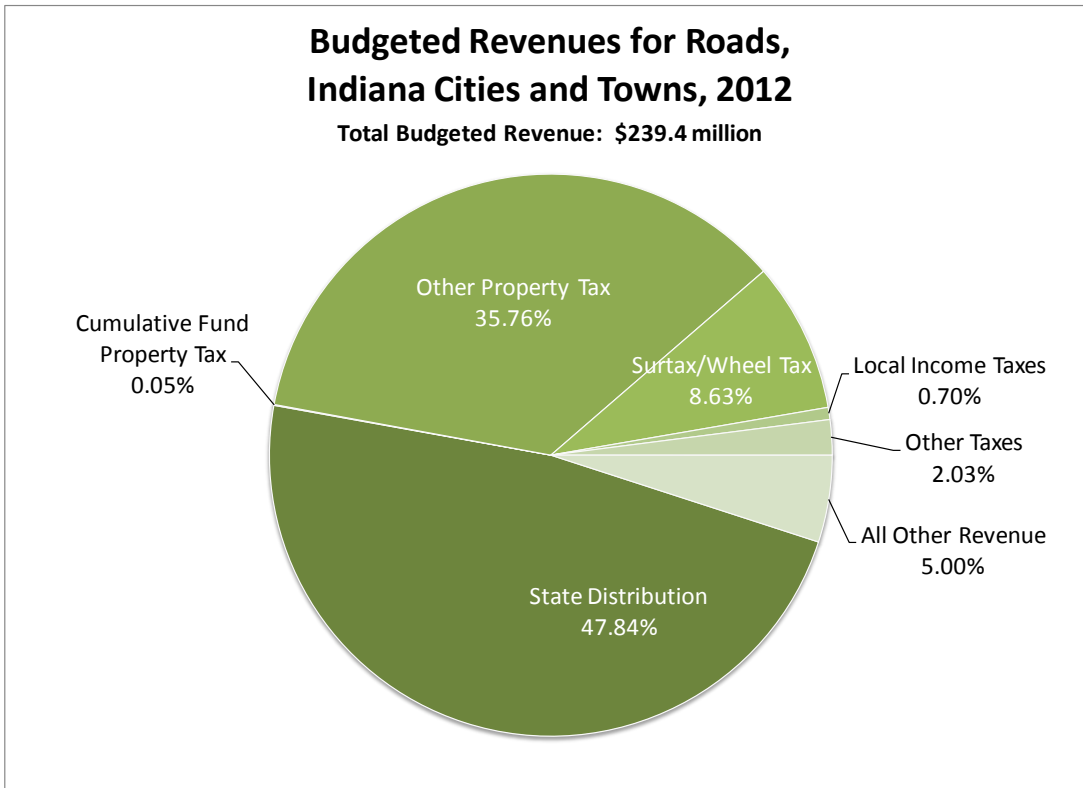


Figure 13.



Economic Development: Do Roads Help? Do Taxes Hurt?

Supporters of the motor vehicle excise surtax and wheel tax claim that added road construction can encourage business location and expansion. Opponents of the surtax/wheel tax claim that higher taxes discourage business location and expansion.

Plenty of evidence shows that both are correct, in general. Many studies have found that road mileage aids economic growth, and many others have found that higher taxes discourage growth. Only one study to the author's knowledge has looked specifically at the impact of Indiana's surtax/wheel tax on growth.

The study (McNamara and Rainey, 1999), looked at the location of manufacturing firms in Indiana counties over the 1986-1989 period. The study found that property tax rates and county option income tax rates had a negative effect on the location of new manufacturing businesses. Higher property and income taxes discouraged manufacturing growth. Adoption of the surtax/wheel tax, however, had no measurable effect on firm location.

The study also found that interstate highway mileage in a county added to manufacturing growth. Interstates are important for a manufacturer's access to customers because such businesses usually ship their products across county borders. The study did not look at county, city or town maintained roads, which can be supported by surtax/wheel tax revenue.

If the surtax/wheel tax has a negative effect on economic development, it should be most evident in the registrations of heavy vehicles, which are usually owned by businesses. The wheel tax makes owning and operating heavy vehicles more expensive. Businesses may operate fewer heavy vehicles in counties with the wheel tax. Businesses that rely on heavy vehicles may avoid locating in counties with the wheel tax.

A statistical model measures the effects of county characteristics on registrations of heavy trucks and farm trucks. Counties with higher employment and more farm activity tend to have more truck registrations, as might be expected. The incomes of households had a negative effect, perhaps because firms tend to locate where wages are lower, all else equal. Curiously, interstate and state road mileage had no effect on registrations, and local road mileage was associated with fewer registrations. Wheel tax rates had no measurable effect on registrations, positive or negative.

A similar model measures the determinants of light vehicle registrations, which are automobiles, pickup trucks and motorcycles. Counties with more population and more employment tend to have more light vehicle registrations, an obvious result. More urban counties also have more registrations. In contrast with truck registrations, counties with higher household incomes have more light vehicle registrations. People with more income buy more cars. Interstate and state road mileage had no effect on registrations, though local road miles did. Counties with more local road miles had more light vehicle registrations. Again, surtax rates had no measurable effect on registrations.

It appears that vehicle registrations are no lower in counties with the surtax/wheel tax than in counties that have not adopted the taxes. Counties with more local road mileage, which can be

financed with surtax/wheel tax revenues, saw fewer heavy vehicle registrations but more light vehicle registrations.

Why the limited effects? The surtax is usually a very small share of household income, perhaps too small to influence decisions about vehicle ownership. The wheel taxes are small as well, compared to the costs of purchasing and operating heavy vehicles. Businesses are more likely to be influenced by other county factors, such as the availability of employees, their wage levels, and other more important costs of doing business.

The map of adopting counties (Figure 1) may show another reason why surtax/wheel tax rates may not matter for registrations. Adopting counties are grouped together. Counties on the southwest to northeast axis have adopted, but counties in the northwest and southeast have not. Every adopting county borders at least one other adopting county; most border more than one. Note that the one exception was Clark County, which rescinded the tax for 2008.

The statistical model of surtax/wheel tax adoptions shows that one of the most important indicators that a county will adopt is being located near other counties which have adopted. If a county has the wheel tax, a business may look to relocate in a neighboring county to avoid the taxes. In a neighboring county the business might still be able to serve the same customers and employ the same workers. If the neighboring county *also* has the wheel tax, however, a business cannot move there to avoid the tax. Adopting counties are clustered together. Businesses have limited options for avoiding the tax so the tax does not appear to discourage vehicle registrations. Perhaps counties surrounded by non-adopting counties would see registrations decline with wheel tax adoption.

There is plenty of evidence that more and better roads promote economic growth, and that higher taxes discourage growth. But the evidence points to interstate highways as the roads that matter, and to broad-based taxes on property and income as the taxes that matter. There is scant evidence that local roads or the surtax/wheel tax have a big effect on growth.

Local road mileage appears to encourage auto registrations. Perhaps better maintained local roads benefit local residents. Local roads appear to discourage heavy vehicle registrations, a curious result. Perhaps all that light vehicle traffic discourages such registrations. It may be that the taxes are too small to make a measurable difference to registrations, and that the added revenue is too small to make a measurable difference in manufacturing business location (as in the McNamara/Rainey study). The fact that adopting counties are clustered near each other may be another reason heavy vehicle registrations do not appear to be affected by the wheel tax.

Counties vs. Cities and Towns: The Decision and the Revenue

County councils decide whether to adopt the surtax/wheel tax or not, but the revenue from the taxes is distributed to cities and towns too. The councils take the political heat for raising taxes, but are able to use only a fraction of the revenue to provide services.

Table 3 above shows the percentages of surtax and wheel tax revenue that go to the county, the largest city and all other cities and towns in each county, under the local road and street formula. County shares range from 14% in Lake to 97% in Brown. Figure 14 provides a map of county shares under the LRS formula.

The map of county shares in Figure 14 identifies by urban, suburban and rural counties. More urban counties have more population and road miles within city or town borders, and so have smaller county shares. More rural counties have bigger county shares.

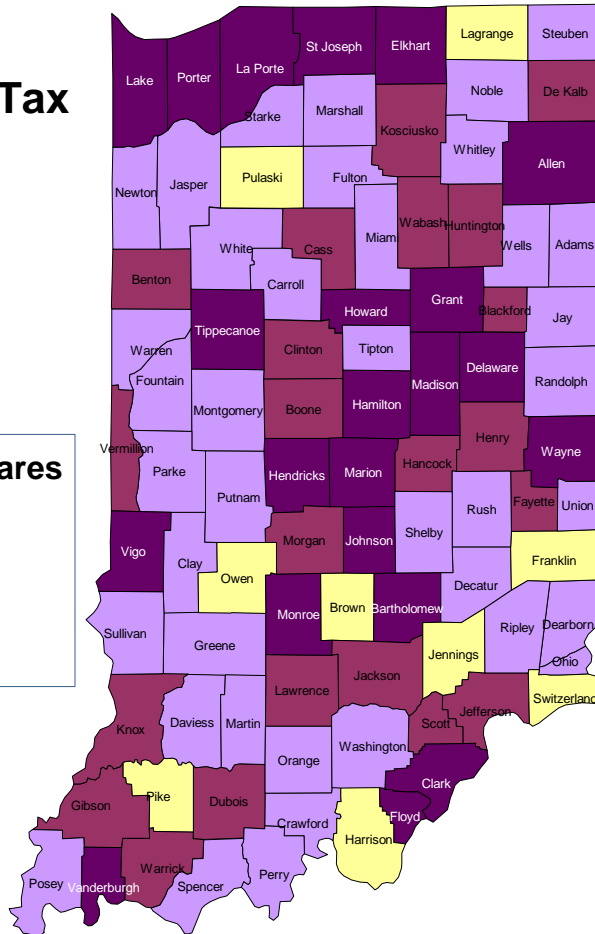
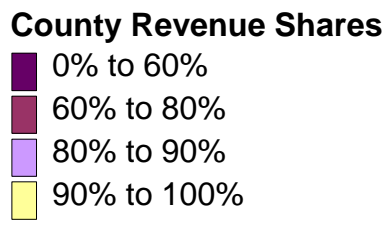
A statistical model of surtax/wheel tax adoption shows that the county revenue share makes a difference (see Appendix 3). The model looks at several factors that determine whether a county has adopted the surtax/wheel tax or not. The county revenue share has a positive influence on adoption. That is, once other variables are controlled for, counties where the county government receives a greater share of surtax/wheel tax revenue are more likely to adopt.

The model also shows that counties with higher population density (urban and suburban counties) are more likely to adopt. Since the county revenue share tends to be smaller where population density is bigger, the model's results may be difficult to interpret. As an example, Vanderburgh and Lake Counties have similar population densities, between 750 and 800 people per square mile. In Vanderburgh the county government receives 38% of surtax/wheel tax revenue; in Lake the county government receives only 14%. Vanderburgh has adopted the surtax/wheel tax. Lake has not.

The county share is not decisive. Many factors go into the county council's decision to adopt the surtax/wheel tax or not. One of these factors appears to be the county's share in surtax/wheel tax revenue. The more the county government receives, the more likely the county is to adopt.

Figure 14.

County Shares in Surtax/Wheel Tax Revenue



Tax Incidence: Benefit Taxes

Some people think that taxes are fair when those who benefit from public services pay taxes to support them. Others think taxes are fair when those with a greater ability to pay are taxed more. Many people see fairness in both the benefit and ability-to-pay standards, which can create confusion in public debates.

The surtax/wheel tax is a benefit or user tax, in general. Vehicle owners use roads and pay the taxes; the taxes support road maintenance and construction. Those who support the benefit view of taxation may see the surtax and wheel tax as fair. Just as often, however, opponents point to the flaws of the surtax and wheel tax under the benefit view. County residents pay the tax. In-commuters and other visitors who use local roads do not pay. Heavy vehicles place greater wear on roads. The owners of such vehicles may not pay higher tax rates consistent with this added wear. The tax rates do not vary with miles traveled. Those who use the roads more, and those who use them less, pay the same tax.

There is no information on the number of out-of-county vehicles that use local roads. There is data on the number of people who work in each county but live elsewhere. These in-commuters regularly use local roads but are not subject to the surtaxes and wheel taxes that residents pay.

Figure 15 is a map of Indiana counties showing the number of in-commuters as a percentage of total county employment. Most of the major employment centers have percentages greater than the 15% median value. Many people commute to these counties. Most rural counties have low in-commuter percentages. Many people in such counties commute to other counties for work. Few commute in.

Some employment center counties are exceptions. Allen, LaPorte and St. Joseph counties have low in-commuter percentages. Other counties not usually thought to be employment centers have high in-commuter percentages, such as Floyd, Martin, Ohio and Vermillion. There is one simple factor that contributes to these results: some counties have greater area than others. Allen is the largest Indiana county measured by area, with 660 square miles. LaPorte is third largest, and St. Joseph is 18th. Ohio is the smallest county, with only 87 square miles. Floyd is second smallest, Vermillion is 9th smallest, and Martin ranks 21st smallest. More people commuting to a large employer in a small county will cross the county line. Those in a big county are more likely to live within a county.

This is an illustration of a principle of “fiscal federalism,” the study of how public services and taxes are distributed among local, state and Federal governments. A tax is more likely to act as a user fee for a service if the boundaries of the taxing unit include more of the people who use the service. Big counties are more likely to qualify.

The surtax/wheel tax behaves only partly as a benefit tax or user tax because out-of-county drivers use local roads. This is more likely to be true in counties that are employment centers, especially if the county’s land area is smaller.

Trucks put much greater wear on pavement than automobiles do. Highway engineers estimate the road wear caused by a vehicle with an index called “equivalent single axle load” (ESAL). ESAL measures the road wear caused by a vehicle relative to an 18,000 pound truck. The Federal Highway Administration’s *Federal Lands Highway, Project Development and Design Manual* (2008, Exhibit 11-2A) provides a chart showing ESALs for vehicles ranging from motorcycles to seven-or-more axle multi-trailer trucks. Passenger cars have an ESAL range of 0.0004 to 0.0008, which means that an 18,000 pound truck with an index of one creates as much wear as 1,250 to 2,500 cars driving similar mileage. The maximum ESAL for the biggest trucks is listed as 3+.

Wheel tax rates for heavy vehicles are usually set higher than surtax rates for automobiles. The average surtax flat rate is \$17 (including the \$7.50 minimum for percentage counties). The average wheel tax rate is \$28. The maximum range is from \$7.50 for automobiles to \$80 for a tractor-trailer combination, a ratio of about 11 to 1.

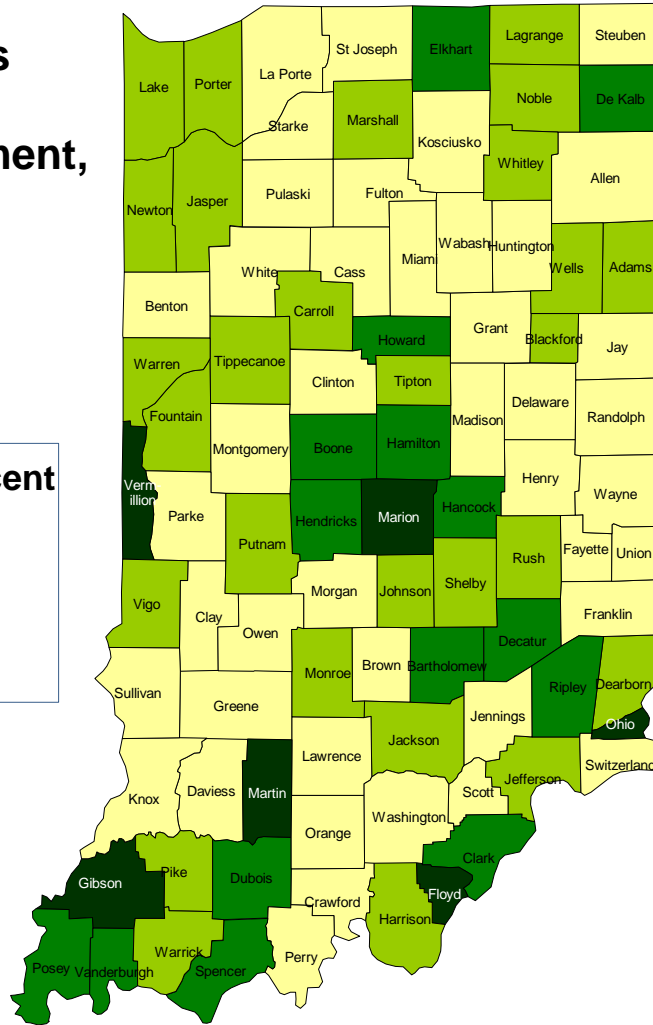
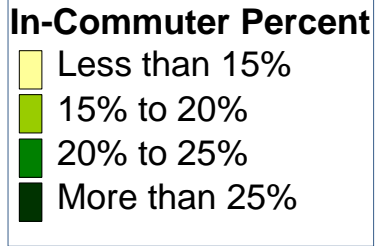
While this is a large variation, it is nowhere near the thousands-to-one ratio of truck to automobile wear measured by highway engineers. Again, the surtax/wheel tax behaves only partly as a benefit tax or user tax because tax rates cannot vary enough to reflect the relative wear placed on roads by heavier vehicles.

Of course, this does not take account of the miles traveled on roads by cars and trucks. If cars are much more likely than trucks to use local roads, the surtax/wheel tax may be closer to a benefit tax. This possibility reveals another flaw—the taxes do not vary by miles traveled. Automobiles that use the roads more, and those that use them less, pay the same tax rate.

The surtax/wheel tax charges vehicle owners for road maintenance and construction. But it does not collect revenues from out-of-county road users, the tax varies too little by weight, and it doesn’t vary by miles traveled at all. The surtax/wheel tax is a benefit tax, but not a perfect benefit tax.

Figure 15.

In-Commuters as Percentage of County Employment, 2010



Tax Incidence: Ability-to-Pay Taxes

The ability-to-pay view of tax fairness regards taxes as fair when those with a greater ability to pay are taxed more. When opponents argue that the surtax is a particular burden for households on fixed incomes, or for those stressed by recession, they are objecting to the tax on ability-to-pay grounds.

The ability-to-pay characteristics of the surtax can be analyzed with estimates of tax payments by income level. The U.S. Department of Labor's Bureau of Labor Statistics publishes the Consumer Expenditure Survey (CES), which provides data on the number of automobiles owned by households with various income levels. In 2010 households with incomes averaging \$12,606 owned an average of 0.9 vehicles, household with incomes averaging \$59,253 averaged 2.2 vehicles, and households with incomes averaging \$241,739 averaged 2.9 vehicles.

With this information it is a simple matter to calculate surtax payments with the maximum fixed rate of \$25 per vehicle. The three households mentioned above pay \$23, \$55 and \$73 respectively. Figure 16 shows the payments for these and several intermediate household incomes.

Calculating tax payments when the surtax is a percentage of the motor vehicle excise tax is more challenging. The excise tax payments are based on the number of vehicles, the original purchase prices and the ages of the vehicles. Price and age data are not available from the Consumer Expenditure Survey.

A little knowledge of the history of the excise tax, and some data from the Federal Reserve, solves this problem. The excise tax was established in 1971 to replace the property tax on motor vehicles. The excise tax rate schedule was based on a property tax rate of about 2.5% of the depreciated value of the vehicle. The Federal Reserve publishes a household wealth survey every three years, which includes the depreciated value of vehicles by income level. Incomes and vehicle values are interpolated to match the incomes in the CES. These values are multiplied by 2.59%, which is the average tax rate for new vehicles in the pre-1996 tax schedule. This estimate of the excise tax payment is multiplied by 10% to give the surtax payment. The results are shown in Figure 16. Surtax payments vary from \$11 to \$65 at the CES income levels.

Tax payments are higher for households with higher incomes under both surtax rates. In this sense the tax is fair under with the ability-to-pay view. The tax does not increase *proportionally* with income, however. The tax is three to six times as large for the upper income household shown in the figures, but incomes are 19 times as high. Tax incidence is usually measured a percentage of income, as shown in Figure 17. Lower income households pay a larger share of their incomes to the surtax than higher income households. In this sense the surtax is not fair under the ability-to-pay view. The surtax is a greater burden for lower income households. The tax is "regressive." The surtax percentages in Figure 17 are very small, however. The tax is not a large burden for any household.

Figure 16.

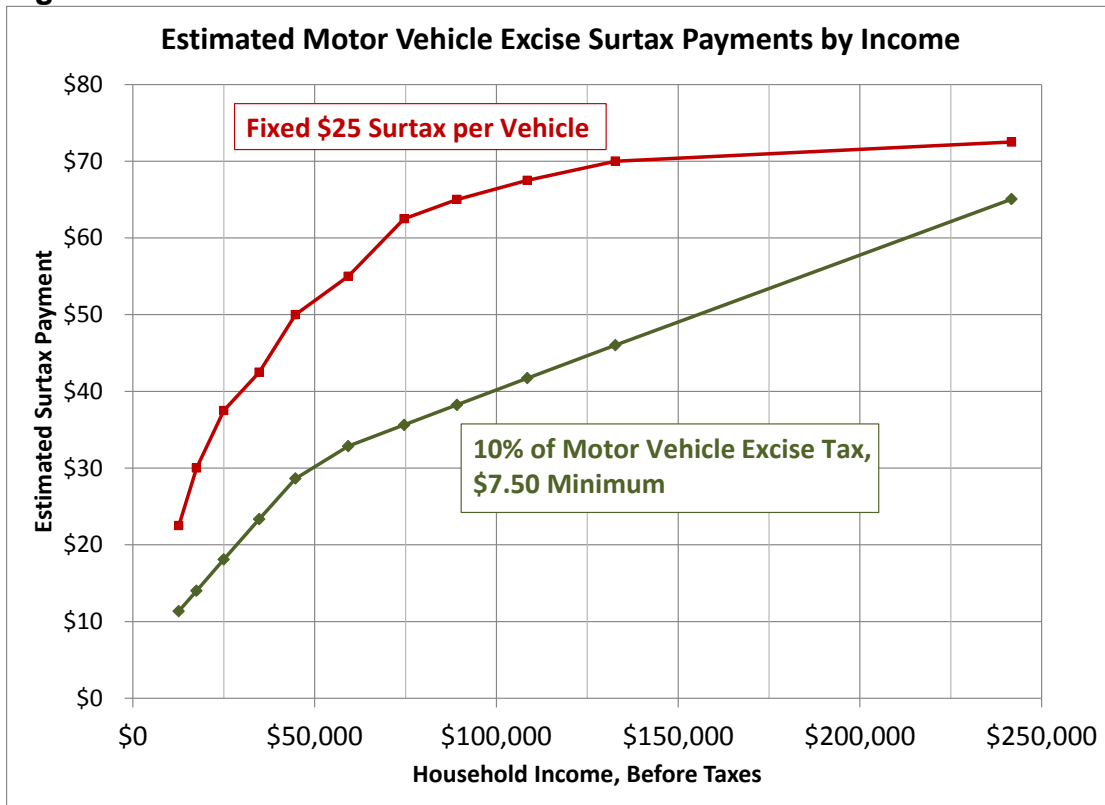
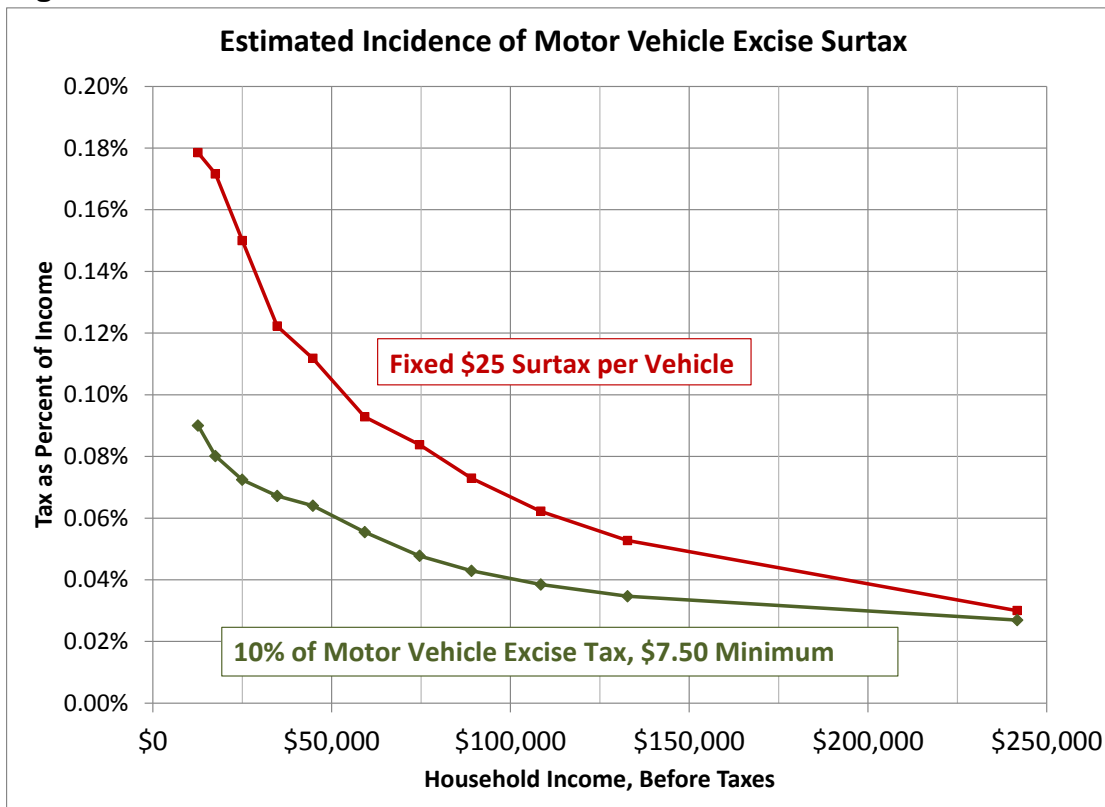


Figure 17.



Recession, Expansion and Inflation: Taxes in an Unstable Economy

Once again recent experience has shown how much state and local government revenues are affected by recessions. The Great Recession of 2007-2009 reduced state sales, income and corporate income tax revenues, and reduced local income tax revenue and even property tax revenue. The subsequent expansion—weak though it has been—has begun to reverse this revenue loss. If counties consider adoption of the surtax/wheel tax, they should want to know how these taxes are affected by recession and expansion.

New car and truck sales are enormously affected by recessions. When households are threatened with job or income loss, new vehicles are one of the first purchases they postpone. When business shipments drop in recessions, businesses have no need for investments in new trucks.

Figures 18 and 19 show monthly measures of light vehicle and heavy truck sales in the United States since 1992, with the 2000 and 2007-09 recessions marked by vertical bars. The 2000 recession had only a small effect on new light vehicle sales, but the 2007-09 Great Recession decimated sales, reducing the annual number of vehicles sold from about 16 million to less than 10 million. Light vehicle sales still have not fully recovered as of April 2012, remaining under 15 million vehicles per year. The value of heavy truck shipments was greatly reduced in both recessions, falling by half or more. Truck shipments regained their pre-recession level as of Spring 2012.

The surtax and wheel tax are levied on newly purchased vehicles, so the fluctuation of vehicle sales will affect tax revenue. But the surtax and wheel tax are not just taxes on new vehicles, they are taxes on all vehicles, both new and old. If a household decides not to buy a new vehicle, in many cases the household will keep an old one. If the surtax has been adopted as a fixed dollar amount per vehicle, this decision would have no effect on surtax revenues. Likewise, the new purchases of trucks may decline in recession, but most businesses will maintain their existing fleet of trucks, or sell them to other Indiana owners. Wheel taxes are paid per vehicle, with no regard for vehicle age.

To measure the effect of recession and expansion and surtax/wheel tax revenues, consider 17 counties that had the surtax/wheel tax throughout the 1996-2011 period. The counties are listed with Figure 20. The revenues from the surtax and wheel tax are summed for all 17 counties, for each year. Figure 20 shows both total revenues and percentage changes from year to year.

The effects of the recessions in 2000 and 2007-2009 are apparent. Revenues fell from \$23.8 million to \$23.3 million in 2000, a 2.3% decline. Revenues were \$27.0 million in 2008, and fell for two years to \$24.6 million in 2010. Revenues declined 3.6% and 5.4% in 2009 and 2010, respectively. The Great Recession seems to have affected revenues with a one-year lag. This may be explained by the fact that the Great Recession was at its worst in the fall of 2008 and first half of 2009. The big drop in vehicle sales at the end of 2008 would have had their full effect on revenues in 2009.

The taxes apply to all vehicles and not just new vehicles, which stabilizes revenue. Light vehicle sales fell 38.5% from December 2007 to June 2009, while surtax/wheel tax revenue which is dominated by the surtax on light vehicles, fell only 8.8% over the 2008-2010 period. The ratio

of the revenue fall to sales fall is 0.2, which implies that each 10% drop in light vehicle sales produced a 2% drop in surtax/wheel tax revenues, with a one-year lag.

Indiana has a long history with the motor vehicle excise tax, and its response to recession and expansion provides additional evidence. The motor vehicle excise surtax is a percentage of the excise tax payment at pre-1996 rates for most light vehicle owners, in 17 counties. Figure 21 shows the history of motor vehicle excise tax revenue, statewide, from 1976 to 2010.

The big drop in 1996 was the result of a large cut in excise tax rates. The effects of two big recessions are evident in this revenue data. The first Great Recession, a double-dip in 1980 and 1981-82, corresponds with a four-year pause in excise tax revenue growth. The second Great Recession in 2007-09 corresponds to a drop in excise tax revenue in 2010.

A statistical model of this data sheds more light (see Appendix 5 for details). The model measures the effects of several variables on motor vehicle excise tax revenue. One of these measures is United States light vehicle sales, the data shown in Figure 18. The results show an “elasticity” of 0.23—meaning that a 10% drop in vehicle sales results in a 2.3% drop in revenue. Again, the effect occurs with a one-year lag. A drop in sales in 2009 affects revenues in 2010.

The two results are similar, which gives local officials a rule of thumb. A drop in vehicle sales in one year appears to cause a drop in surtax/wheel tax revenues about 20% as large in the following year. The results also imply that expansions work in the opposite direction. Growth in vehicle sales causes revenue growth about 20% as fast in the following year.

What about inflation? The statistical model shows that a 10% increase in the average price of light vehicles results in a 3% increase in motor vehicle excise tax revenue. The motor vehicle excise tax charges higher taxes on more expensive vehicles. As inflation pushes up the prices of vehicles, the taxes on these vehicles increase. So the tax responds—slowly—to inflation.

This result does not apply to the surtax/wheel tax in most counties. The surtax is a fixed payment per vehicle in most counties. The wheel tax is a fixed payment per vehicle in all counties. These tax payments are not affected by vehicle price, so surtax/wheel tax revenue will not respond to inflation. Inflation will affect revenues in the 17 counties where the surtax is a percentage of the motor vehicle excise tax at pre-1996 rates.

Even these counties should not expect surtax/wheel tax revenues to keep up with the rising costs of road construction, however. This is because there has been no inflation in light vehicle prices since 1994. According to data from the U.S. Department of Commerce, Bureau of Economic Analysis, the price index of new motor vehicles was only 3% higher in 2011 than it was in 1994. Prices rose about 75% overall during this period. Road construction costs rose 44% (see Figure 7), though they were up 81% as of 2008.

Motor vehicle excise surtax/wheel tax revenues respond to recessions, falling about 2% for every 10% drop in light vehicle sales. Surtax/wheel tax revenue does not respond to inflation, so the purchasing power of this revenue will fall as road constructions costs rise.

Figure 18.

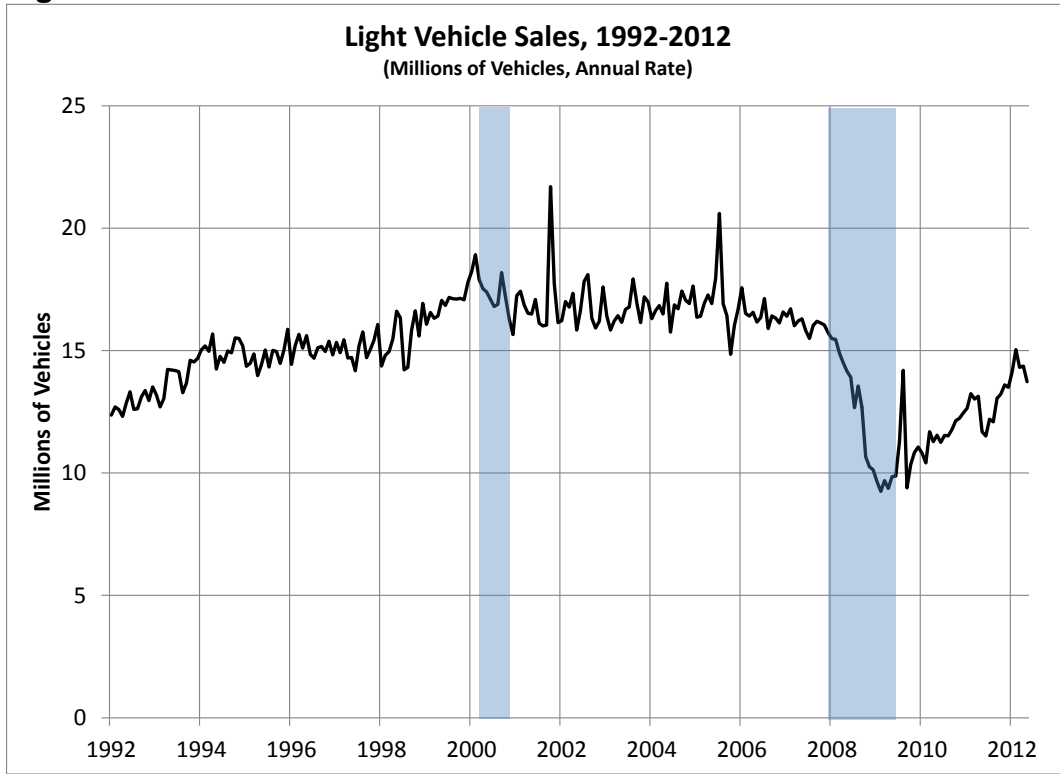


Figure 19.

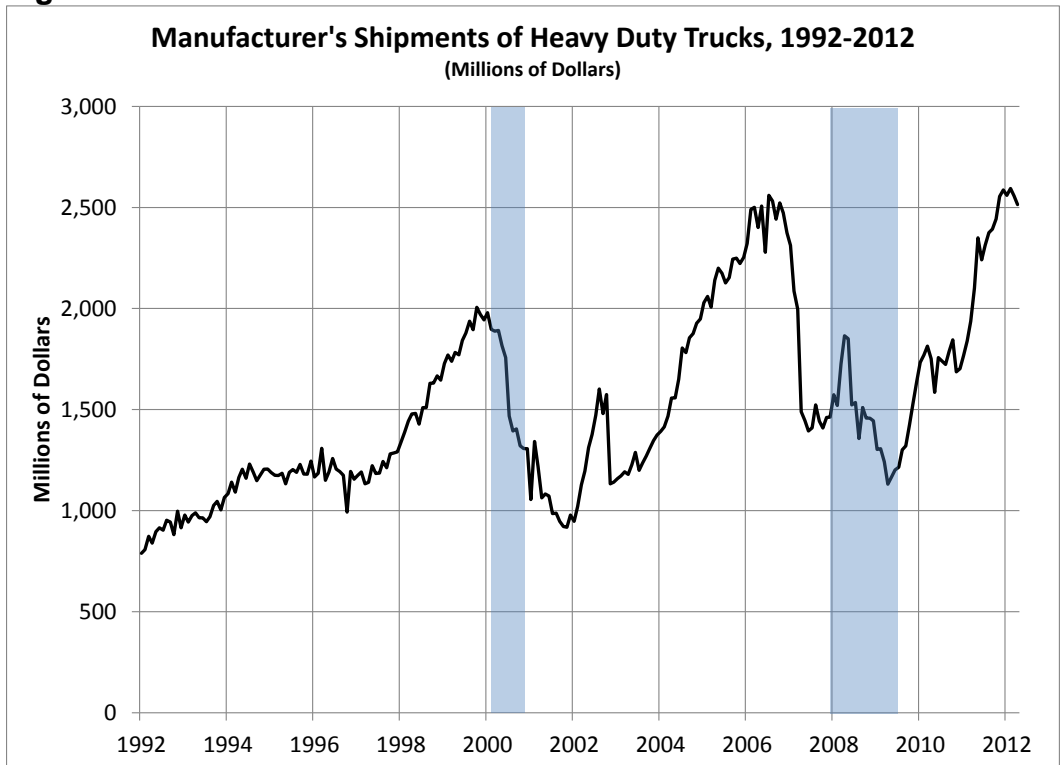
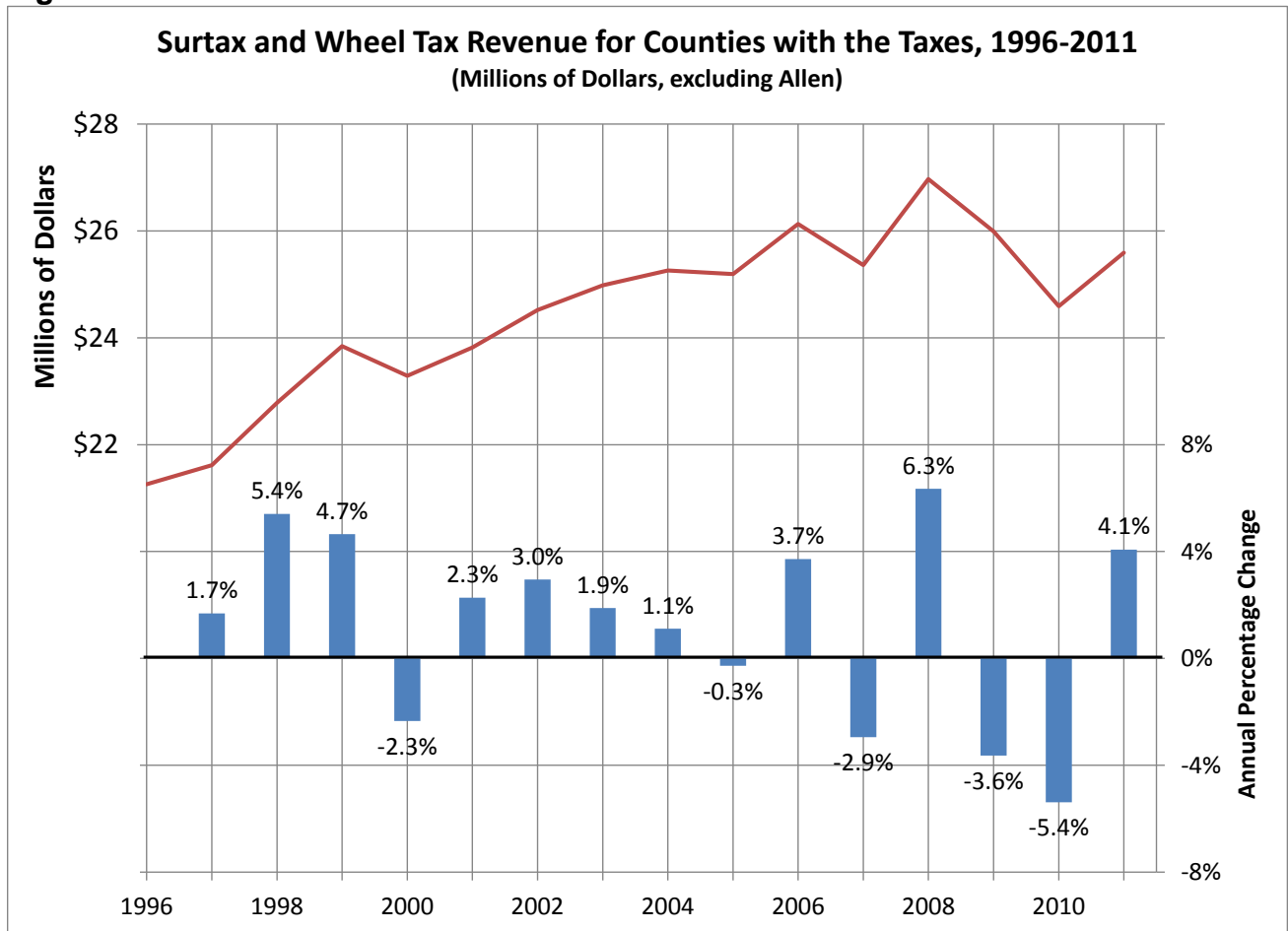
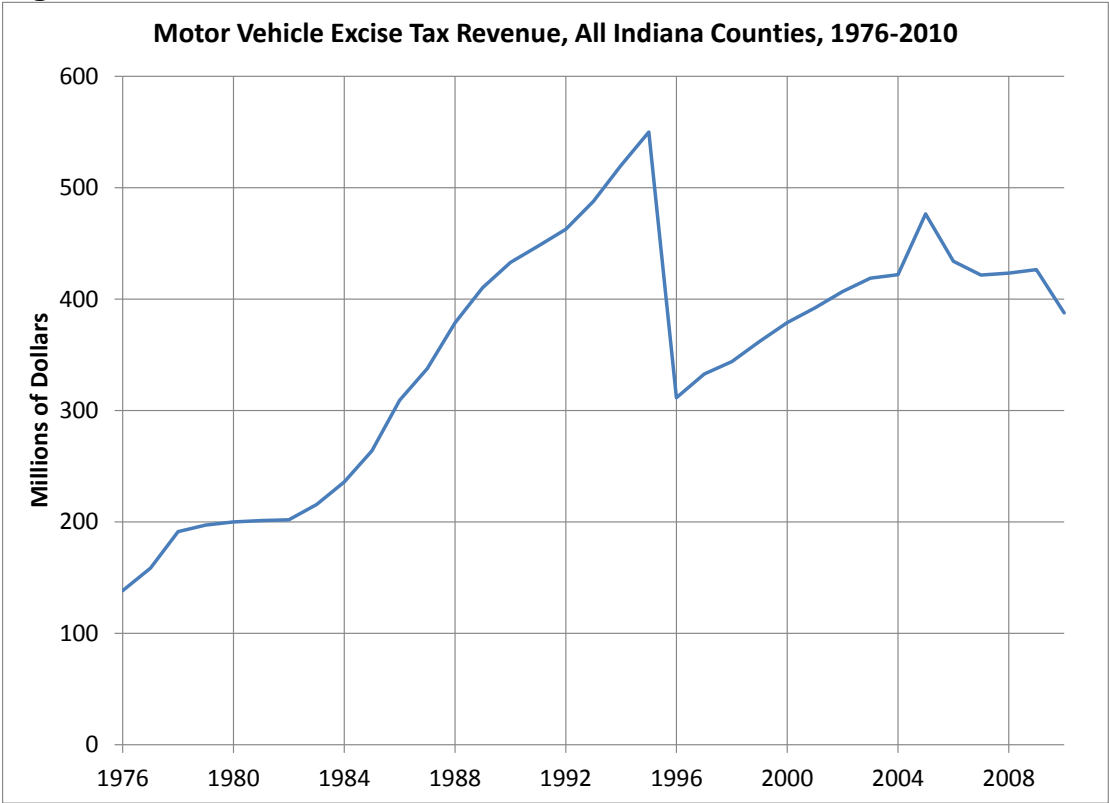


Figure 20.



Counties included are Brown, Daviess, Dubois, Fountain, Gibson, Howard, Jay, Marion, Monroe, Montgomery, Noble, Parke, Posey, Rush, Vanderburgh and Warrick. Allen County had the taxes from 1996 to 2011, but is excluded because of a major rate increase in 2009, which obscures the effect of the Great Recession. Any rate changes by other counties appear too small to affect the results. The revenues for the surtax and wheel tax are summed rather than reported separately because in some years—2009 particularly—it is clear that some surtax revenue was recorded as wheel tax revenue. The 17-county wheel tax total jumps 50% in 2009, then falls 28% in 2010, and remains near its 2008 level in 2011.

Figure 21.



Appendix 1. Highlights from the Indiana Code

Here are the sections of the Indiana Code that describe the motor vehicle excise surtax and wheel tax. The complete code text is available on the Indiana Legislative Services Agency's Indiana Code website, at www.in.gov/legislative/ic/code. The surtax is in IC 6-3.5-4 and the wheel tax in IC 6-3.5-5.

These highlights have been arranged by topic. Many of the sections of the surtax and wheel tax code are nearly identical, and this arrangement points out the sections where this is true.

Adoption, Rates and Vehicles Subject to Tax

IC 6-3.5-4-2 Adoption and rates of the motor vehicle excise surtax

(a) The county council of any county may, subject to the limitation imposed by subsection (c), adopt an ordinance to impose an annual license excise surtax at the same rate or amount on each motor vehicle listed in subsection (b) that is registered in the county. The county council may impose the surtax either:

- (1) at a rate of not less than two percent (2%) nor more than ten percent (10%); or
- (2) at a specific amount of at least seven dollars and fifty cents (\$7.50) and not more than twenty-five dollars (\$25). However, the surtax on a vehicle may not be less than seven dollars and fifty cents (\$7.50). The county council shall state the surtax rate or amount in the ordinance which imposes the tax.

(b) The license excise surtax applies to the following vehicles:

- (1) Passenger vehicles.
- (2) Motorcycles.
- (3) Trucks with a declared gross weight that does not exceed eleven thousand (11,000) pounds.

(c) The county council may not adopt an ordinance to impose the surtax unless it concurrently adopts an ordinance under IC 6-3.5-5 to impose the wheel tax.

IC 6-3.5-5-2 Adoption and rates of the wheel tax

(a) The county council of any county may, subject to the limitation imposed by subsection (b), adopt an ordinance to impose an annual wheel tax on each vehicle which:

- (1) is included in one (1) of the classes of vehicles listed in section 3 of this chapter;
- (2) is not exempt from the wheel tax under section 4 of this chapter; and
- (3) is registered in the county.

(b) The county council of a county may not adopt an ordinance to impose the wheel tax unless it concurrently adopts an ordinance under IC 6-3.5-4 to impose the annual license excise surtax.

(c) The county council may impose the wheel tax at a different rate for each of the classes of vehicles listed in section 3 of this chapter. In addition, the county council may establish different rates within the classes of buses, semitrailers, trailers, tractors, and trucks based on weight classifications of those vehicles that are established by the bureau of motor vehicles for use throughout Indiana. However, the wheel tax rate for a particular class or weight classification of vehicles may not be less than five dollars (\$5) and may not exceed forty dollars (\$40). The

county council shall state the initial wheel tax rates in the ordinance that imposes the tax.

IC 6-3.5-5-3 Vehicles subject to the wheel tax

The wheel tax applies to the following classes of vehicles:

- (1) buses;
- (2) recreational vehicles;
- (3) semitrailers;
- (4) tractors;
- (5) trailers; and
- (6) trucks.

IC 6-3.5-5-4 Vehicles exempt from the wheel tax

A vehicle is exempt from the wheel tax imposed under this chapter if the vehicle is:

- (1) owned by this state;
- (2) owned by a state agency of this state;
- (3) owned by a political subdivision of this state;
- (4) subject to the annual license excise surtax imposed under IC 6-3.5-4; or
- (5) a bus owned and operated by a religious or nonprofit youth organization and used to haul persons to religious services or for the benefit of their members.

Timing of Adoption, Rescission and Rate Changes

IC 6-3.5-4-3 Timing of adoption and collection of the surtax

If a county council adopts an ordinance imposing the surtax after December 31 but before July 1 of the following year, a motor vehicle is subject to the tax if it is registered in the county after December 31 of the year in which the ordinance is adopted. If a county council adopts an ordinance imposing the surtax after June 30 but before the following January 1, a motor vehicle is subject to the tax if it is registered in the county after December 31 of the year following the year in which the ordinance is adopted. However, in the first year the surtax is effective, the surtax does not apply to the registration of a motor vehicle for the registration year that commenced in the calendar year preceding the year the surtax is first effective.

IC 6-3.5-5-5 Timing of adoption and collection of the wheel tax is nearly identical to this section.

IC 6-3.5-4-4 Rescission of the motor vehicle excise surtax

(a) After January 1 but before July 1 of any year, the county council may, subject to the limitations imposed by subsection (b), adopt an ordinance to rescind the surtax. If the county council adopts such an ordinance, the surtax does not apply to a motor vehicle registered after December 31 of the year the ordinance is adopted.

(b) The county council may not adopt an ordinance to rescind the surtax unless it concurrently adopts an ordinance under IC 6-3.5-5 to rescind the wheel tax. In addition, the county council may not adopt an ordinance to rescind the surtax if any portion of a loan obtained by the county under IC 8-14-8 is unpaid, or if any bonds issued by the county under IC 8-14-9 are outstanding.

IC 6-3.5-5-6 *Rescission of wheel tax is nearly identical to this section.*

IC 6-3.5-4-5 *Increase or decrease of the surtax rate*

(a) The county council may, subject to the limitations imposed by subsection (b), adopt an ordinance to increase or decrease the surtax rate or amount. The new surtax rate or amount must be within the range of rates or amounts prescribed by section 2 of this chapter. A new rate or amount that is established by an ordinance that is adopted after December 31 but before July 1 of the following year applies to motor vehicles registered after December 31 of the year in which the ordinance to change the rate or amount is adopted. A new rate or amount that is established by an ordinance that is adopted after June 30 but before January 1 of the following year applies to motor vehicles registered after December 31 of the year following the year in which the ordinance is adopted.

(b) The county council may not adopt an ordinance to decrease the surtax rate or amount under this section if any portion of a loan obtained by the county under IC 8-14-8 is unpaid, or if any bonds issued by the county under IC 8-14-9 are outstanding.

IC 6-3.5-5-7 *Increase or decrease of the wheel tax rates is nearly identical to this section.*

Special Tax Calculations

IC 6-3.5-4-7.3 *Tax schedule to be used for calculating the surtax*

Sec. 7.3. (a) The amount of surtax imposed by rate under this chapter shall be based upon the classification and age of a vehicle as determined by the bureau of motor vehicles under IC 6-6-5, in accordance with the schedule set out in subsection (b).

(b) The schedule to be used in determining the amount to be used in section 7 of this chapter is as follows:

Year of Manufacture	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII
1	12	36	60	96	132	168	206	246	300	344	413	500	600	700	812	938	1063
2	12	30	51	84	114	147	184	220	268	298	358	434	520	607	705	814	922
3	12	27	42	72	96	126	154	186	230	260	312	378	450	529	614	709	795
4	12	24	33	60	78	104	127	156	196	224	269	326	367	456	513	611	693
5	12	18	24	48	66	82	101	128	164	191	229	278	300	389	420	521	591
6	12	12	18	36	54	63	74	98	130	157	188	228	242	319	338	428	483
7	12	12	12	24	42	49	60	75	104	129	155	188	192	263	268	353	383
8	12	12	12	18	24	30	40	54	80	106	127	129	129	181	181	258	258
9	12	12	12	12	12	18	21	34	40	50	62	62	62	87	87	125	125
10	12	12	12	12	12	12	12	12	12	12	21	26	30	36	42	49	55

IC 6-3.5-5-9.5 *Apportioned wheel tax for certain vehicles*

(a) This section applies to a wheel tax adopted after June 30, 2007.

(b) An owner of one (1) or more commercial vehicles paying an apportioned registration to the state under the International Registration Plan that is required to pay a wheel tax shall pay an

apportioned wheel tax calculated by dividing in-state actual miles by total fleet miles generated during the preceding year. If in-state miles are estimated for purposes of proportional registration, these miles are divided by total actual and estimated fleet miles. The apportioned wheel tax under this section shall be paid at the same time and in the same manner as the commercial motor vehicle excise tax under IC 6-6-5.5.

(c) A voucher from the department of state revenue showing payment of the wheel tax may be accepted by the bureau of motor vehicles in lieu of the payment required under section 9 of this chapter.

Collection and Remittance by the License Branches, BMV or DOR

IC 6-3.5-4-9 Surtax collection by the license branch and remittance to the county

On or before the tenth day of the month following the month in which surtax is collected at a branch office, the branch office manager shall remit the surtax to the county treasurer of the county that imposed the surtax. Concurrently with the remittance, the branch office manager shall file a surtax collections report with the county treasurer and the county auditor. The branch manager shall prepare the report on forms prescribed by the state board of accounts.

IC 6-3.5-5-11 Wheel tax collection by the license branch and remittance to the county is nearly identical to this section.

IC 6-3.5-4-11 Surtax collection by the BMV and remittance to the county

If surtax is collected directly by the bureau of motor vehicles, instead of at a branch office, the commissioner of the bureau shall:

(1) remit the surtax to, and file a surtax collections report with, the appropriate county treasurer; and

(2) file a surtax collections report with the county auditor; in the same manner and at the same time that a branch office manager is required to remit and report under section 9 of this chapter.

IC 6-3.5-5-13 Wheel tax collection by the BMV or DOR and remittance to the county

(a) If the wheel tax is collected directly by the bureau of motor vehicles, instead of at a branch office, the commissioner of the bureau shall:

(1) remit the wheel tax to, and file a wheel tax collections report with, the appropriate county treasurer; and

(2) file a wheel tax collections report with the county auditor; in the same manner and at the same time that a branch office manager is required to remit and report under section 11 of this chapter.

(b) If the wheel tax for a commercial vehicle is collected directly by the department of state revenue, the commissioner of the department of state revenue shall:

(1) remit the wheel tax to, and file a wheel tax collections report with, the appropriate county treasurer; and

(2) file a wheel tax collections report with the county auditor; in the same manner and at the same time that a branch office manager is required to remit and

report under section 11 of this chapter.

Distribution and Use of Surtax and Wheel Tax Revenue

IC 6-3.5-4-13 Distribution and use of surtax revenue

(a) In the case of a county that does not contain a consolidated city of the first class, the county treasurer shall deposit the surtax revenues in a fund to be known as the "_____ County Surtax Fund".

(b) Before the twentieth day of each month, the county auditor shall allocate the money deposited in the county surtax fund during that month among the county and the cities and the towns in the county. The county auditor shall allocate the money to counties, cities, and towns under IC 8-14-2-4(c)(1) through IC 8-14-2-4(c)(3). [These sections follow.]

(c) Before the twenty-fifth day of each month, the county treasurer shall distribute to the county and the cities and towns in the county the money deposited in the county surtax fund during that month. The county treasurer shall base the distribution on allocations made by the county auditor for that month under subsection (b).

(d) A county, city, or town may only use the surtax revenues it receives under this section to construct, reconstruct, repair, or maintain streets and roads under its jurisdiction.

IC 6-3.5-5-15 Distribution and use of wheel tax revenue is nearly identical to this section, except for (a) and (d):

(a) In the case of a county that does not contain a consolidated city, the county treasurer shall deposit the wheel tax revenues in a fund to be known as the "County Wheel Tax Fund".

(d) A county, city, or town may only use the wheel tax revenues it receives under this section:

- (1) to construct, reconstruct, repair, or maintain streets and roads under its jurisdiction; or
- (2) as a contribution to an authority established under IC 36-7-23. [This chapter defines a Multiple County Infrastructure Authority.]

IC 8-14-2-4(c)(1-3) Distribution of surtax and wheel tax revenues using the local road and street formula

(c) (1) In counties having a population of more than fifty thousand (50,000), sixty percent (60%) of the money shall be distributed on the basis of the population of the city or town as a percentage of the total population of the county and forty percent (40%) distributed on the basis of the ratio of city and town street mileage to county road mileage.

(2) In counties having a population of fifty thousand (50,000) or less, twenty percent (20%) of the money shall be distributed on the basis of the population of the city or town as a percentage of the total population of the county and eighty percent (80%) distributed on the basis of the ratio of city and town street mileage to county road mileage.

(3) For the purposes of allocating funds as provided in this section, towns which become incorporated as a town between the effective dates of decennial censuses shall be eligible for allocations upon the effectiveness of a corrected population count for the town under IC 1-1-3.5.

Appendix 2. A Statistical Model of Indiana Gasoline Sales

A statistical model of Indiana gasoline sales measures the effects of several variables on the estimated gallons of gasoline sold in Indiana from 1973 to 2011. Gallons are estimated by dividing gasoline tax revenue by the gas tax rate for each year.

The variables used to “explain” gasoline sales are Indiana income adjusted for inflation (“real” income), the price of gasoline per gallon relative to the prices of other goods and services, the average miles per gallon of U.S. automobiles, and the number of gallons sold in the previous year (“lagged” gallons). Real income is expected to have a positive effect on gasoline sales. People with higher incomes buy more vehicles and make more trips. The price of gasoline relative to other prices is expected to have a negative effect on sales. When gasoline prices rise people try to economize on their purchases. Fuel efficiency measured by miles per gallon is also expected to have a negative effect on sales, because more fuel efficient vehicles require less gasoline. Lagged gallons are included because it may take a long time for households to adjust to changes in incomes and prices. Gasoline prices may rise and households may wish to move closer to work or buy a more fuel efficient vehicle. This takes time, so the previous year’s living arrangements will still influence this year’s sales.

The statistical method is “linear regression.” This method estimates the linear equation which best explains the dependent variable (gallons). The linear equation multiplies an estimated coefficient by each explanatory variable in each year, and sums them (along with a constant term) to provide an estimate of gallons sold. The difference between the estimate and the actual gallons provides a measure of how well the variables explain gallons sold. If the errors are small the variables do a good job of explaining the dependent variable. The “R-squared” statistic shows how good this explanation is. R-squared can vary from zero to one, where zero means the variables do not explain the dependent variable at all, and one means the variables explain the dependent variable perfectly.

The “significance” of each explanatory variable is measured by the “t-statistic.” If the t-statistic is absolutely greater than two (positive or negative), the coefficient is significant at the 95% confidence level. This means we can be very confident that the true relationship between the explanatory variable and gallons has the positive or negative sign estimated by the regression.

Gallons sold and the explanatory variables are used in logarithmic form. This ensures that the coefficients are “elasticities,” which show the percentage change in gallons sold resulting from a one percent change in each dependent variable. This form makes the coefficients easier to interpret.

Table A2 shows the results. All the coefficients have the expected signs, and are significant at the 95% confidence level. The R-squared statistic shows that the explanatory variables explain 94.6% of the variation in gallons.

Table A2.

Dependent Variable: Gallons			
	<i>Coefficients</i>	<i>St. Error</i>	<i>t Stat</i>
Constant	0.150	0.373	0.403
Real Income	0.571	0.112	5.085 *
Gas Price	-0.089	0.018	-4.969 *
MPG, Autos	-0.396	0.089	-4.461 *
Gallons, Lagged	0.318	0.125	2.542 *

* significant at 95% level

R-Squared 0.946

Variable Definitions
 Gallons: Logarithm of estimated Indiana gallons of gasoline, 1973-2011
 Real Income: Logarithm of Indiana Income in 1983 dollars
 Gas Price: Logarithm of Leaded/Unleaded gasoline price divided by consumer price index
 MPG, Autos: Logarithm of average miles per gallon of U.S. automobiles
 Gallons, Lagged: Logarithm of previous year's gallons of gasoline

The coefficients are elasticities. A one percent increase in income above inflation results in a 0.57% increase in gallons sold. A typical 2% real income increase in a year would then result in a 1.1% rise in gasoline sales.

The gas price elasticity is small. A ten percent rise in the price of gasoline relative to the price of everything else results in a 0.9% drop in gallons sold. Gasoline is “price inelastic”, meaning that households have a hard time adjusting their purchases to changes in price. Changes in gasoline prices can be large, though. A 50% increase in price would result in a 4.5% drop in gasoline sales.

Gasoline sales are responsive to changes in fuel efficiency. A one percent rise in miles per gallon (from, say, 20 MPG to 20.2 MPG) would cause a 0.4% fall in gasoline sales. Average miles per gallon have been rising slowly in recent years, but future increases in efficiency may put steady downward pressure on gasoline sales.

Lagged gallons have a positive coefficient, which means that last year’s living arrangements still influence this year’s gasoline purchases, even as income, prices and fuel efficiency change. Older less efficient vehicles remain on the road, for example, and this continues to influence sales even as the efficiency of new vehicles increases.

Appendix 3. A Statistical Model of County Surtax/Wheel Tax Adoption

A statistical model of Indiana county surtax/wheel tax adoption measures the effects of several variables on the decision by counties to adopt the taxes as of 2011. Adoption is measured by a zero-one “dummy” variable. The adoption variable equals one if the county has adopted the surtax/wheel tax as of 2011 and equals zero if the county has not adopted.

The variables used to “explain” adoption are county population density, the share of the county government in surtax/wheel tax revenue (as opposed to the share going to cities and towns), the cumulative bridge fund property tax rate (which equals zero in counties without this rate), and the share of a county’s neighboring Indiana counties that have adopted the taxes. This is measured as the number of counties within half a degree of longitude or latitude of each county that have the taxes, divided by the total number of counties located within that range.

Population density is a measure of urban or rural counties. Urban counties have more traffic and more wear on roads, so they may see a need for more revenue for road maintenance. Density is expected to have a positive effect on adoption (that is, greater population density is associated with increased likelihood that a county has adopted the surtax/wheel tax). The county government’s share of surtax/wheel tax revenue is expected to have a positive effect on adoption. County councils make the adoption decision, and may look more favorably on the tax if their own government receives more of the revenue. The cumulative bridge fund property tax is an alternate revenue source for road maintenance. If it is a substitute for the surtax/wheel tax, it should have a negative effect on adoption. Counties with more neighbors with the taxes are expected to be more likely to adopt the taxes themselves. They may be more aware of the benefits of the taxes, and their negative development effects may be less if businesses cannot avoid the taxes by moving to a neighboring county.

The statistical method is “logit regression.” This is a special regression method used when the dependent variable (the variable to be explained) is a zero-one dummy variable. The results can be used to calculate a likelihood or probability that a county will adopt the taxes, given the values of their dependent variables.

The “significance” of each explanatory variable individually is measured in the logit regression by the “z-statistic.” If the z-statistic is absolutely greater than two (positive or negative), the coefficient is significant at the 95% confidence level. This means we can be very confident that the true relationship between the explanatory variable and the adoption decision has the positive or negative sign estimated by the logit regression.

The accuracy of the logit model can be measured by a “correct prediction ratio.” The probability of adoption is calculated for each county. If the probability is greater than 50%, and the county has adopted, or the probability is less than 50% and the county has not adopted, the logit result for that county is identified as correct. Logit results are wrong when the probability is greater than 50% and the county has not adopted, or the probability is less than 50% and the county has adopted.

Table A3-1 shows the results. Population density, county share and neighbors adopting have the expected signs, and are significant at the 95% confidence level. The correct prediction ratio is 0.761, meaning 76% of the counties were “predicted” correctly by the logit model.

Table A3-1

Dependent Variable: Adoption			
	<i>Coefficients</i>	<i>St. Error</i>	<i>z-Stat</i>
Constant	-10.935	3.836	-2.851
Pop Density	0.011	0.004	2.375 *
County Share	7.785	3.757	2.072 *
Cum Bridge Rate	28.062	16.391	1.712 **
Neighbors Adopting	5.207	1.173	4.439 *
* significant at 95% level			
** significant at 90% level			
Correct Prediction Ratio	0.761		
<i>Variable Definitions</i>			
Adoption: Equals one if a county has the surtax/wheel tax in 2011, zero if not			
Pop Density: Population density, county population divided by square miles			
County Share: The share of the county government in surtax/wheel tax revenues			
Cum Bridge Rate: Cumulative bridge fund property tax rate			
Neighbors Adopting: Share of nearby counties that have adopted the taxes			

The cumulative bridge rate does not have the expected negative sign, and it is significant only at the 90% confidence level. It appears that counties do not treat the surtax/wheel tax and the cumulative bridge property tax as substitutes. Perhaps counties with greater road maintenance needs adopt both, though the low significance level may mean that the two taxes are not related.

Other variables were tested in the model and found to be insignificant. Adoption of the CEDIT local income tax and the percentage of in-commuters in the county employment had no measurable effect on the adoption decision.

The logit coefficients can be used to calculate the probability of adoption for each county, based on the values of the four explanatory variables. Table A3-2 shows these probabilities in four lists, based on the logit probability and whether the county actually has the surtax/wheel tax.

Of the 47 counties that have adopted, 39 have probabilities of adoption greater than 0.5. Marion’s probability rounds to one. The county’s very high population density (more than 2,000

per square mile) is the reason. Of the 45 counties that have not adopted, 31 have probabilities less than 0.5. Clark has the smallest probability of adoption of all 92 counties. Though its population density is fairly high, the county receives less than half of the surtax/wheel tax revenue. It has no neighbors with the taxes, and it does not have the cumulative bridge property tax.

Table A3-2

Correct Prediction County has Adopted		Correct Prediction County has not Adopted		Incorrect Prediction County has not Adopted		Incorrect Prediction County has Adopted	
Probability > 0.5	<u>Probability of Adoption</u>	Probability < 0.5	<u>Probability of Adoption</u>	Probability > 0.5	<u>Probability of Adoption</u>	Probability < 0.5	<u>Probability of Adoption</u>
Marion County	1.0000	Clark County	0.0155	Hamilton County	0.8808	Perry County	0.1706
Vanderburgh County	0.9908	Porter County	0.0257	Adams County	0.8537	Wells County	0.1796
Posey County	0.9877	Laporte County	0.0267	Spencer County	0.8038	Dubois County	0.2109
Owen County	0.9718	Scott County	0.0383	Boone County	0.8015	Howard County	0.2661
Putnam County	0.9292	Newton County	0.0509	Warren County	0.7579	Union County	0.3732
Parke County	0.9246	Jasper County	0.0607	Pike County	0.7236	Noble County	0.3982
Elkhart County	0.9171	Ohio County	0.0927	Franklin County	0.7120	Decatur County	0.4556
Hendricks County	0.9086	Benton County	0.0958	Steuben County	0.6658	Cass County	0.4739
Clay County	0.8984	Fulton County	0.0980	Knox County	0.6273		
Morgan County	0.8685	Starke County	0.0984	Wayne County	0.5986		
Vigo County	0.8680	Jefferson County	0.1106	Martin County	0.5604		
Shelby County	0.8648	Grant County	0.1155	DeKalb County	0.5274		
Hancock County	0.8620	Washington County	0.1197	Orange County	0.5148		
Johnson County	0.8535	Wabash County	0.1221	Madison County	0.5126		
Fountain County	0.8519	Pulaski County	0.1227				
Brown County	0.8102	Ripley County	0.1249				
Sullivan County	0.7874	Crawford County	0.1298				
Monroe County	0.7779	Switzerland County	0.1352				
Carroll County	0.7757	Jackson County	0.1468				
Whitley County	0.7449	Floyd County	0.2176				
Montgomery County	0.7383	Lake County	0.2193				
Henry County	0.7382	Marshall County	0.2239				
Fayette County	0.7035	Harrison County	0.2635				
Gibson County	0.7031	Blackford County	0.2746				
Greene County	0.6904	Huntington County	0.2877				
Jay County	0.6860	Dearborn County	0.2949				
Vermillion County	0.6801	Kosciusko County	0.2951				
St. Joseph County	0.6756	Miami County	0.3641				
Lawrence County	0.6700	Bartholomew County	0.3669				
Randolph County	0.6345	Jennings County	0.3672				
Tipton County	0.6203	White County	0.4618				
Delaware County	0.5886						
Lagrange County	0.5776						
Clinton County	0.5711						
Daviess County	0.5577						
Rush County	0.5512						
Warrick County	0.5447						
Tippecanoe County	0.5232						
Allen County	0.5177						

Those 70 correct predictions are the model's successes ($70/92 = 76.1\%$, the correct prediction ratio). The model's failures are in the right two columns. There are 14 counties which have not adopted, but have probabilities greater than 0.5. Hamilton County is the model's biggest error. Hamilton's high population density and surrounding adopting counties are characteristics similar to counties that have adopted. Yet the county does not have the taxes. There appears to be some characteristic of Hamilton County, not measured by the logit model, that has caused its county council to reject the taxes.

Finally, there are eight counties with probabilities less than 0.5, that have adopted the taxes. Perry County is at the top of this list. Perry has a low population density and only one adopting neighbor, yet it has the tax (and has had it since the 1980's). Again, some characteristic not measured by the logit model has caused Perry to adopt.

Can the probabilities be interpreted as predictions of future adoption activity? Probably not, but consider the following counties.

- Clay County adopted in 2012, the most recent county to adopt. Its logit probability is 0.8984. Until 2012 it was at the top of the third column, the county most likely to adopt, which did not have the tax.
- Clark County's logit probability is 0.0155. It had the tax from 2004 to 2008. During that period it would have been at the top of the fourth column, the county least likely to adopt, which had the tax.
- Madison County is at the bottom of column three, with a probability of 0.5126. Adoption for Madison is near a 50/50 proposition, and it rescinded the tax in 2012 amid much controversy.
- Likewise, Allen County is at the bottom of column one, with a probability of 0.5177. The county and the City of Ft. Wayne were involved in a drawn out controversy about bridge funding, which may be revisited later in this decade.

On the other hand, Hamilton County had the tax from 1990 to 1997. Its probability is .8808. It would have been among the least likely counties to rescind the tax, according to the logit model. But Hamilton did rescind it.

So, we should not take the probabilities as predictions. We should not predict that Hamilton, Adams, Spencer and Boone will adopt the taxes, and Perry, Wells, Dubois and Howard will rescind them. These counties most likely represent the model's inadequacies. There are reasons for their decisions that are simply not measured by the model. All we should say is that the first four have some characteristics like other Indiana counties that have adopted the taxes, and the second four have some characteristics like other Indiana counties that have not adopted.

Appendix 4. A Statistical Model of Light and Heavy Vehicle Registrations

A statistical model of Indiana vehicle registrations measures the effects of several variables on the numbers of light and heavy vehicles registered in Indiana counties in 2009.

Separate models for light and heavy vehicles are estimated. Light vehicles include automobiles, light trucks (pickup trucks) and motorcycles. The variables used to “explain” light vehicle registrations are county population, population density, median household income, total employment in the county, miles of Federal and state highways in the county, miles of county, city and town roads in the county, and the minimum or fixed motor vehicle excise surtax rate. The rate is set at zero for counties that have not adopted the surtax. Population is expected to have a positive effect on registrations, as more people are likely to own more vehicles. Population density measures urbanization. More urban counties may have fewer registrations, if more mass transit is available. This may not apply to many Indiana counties, however. Household income should have a positive effect on registrations, if richer households own more vehicles. Employment should also have a positive effect, since the people need vehicles to get to work, and the businesses themselves may own vehicle fleets. More miles of federal, state, county and city/town roads are expected to add to registrations, if mileage promotes economic development. Finally, the adoption of the surtax is expected to discourage registrations, all else equal, because it makes vehicle ownership more expensive.

Heavy vehicles include heavy trucks (above 11,000 pounds) and farm trucks. The variables used in the heavy vehicle registration model are median household income, total employment in the county, dollar receipts of agricultural operations, miles of Federal and state highways in the county, miles of county, city and town roads in the county, and the wheel tax rate on heavy trucks (the maximum rate is used for counties with more than one truck rate). The rate is set at zero for counties without a wheel tax. Household income is expected to have a positive effect on registrations, if richer households generate more business for local firms. Employment should also have a positive effect, since more businesses are likely to own more trucks. Agricultural receipts should have a positive effect, since farm trucks are included in the registration total. More miles of federal, state, county and city/town roads should have a positive effect on registrations, if road mileage reduces business costs and makes vehicle ownership more profitable. Finally, the adoption of the wheel tax is expected to discourage registrations, all else equal, because it makes vehicle ownership more expensive.

The statistical method is “linear regression.” This method estimates the linear equation which best explains the dependent variable (registrations). The linear equation multiplies an estimated coefficient by each explanatory variable in each year, and sums them (along with a constant term) to provide an estimate of vehicles registered in each county. The difference between the estimate and the actual registrations provides a measure of how well the variables explain registrations. If the errors are small the variables do a good job of explaining the dependent variable. The “R-squared” statistic shows how good this explanation is. R-squared can vary from zero to one, where zero means the variables do not explain the dependent variable at all, and one means the variables explain the dependent variable perfectly.

The “significance” of each explanatory variable individually is measured by the “t-statistic.” If the t-statistic is absolutely greater than two (positive or negative), the coefficient is significant at the 95% confidence level. This means we can be very confident that the true relationship between the explanatory variable and gallons has the positive or negative sign estimated by the regression.

Table A4-1 shows the results for light vehicle registrations. The R-squared statistic shows that the explanatory variables explain 99.8% of the variation in light vehicle registrations, a very high R-squared. The model does a very good job explaining the variation in registrations among Indiana counties.

Table A4-1

Dependent Variable: Light Vehicle Registrations			
	<i>Coefficients</i>	<i>St. Error</i>	<i>t Stat</i>
Constant	-19487.634	3488.644	-5.586
Population	0.633	0.032	19.887 *
Pop Density	26.440	8.779	3.012 *
Income	0.448	0.068	6.574 *
Employment	0.149	0.048	3.104 *
Fed/State Miles	23.742	16.170	1.468
Local Miles	39.225	12.717	3.084 *
Surtax Rate	-64.341	51.300	-1.254

* significant at 95% level

R-Squared 0.998

Variable Definitions
 Registrations: Registrations of automobiles, light trucks and motorcycles in county, 1999
 Population: County population
 Pop Density: County population per square mile
 Income: County household income
 Employment: Total county employment
 Fed/State Miles: Miles of Federal and state highways within county
 Local Miles: Miles of county, city and town roads within county
 Surtax Rate: Minimum or fixed rate per vehicle

Population, income, employment and local miles are significant at the 95% confidence level, and have the expected positive signs. Counties with more of each of these variables tend to have more light vehicle registrations.

Population density was expected to have a negative sign, but the sign on its coefficient is positive, and it is significant. In Indiana, urban and suburban counties have more registrations, not less. It may be that mass transit is not readily available in many of Indiana's more urban counties, so mass transit does not serve as a substitute for vehicle ownership. Perhaps as well the density variable is indicating suburban counties more than urban counties, and suburban households own more vehicles.

Two variables are not significant, meaning there is no evidence in the model that those variables have an effect on light vehicle registrations. One is Federal and state highways and the other is the surtax rate. Of particular interest is the surtax rate. It has the predicted negative sign, but since it is not significant there is no clear evidence that counties with the surtax see reduced light vehicle registrations, all else equal.

Table A4-2 shows the results for the heavy vehicle registration model. The R-squared statistic shows that the explanatory variables explain 94.3% of the variation in light vehicle registrations.

Table A4-2

Dependent Variable: Heavy and Farm Truck Registrations			
	<i>Coefficients</i>	<i>St. Error</i>	<i>t Stat</i>
Constant	1257.633	460.650	2.730
Income	-0.019	0.009	-2.023 *
Employment	0.034	0.001	26.785 *
Farm Receipts	0.005	0.001	4.264 *
Fed/State Miles	2.388	1.972	1.211
Local Miles	-3.336	1.653	-2.017 *
Wheel Tax Rate	-4.248	3.929	-1.081

* significant at 95% level

R-Squared 0.943

Variable Definitions
 Registrations: Registrations of heavy and farm trucks in county, 1999
 Income: County household income
 Employment: Total county employment
 Farm Receipts: Dollar receipts of agriculture in county
 Fed/State Miles: Miles of Federal and state highways within county
 Local Miles: Miles of county, city and town roads within county
 Wheel Tax Rate: Tax rate on heavy trucks

Though the model has a high R-squared, indicating that it does a good job explaining variation in heavy vehicle registrations among counties, the signs and significance of the variables offer some surprises. Only employment and farm receipts are significant with the expected positive signs. The t-statistic on employment is particularly large, implying that this variable influences county truck registrations more than any other.

Income and local road miles have unexpected negative signs, and both are significant. Both of these variables are positive and significant in the light vehicle model, indicating that they are positively associated with more light vehicle registrations. Perhaps this implies a degree of road congestion that businesses that use heavy trucks wish to avoid.

Federal and state road mileage and the wheel tax rate are not significant, though each have the expected signs. Again, the wheel tax rate is of particular interest. It is not significant, so there is no clear evidence that counties with the wheel tax see reduced truck registrations, all else equal.

Appendix 5. A Statistical Model of Statewide Motor Vehicle Excise Tax Revenue

A statistical model of Indiana motor vehicle excise tax revenue estimates the effects of several variables on the sum of excise tax revenue for all counties from 1976 to 2010. The motor vehicle excise tax is a revenue source for all Indiana local governments, originally created as a substitute for the property tax on vehicles. Tax revenues are based on the number, purchase price and age of vehicles registered in each county. It is a tax on the same light vehicles that are subject to the motor vehicle excise surtax. Counties that adopt the percentage surtax rate tie their revenues directly to their county excise tax receipts. Counties with a fixed surtax rate per vehicle are taxing the same number of vehicles, but without regard to vehicle purchase price or age.

The variables used to “explain” the statewide sum of motor vehicle excise tax revenue are lagged motor vehicle excise tax revenues from the previous year, U.S. light vehicle sales from the previous year, a price index of new vehicles from the previous year, a variable indicating the excise tax rate change that occurred in 1996, and the product of the rate change variable and the previous year’s revenues.

The motor vehicle excise tax is a tax on all registered vehicles. While some vehicles are discarded each year, most vehicles purchased in previous years continue to be taxed. This implies that the previous year’s revenues should have a positive influence on current year revenues. New vehicle sales add to the stock of taxable vehicles, and so should have a positive effect on revenues. There is no measure of Indiana vehicle sales available for the whole period, so the U.S. figure must serve. The previous year’s number is used (that is, 2009 vehicle sales explain 2010 revenues), because vehicles purchased during a year pay only a pro-rated portion of the excise tax that year. Vehicles are first fully taxed in the year after they are purchased. The excise tax schedule taxes more expensive vehicles at higher rates. Vehicle purchase price from the previous year should have a positive effect on revenues.

In 1996 Indiana cut most motor vehicle excise tax rates in half. A “dummy” variable is used to measure this one-time change. The variable equals zero in the years up to 1996, and one after that. The coefficient will be negative. Rates on older vehicles were not quite halved—the \$12 minimum on cheaper, older vehicles was maintained. That should change the relationship between previous year’s revenue and current revenue. Taxes on older vehicles do not fall as much when vehicles age under the new rate schedule, because vehicles hit the \$12 minimum at newer ages. The lagged revenue variable after 1996 should have a bigger positive effect on current revenue as a result.

The statistical method is “linear regression.” This method estimates the linear equation which best explains the dependent variable (excise tax revenue). The linear equation multiplies an estimated coefficient by each explanatory variable in each year, and sums them (along with a constant term) to provide an estimate of revenue. The difference between the estimate and the actual revenue provides a measure of how well the variables explain revenue. If the errors are small the variables do a good job of explaining the dependent variable. The “R-squared” statistic shows how good this explanation is. R-squared can vary from zero to one, where zero means the variables do not explain the dependent variable at all, and one means the variables explain the dependent variable perfectly.

The “significance” of each explanatory variable individually is measured by the “t-statistic.” If the t-statistic is absolutely greater than two (positive or negative), the coefficient is significant at the 95% confidence level. This means we can be very confident that the true relationship between the explanatory variable and gallons has the positive or negative sign estimated by the regression.

Excise tax revenue and all but one of the explanatory variables are used in logarithmic form. This ensures that the coefficients are “elasticities,” which show the percentage change in revenue sold resulting from a one percent change in each dependent variable. This form makes the coefficients easier to interpret. The 1996 rate change dummy variable cannot be used in logarithmic form, because the log of zero is not defined. The coefficient on this variable is the percent change in revenue due to the adoption of the new tax rates in 1996.

Table A5 shows the results. All the coefficients have the expected signs, and are significant at the 95% confidence level. The R-squared statistic shows that the explanatory variables explain 98.5% of the variation in excise tax revenue.

Table A5

Dependent Variable: Statewide Motor Vehicle Excise Tax Revenue, 1977-2010			
	<i>Coefficients</i>	<i>St. Error</i>	<i>t Stat</i>
Constant	-0.659	0.281	-2.346
Lagged Revenues	0.796	0.056	14.270 *
Vehicle Sales, lagged	0.233	0.061	3.795 *
Vehicle Price Index, lagged	0.296	0.111	2.666 *
Rate Change, 1996	-0.616	0.048	-12.811 *
Lagged Revenues since 1996	0.084	0.008	10.339 *
* significant at 95% level			
R-Squared	0.985		
<i>Variable Definitions</i>			
Excise Tax Revenues: Motor vehicle excise tax revenue, all counties			
Lagged Revenues: Exise Tax Revenues, prior year			
Vehicle Sales, lagged: U.S. light vehicle sales, prior year			
Vehicle Price Index, lagged: price index, new motor vehicles (GDP accounts)			
Rate Change, 1996: dummy variable, 1996 and after =1			
Lagged Revenues since 1996: Lagged Revenues x Rate Change, 1996			

Lagged revenues have the expected positive sign. At 0.796, it is less than one. This is also expected. Some of the vehicles taxed in the previous year are discarded; most are taxed at a

lower rate this year. Since 1996 this coefficient has been larger (add 0.084 to 0.796 to get 0.880), since more vehicles are at their \$12 minimum, and so do not see their taxes reduced from the previous year. The 1996 rate change has the expected negative sign, implying that revenues are 61.6% lower as a result of the rate reduction that year.

Vehicle sales from the previous year have an elasticity of 0.233 on current excise tax revenues. When U.S. vehicle sales drop 10%, excise tax revenue drops about 2.3% the next year. Recessions matter, but the fact that the whole stock of vehicles is taxed means the effect of falling sales on revenues is diminished. Likewise, the previous year's price index affects current revenues. A 10% increase in vehicle prices results in a 3% increase in revenues the following year. Again, inflation matters, but its effect is diminished because older vehicles are taxed based on their original purchase prices. Recall that this inflation effect will not apply when surtax rates are levied per vehicle, rather than as a percentage of excise tax revenue.

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