Journal of Transport Economics and Policy, Volume 35, Part 2, May 2001, pp.223–238

Why States Toll

An Empirical Model of Finance Choice

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Abstract

This paper examines the question of why some states impose tolls while others rely more heavily on fuel and other taxes. A model to predict the share of street and highway revenue from tolls is estimated as a function of the share of non-resident workers, the policies of neighbouring states, historical factors, and population. The more non-resident workers, the greater the likelihood of tolling, after controlling for the miles of toll road planned or constructed before the 1956 Interstate Act. Similarly if a state exports a number of residents to work out-of-state and those neighbouring states toll, it will be likely to retaliate by imposing its own tolls. Decentralisation of finance and control of the road network from the federal to the state, metropolitan, and city and county levels of government will increase the incentives for the highway-managing jurisdiction to impose tolls.

Date of receipt of final manuscript: October 1999

Introduction

Interest in road pricing to finance infrastructure, mitigate congestion, and improve air quality has been rising at a regular pace over recent years (Small *et al.*, 1989; TRB 1994; Roth 1996). States have the opportunity to impose toll financing on many of their bridges and highways and to determine the rate of toll, recognising the legal and fiscal constraints imposed by accepting federal transport funds. Yet not all states levy tolls, and those that do vary in the rate of toll. This paper examines empirical evidence to explain the dependence of state highway finance on tolls, extending theoretical work by the author (Levinson, 1998a,1999).

While the use of tolls to manage the externalities of congestion and pollution is relatively new in the realm of highways, road pricing to build and maintain infrastructure has a long history (Levinson, 1998b). Road tolls, present since ancient times, were deployed widely in the eighteenth century. By the middle of the nineteenth century, most intercity land travel in Britain and the United States used turnpikes. Yet at the onset of the twentieth century and soon thereafter almost all tollgates had been disbanded and the turnpikes converted to publicly owned, publicly operated, free highways. Disturnpiking occurred simultaneously with the centralisation of control over roads—management moved from small local agencies, companies, and authorities to larger regions or states. Longer-distance travel was viewed as a responsibility of a higher level of government, which saw more users as local residents. What is non-local to a county may be local to a state. By the 1940s the desire for limited-access highways serving long-distance auto trips led to another upsurge in toll road construction by states. The 1956 Federal Aid Highway Act arrested this trend by guaranteeing federal funding for a designated interstate highway system free of tolls. Just as before, what is non-local to a state is local to the nation. Thus, the vast majority of intercity roads in the United States constructed in the interstate era are not tolled because of centralised national policy-making. Recent interest in tolls in the United States has increased with the completion of the interstate highway programme. New road financing has largely become a state and local problem again. Because of the reduction in the transactions costs to government and travellers with electronic toll collection, tolls are more widely viewed as a feasible option. New public and even private toll roads are being constructed with electronic toll collection, while existing toll plazas are being converted.

The term "beggar-thy-neighbour" describes strategic trade behaviour, essentially mercantilist in nature, designed to give one country a foreign trade advantage at the expense of others.[1] Inevitably, such behaviour leads to retaliation and only makes everyone worse off. Countries perceive what game theorists term a "prisoner's dilemma," whereby "cooperating" to reduce barriers only pays off in the long term and only if others reciprocate. Highway tolls are in some ways analogous to tariffs. States (or the turnpike authorities they establish) can charge travellers crossing a boundary. For many facilities, no similar charge is levied on traffic remaining within the boundary. In this way, a toll may be viewed as a tariff on the transport portion of a good or on labour. Overall, states and users may be better off if other financing mechanisms, such as fuel taxes, with significantly lower transactions costs are chosen. However, the inability of states to cooperate and compensate each other for their residents' travel on other states' roads leads to a more direct and costly toll system. When most users are in-state residents, a legislature can develop a reasonably practical cost-sharing solution for highway finance. That is not nearly so simple when states need to cooperate. While the extent to which the behaviour of tolling roads is to achieve efficiencies, and the extent to which it is price discrimination, cannot be established *a priori*, we can surmise that one state's perception of efficient financing may be perceived by another as discriminatory exploitation.

Tariffs and tolls differ in several important respects. First, tolls may be seen as efficient user charges as states provide a service in exchange for payment of a toll. Second, because of the nature of surface transport, the toll may affect "through trips", travel conducted between two other states. Third, the presence of externalities, particularly congestion, may make it socially beneficial to use tolls rather than other sources of revenue (Walters, 1961; Vickery, 1963). To date this use of tolls has been much more promise than practice.

While road tolls differ from tariffs, this paper argues "beggar-thy-neighbour" policies help explain their extent. For states that import a significant number of workers during the workday, tolls may seem an ideal way to raise revenue with little political implications. Because out-of-state residents cannot vote in a state's election, toll policies will be more prevalent in states that import labour, as it enables them to raise revenue from non-voters. While complicated, the economics suggest that there will be some effects (both positive and negative) on local residents of tolls assessed

[1] Beggar-Thy-Neighbour Policy—"A course of action through which a country tries to reduce unemployment and increase domestic output by raising tariffs and instituting non-tariff barriers that impede imports. . .which, by reducing export markets, tended to worsen the economic difficulties that precipitated the initial protectionist action." (Smith and Blakeslee, 1998)

against non-residents, principally through the mechanism of real estate. Furthermore, a toll policy may provoke a retaliatory response by the labour exporting states, but the response will be less than full force. In labour exporting states, the burden of tolls (collection costs and so on) falls disproportionately on residents. States with large shares of resident workers (and thus fewer imported or exported labourers) are most likely to rely on taxes.

This paper begins by an examination of the data used in the statistical analyses. Then the specific hypotheses for the essential variables are presented accompanied with the results from a regression analysis. A sensitivity analysis is conducted using California data to examine the possible effect on share of toll revenue when states devolve the power to toll and responsibility for roads to counties and to metropolitan areas. The main difference is that the number of interstate trips is much smaller than inter-county trips, so the incentive structure shifts. Finally the research is summarised and some policy conclusions are drawn.

Data

Several sources of data are used in this analysis. Highway finance data come from the Federal Highway Administration's (1995) Highway Finance tables, which provide information on total revenue by state, and revenue by source, including tolls and other sources. Alaska is excluded, because although that state's data identify the "Alaska Marine Highway" as a highway toll, the service is a ferry. The District of Columbia does not have independent authority over its own roads, rather it faces veto from Congress, and so it too is excluded. The remaining 49 states are included in the analysis.

The Census Journey to Work survey (US Census 1998) is used to develop state-to-state traffic flows. The author developed a state-level trip table from the journey to work data. This table provides the number of work trips from each state by state of destination (in state or out of state). It also provides the number of work trips to each state by state of origin, not available from published data. The trip table can be used to determine the level of interaction between states, so that the effects of neighbouring states' policies can be estimated.

To apply the model to geographic units smaller than states, and thus test the implications of a policy for decentralising highway finance, Census Public Use Microdata Areas (PUMAs) were used. PUMAs are the smallest geographic unit of analysis in the Public Use Microdata Sample (PUMS) data set. The Census constructs PUMAs such that they contain approximately 100,000 people within them. They can be as small as a few city blocks or as large as several counties. An exact description of PUMAs is available from the University of Virginia Library Geospatial and Statistical Data Center (1998).

In preliminary analysis, the American Travel Survey (1995) was also used to construct a trip table of long trips (greater than 100 miles). While the journey to work survey focuses on short trips (though not the very short non-work trips), it does not consider long trips, which may have some effect on policy. State level summaries from this trip table were also tested in the regression models, but proved insignificant upon the inclusion of the journey to work data and so were excluded from the final analysis. Several special cases are thus missed, such as Florida, a major tourist destination, which may have a special incentive to export road costs to visitors.

Data on land area and population by state (and thus density) were also obtained from the Census Bureau. Historical data representing the miles of toll road in operation in 1963 by state were obtained from Rae (1969). A summary of state level data is provided in Table 1.

Hypotheses

This research hypothesises that states impose tolls to ensure a significant revenue flow from non-local travellers. Individuals pay income and property taxes to the state in which they live, not necessarily where they work or travel. Furthermore, because drivers can control where they purchase gasoline, particularly for shorter trips, the fuel tax does not guarantee revenue from non-resident travellers. Unfortunately, there is no single systematic source of data about interstate trips. The American Travel Survey captures long trips and the Census Journey to Work data captures work trips, but short trips for non-work activities are not collected in sufficient detail to measure interstate travel. Because most non-work trips are shorter than most work trips, it seems reasonable to suppose that interstate non-work trips are relatively small in number compared with work trips. We might also suppose that the number of non-work trips between states is proportional to work trips between those states, though this cannot be corroborated with the available data. We expect to see a positive and significant relationship between the share of non-resident workers (O) and the share of toll revenue (S).

Table 1
Summary Data

State	*Percentage Revenue from Tolls (S)*	*Workers Who Live Out of State (O)*	*Residents Who Work Out of State*	*Federal Land*	*Miles Toll Roads in 1963*	*Freeways Expwy, 1995*
Alabema	0.0	2.4	3.6	3.3	0	925
Arizona	0.0	1.1	1.6	41.5	0	1250
Arkansas	0.0	4.0	3.2	8.3	0	646
California	2.1	0.5	0.4	44.6	0	3750
Colorado	0.3	0.8	1.0	36.0	17	1170
Connecticut	0.0	4.6	4.7	0.2	194	542
Delaware	25.3	13.8	9.5	2.2	11	51
Florida	7.8	0.8	1.0	7.6	207	1861
Georgia	0.4	2.8	2.4	3.9	11	1413
Hawaii	0.0	1.0	0.5	8.5	0	77
Idaho	0.0	2.6	4.0	60.6	0	613
Illinois	9.3	2.8	2.9	1.3	185	2245
Indiana	4.3	3.3	4.8	1.7	157	1303
Iowa	0.1	3.7	4.3	0.2	0	781
Kansas	6.5	7.1	7.6	0.5	241	1008
Kentucky	0.8	6.3	6.7	4.2	205	855
Louisiana	2.9	2.1	1.9	2.8	0	929
Maine	10.5	2.1	3.1	0.9	112	383
Maryland	7.0	7.0	17.3	3.1	42	711
Massachusetts	10.4	5.0	3.1	1.2	124	762
Michigan	0.7	0.8	1.5	10.1	0	1458
Minnesota	0.0	2.3	1.8	3.1	0	1042
Mississippi	0.0	3.1	5.9	4.3	0	726
Missouri	0.1	7.2	4.8	3.8	0	1460
Montana	0.0	0.8	1.2	27.5	0	1190
Nebraska	0.2	4.3	2.3	1.2	0	497
Nevada	0.0	4.3	1.2	77.1	0	586
New Hampshire	11.8	8.5	16.8	12.8	77	266
New Jersey	27.3	7.0	11.7	3.3	309	728
New Mexico	0.0	1.9	2.5	33.9	0	1003
New York	33.2	5.1	2.4	0.7	629	2328
North Carolina	0.1	2.2	1.8	6.9	0	1237
North Dakota	0.0	5.9	3.7	4.0	0	570
Ohio	3.3	2.8	2.2	1.1	241	1937
Oklahoma	7.6	1.1	2.9	1.5	174	1064
Oregon	0.5	3.7	2.1	51.8	0	780
Pennsylvania	11.7	3.4	4.3	2.2	469	2087
Rhode Island	3.7	7.6	11.9	0.7	0	137
South Carolina	0.0	2.1	1.8	3.8	0	894
South Dakota	0.0	3.0	4.0	5.5	0	681
Tennessee	0.0	4.6	3.3	5.7	0	1176
Texas	2.5	0.9	0.8	1.4	30	4474
Utah	0.1	1.0	1.3	63.1	0	948
Vermont	0.0	4.9	5.8	6.4	0	1329
Virginia	4.7	6.5	9.3	9.4	35	339
Washington	4.1	1.5	2.7	24.1	0	1079
West Virginia	6.6	8.3	9.7	7.0	86	560
Wisconsin	0.0	1.4	3.2	5.3	0	830
Wyoming	0.0	2.6	2.0	48.5	0	916

Note: Toll Miles = Toll Miles in Use in 1963, from Rae (1971) after Bureau of Public Road data

A state that exports labour may find some of its residents paying tolls to other states. That state may respond by tolling in return to try to recapture some of that revenue. However, a situation where both states taxed instead of tolled could be better overall, especially for the labour-exporting state. Therefore, the labour-exporter may be less likely to toll initially — where initial tolls will bring about retaliatory tolls. If its labour-importing neighbour taxes, the labour-exporting state may retain taxes as well. In game theory terms, it will cooperate initially, and only be non-cooperative if its neighbour is as well. The outcomes of alternatives are illustrated in the following schematic:

Importing Neighbour / Exporting State	Tax	Toll
Tax	Cooperative	Exploited
Toll	Exploiter	Non-Cooperative

It is unlikely that the effect of a neighbour's tolls will be as strong as the effect of non-local trips, because tolls in a labour exporting state will disproportionately affect its own residents. (A labour importing state is in a politically much better position to exploit its neighbours than a labour exporting state.) Furthermore, only a fraction of its own residents will travel out of state and pay tolls to their neighbours. So this can be thought of as a second-order effect. It is hypothesised that the toll share will be positively and significantly affected by the tolls of neighbouring states. We measure the neighbour tolls (N), as the share of revenue from tolls in each neighbouring state weighted by the share of that state's residents commuting to those neighbours.

$$N_i = \left\{ \left(\sum_j T_{ij} S_j \right) \Big/ W_i \right\}^{b} \qquad \text{for } j <> i$$

Where: N_i = Neighbour state effect for state i;
T_{ij} = Trips from state i to state j;
$W_i = \sum_j T_{ij}$ for all j;
S_j = Share of revenue from tolls in state j;
b = model coefficient

Raising the term to a power greater than 1 magnifies larger interactions, and reduces noise in the data. The value of b ($b = 4$) was arrived at after some experimentation.

Before the interstate highway act, states were responsible for funding their own limited access highways. As noted in the introduction, many of these highways were toll financed. Tolls capture out of state traffic as well as securing a source of funds against which an independent public authority can borrow. Many of those roads are extant and still operated as toll roads. Because of historical inertia, the share of toll revenue in 1995 still depends on the presence of toll roads from 40 years ago. Since the dependent variable is a ratio, we construct this independent variable similarly. To measure the effect of historical toll miles (M), we use the ratio of toll miles in 1963 to miles of limited access highways in 1995. Toll miles in 1963 reflect linear miles of toll roads built or under construction before the interstate programme took full force. Limited access highways in 1995 are measured as the linear miles of toll roads, interstate highways, and other freeways and expressways. Revenue and miles are not directly related — revenue depends also on the rate of toll and the use of the facility, both of which are affected by the other variables described here. Certainly the theory applies before 1956 as well, but data on interstate trips from that era are unavailable to test.

The size of a jurisdiction may affect the share of revenue from tolls. Jurisdictions that are more populous may have higher costs for building and maintaining highways and more congestion. Furthermore, states containing large cities may be more likely to import workers than rural states. Finally, states in the Northeast and Midwest tend to be more populous than the national average (recognising some obvious very populous states in the south and west), and those states have less land area than the average. Those states have many more miles of toll roads, because of their early start building limited access highways. We expect that 1990 population (P) will be positively and significantly associated with share of toll revenue, but we will test it in combination with population density and land area.

If states have higher costs, then they should have higher expenditures, and may require more revenue from tolls (to avoid the losses caused by fuel tax border effects). If population is important because of costs, then expenditures may also be a significant variable.

In the interstate act, interstate highways were financed with a 90 per cent federal share and a 10 per cent state share except in the so-called "public lands" states. In those states up to 95 per cent federal financing was provided. Under the interstate act, federally funded roads had to be free of tolls. This additional incentive to use federal dollars may be apparent in today's tolls share. A variable indicating the percentage of land in a state that is federally owned was tested to capture this effect.

Results

To test the hypotheses, a series of regressions was run, with the dependent variable being the share of state revenue from tolls. Other model structures, including binomial logit and probit models were tested (the choice of toll/not toll) as was an aggregate logistic form, where the dependent variable was $S/(1-S)$. Subsamples of the tolling states were used in some estimates, excluding from the share estimates states that don't toll. Different functional forms (Cobb-Douglas) as well as non-linear transformations of the variables were tested. The linear specification was preferred because it was plausible and simple and the fit was good. The Cook-Weisberg test on an uncorrected ordinary least squares regression reports heteroscedasticity, so corrected robust estimates using the Huber-White estimator of variance are presented in Table 2.

Table 2
Dependent Variable: Share of Transportation Revenue from Tolls

	Model 1 Coefficients	*t Stat*	*Model 2 Coefficients*	*t Stat*
Intercept	−0.0343	−1.91*	−0.0362	−2.18**
Population (P) (millions)	0.00383	1.83*	0.00385	1.94*
Mile Ratio (M)	0.300	2.34**	0.352	3.14***
Imported Workers (O)	0.843	2.04**	0.839	2.14**
Neighbour Effect (N)	89320	1.70*		
Adjusted R Square	0.62		0.60	
Standard Error	0.04		0.05	
Observations	49		49	
F	20.87		25.76	
Significance F	0.00		0.00	

Note: *, **, *** denotes significance at 10%, 5%, 1% on two-tailed t-test respectively

Analysis of Variance for Model 1:H_0: Y= Mean (Y)

	DF	*Sum of Squares*	*Mean of Squares*
Model	4	0.1674	0.0419
Residuals	44	0.0882	0.0020
Total	48	0.2556	

Source	*Type I SS*	*Fisher's F*	*Pr.> F*
Population (P)	0.0182	9.0680	0.0043
Mile Ratio (M)	0.1263	63.0004	0.0001
Imported Workers (O)	0.0171	8.5174	0.0055
Neighbour Effect (N)	0.0058	2.9105	0.0951

After preliminary analysis, several hypotheses were rejected. The percentage of federal lands variable turned out to be statistically insignificant, and so was dropped from the final analysis presented here. Similarly, variables for capital and non-capital expenditures were tested as possible explanatory variables and rejected as statistically insignificant. While land is an important variable if the share of workers residing out of state (*O*) is excluded, it is clearly the number of workers, rather than the less direct estimate based on land area, which is significant. Population and density were tested, but density was dropped because population was a much more important and significant variable, and density was statistically insignificant.

Model 1 was estimated was as follows:

$$S = a_0 + a_1 O + a_2 N + a_3 M + a_4 P \tag{1}$$

Where: $S =$ Share of Revenue from Tolls in 1995;
$O =$ Share of workers residing out of state in 1990;
$N =$ neighbouring states effect;
$M =$ ratio of miles of toll road in 1963 to all limited access highways in 1995;
$P =$ 1990 population.

The regression corroborates the hypotheses concerning the effect of population (*P*), out of state workers (*O*), the neighbour effect (*N*), and the historical toll miles (*M*), which are all positive and significant. As expected the neighbour effect (*N*) was less significant than the share of non-resident workers (*O*). As shown in Table 2 (the results from the statistical analysis) overall the model explains 62.4 per cent (adjusted *r*-squared) of the variance in states share of highway revenue from tolls. In order of importance, the ratio of toll miles (*M*) explains 49.4 per cent, population explains 7.1 per cent, out of state workers (*O*) explains 6.7 per cent and the neighbour effect (*N*) explains 2.3 per cent of that variance. All four variables are statistically significant at the 10 per cent threshold (2-tailed *t* test).

Each 1 per cent increase in the share of non-resident workers (*O*) increases the share of toll revenue (*S*) by 0.85 per cent on average. Each 1 per cent increase in the toll mile ratio (*M*) increases the S by 0.30 per cent. Each additional million people increases *S* by 0.38 per cent. The effect of a neighbour's tolling policy on a state's residents is more complicated because of the non-linearity involved. To illustrate, if $N = 0.01$ (for example in Rhode Island $N = 0.011$), a 1 per cent increase in neighbours' tolls causes *S* to increase by 0.0036 per cent. If $N = 0.02$ (in New

Hampshire $N = 0.017$), a 1 per cent increase leads S to increase by 0.058 per cent, while if $N = 0.03$ (in New Jersey $N = 0.031$), a 1 per cent increase induces a 0.30 per cent increase in S.

Model 2 in Table 2 shows the regression results when we drop the effect of neighbours (N). The results are quite similar. However, the implications of the model differ significantly as seen in the next section, which applies the model to metropolitan and county level data.

Sensitivity Analysis

Our model, estimated at the state level, suggests that more localised control over highways will lead to a greater likelihood of toll financing, all else being equal. The magnitude of this can be tested by applying the model of state behaviour to smaller levels of government (for instance, metropolitan areas or counties). The analysis suggests what might happen if financing responsibility and control over streets and roads were devolved from states to counties or metro areas. We expect that counties, which have a great deal of cross-jurisdictional flows, would be more likely to toll than metro areas, or than the states which contain them. This section hopes to establish the magnitude.

Journey to Work Trip tables using the public use microdata area (PUMA) definition available from the Census PUMS database were constructed for the state of California. PUMAs, of about 100,000 residents apiece, either coincide with counties, or aggregations of counties, or can be aggregated to the level of a county. A new definition was created, aggregated PUMA or APUMA, which was the larger of a PUMA or a county. The APUMA is at a minimum one county, but may be comprised of several small counties. The trip table, created with the PUMA definition, was further aggregated into the larger of the census metropolitan statistical areas (MSA) or consolidated metropolitan statistical areas (CMSA) for each place.

The previous section's Model 2 was applied to each of the new geographical units (APUMA and MSA/CMSA). Bridges are not counted as part of 1963 miles of toll road, so the effect of historical miles is zero for each county and the state of California as a whole.

Table 3 shows the resulting share by area. Compared with California's toll share of 2.1 per cent, MSA/CMSAs had an average predicted share of 2.3 per cent and APUMAs of 10 per cent. However, metropolitan APUMAs, part of larger CMSAs, had much higher shares. By definition, very

Table 3
Share of Toll Revenue by Geographical Area

CMSA	*Share*	*APUMA (Counties)*	*Share*
Bakersfield	0.027	Kern	0.027
Chico	0.014	Butte	0.014
Fresno	0.025	Fresno	0.025
Los Angeles	0.027	Orange	0.125
		Los Angeles	0.087
		Ventura	0.048
		Riverside	0.094
		San Bernardino	0.117
Merced	0.049	Merced	0.049
Modesto	0.057	Stanislaus	0.057
Redding	0.075	Shasta	0.075
Sacramento	0.010	Yolo	0.274
		Placer	0.272
		El Dorado	0.074
		Sacramento	0.094
Salinas	0.017	Monterey	0.017
San Diego	0	San Diego	0
San Francisco	0.011	Alameda	0.213
		Contra Costa	0.208
		Marin	0.222
		San Francisco (city)	0.345
		San Mateo	0.265
		Santa Clara	0.115
		Santa Cruz	0.076
		Sonoma	0.024
		Napa	0.115
		Solano	0.135
Santa Barbara	0.028	Santa Barbara	0.028
Stockton	0.141	San Joaquin	0.141
Visalia	0.012	Tulare	0.012
Yuba	0.057	Sutter, Yuba	0.057
NonMetro	0.069	Del Norte, Lassen, Modoc, Siskiyou	0.107
		Humboldt	0.061
		Lake, Mendocino	0.066
		Colusa, Glenn, Tehama, Trinity	0.198
		Nevada, Plumas, Sierra	0.074
		Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, Tuolumne, Madera, San Benito	0.134
		Kings	0.127
		Imperial	0.000
		San Luis Obispo	0.042

few work trips travel between MSAs or CMSAs. However, many do travel between APUMAs within a larger metro area. Consequently, the share of trips originating outside an area increases as the area gets smaller.

For instance, the Los Angeles metropolitan area, if treated as a whole and given pricing authority over all its roads, was predicted to have a share of toll revenue of 2.7 per cent. However, if the same analysis is carried out with counties having that authority, the results differ markedly. The shares ranged from 4.8 per cent in Ventura County to 12.5 per cent in Orange County. (Interestingly it is in Orange County that most of the new toll road construction in California is taking place, on SR91 and the Eastern Transportation Corridor.)

Similarly in San Francisco the metro area as a whole would have a fairly low share of toll revenue (1.1 per cent), as most work trips remain within the large area. But the toll share for individual counties would range from 2.4 per cent in Santa Rosa to 34.5 per cent in the City of San Francisco. The counties within the Bay Area have California's highest percentages of inter-county flows. It should be noted that with seven toll bridges and several bottleneck passes, the Bay Area is probably most easily adapted to increasing the share of toll revenue.

Application of Model 1 from the previous section, which included a neighbour effect (N), is somewhat more complicated, especially since a power term is used. The model would need to be applied iteratively or simultaneously, since we are solving for the toll share of each geographical units (APUMA, MSA/CMSA) depending on the toll share of all other areas. If we use the estimated power term, the model "blows up" at the APUMA level, most jurisdictions go to 100 per cent toll share very quickly. Toll shares were constrained to fall between 0 and 100 per cent.

Summary and Conclusions

This paper evaluated the empirical evidence surrounding the hypothesis that jurisdictions' highway finance behaviour is determined in part by the share of non-local traffic and by the behaviour of neighbouring jurisdictions. It found that the greater the burden of finance that could be placed on non-resident workers, the greater the burden that is placed on those individuals. Similarly, it found corroborating evidence for a weak second-order effect, when a jurisdiction responds to its neighbours' policies. The greater the toll share imposed by neighbours on a jurisdiction's residents, the greater the tolls that the jurisdiction will levy in response.

Whether this is a globally detrimental "beggar-thy-neighbour" policy, or simply a rational non-cooperative outcome from states behaving efficiently, depends on your point of view. This outcome has the potential for internalising the congestion externality that a more "cooperative" outcome may lack. Only with the presence of tolls can marginal cost pricing (or its variants of time-of-day or so-called value pricing) be implemented and a more efficient utilisation of congested highways achieved. The smaller the jurisdiction, the greater the share of non-local traffic, and thus the higher incentive for tolls. This is especially true when looking at county sized jurisdictions, such as those within California. Therefore, a way to increase the likelihood of tolling is to decentralise the financial responsibility and governance of highways to more local agencies (for instance by eliminating federal funding and moving authority from states to sub-metropolitan areas and counties).

This potential could quickly turn sour in cases without congestion (such as rural interstates), where the tolls may significantly exceed the marginal cost price. Decentralisation may also lead to misinvestment, as jurisdictions have monopoly power and will be setting tolls and building infrastructure with local profits rather than global welfare in mind.

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