

# **An Investment Analysis of the Kansas Highway System**

March 25, 1999

By John Semmens and Myron Calhoun, Ph.D.

The key question is "how much should we invest and in which roadways?"

Traditional "needs studies" do not provide a sensible answer to this key question.

Typical cost/benefit analyses are biased in favor of higher public expenditures. Benefits are inflated and costs understated in most cost/benefit analyses.

Highway investments should be evaluated the same way private-sector investments are evaluated: do earned revenues exceed costs.

Tax funding of highways promotes a "binge and bust" cycle that generates high levels of waste and recurring financial crises.

Legislative proposals for a Kansas highway program offer no guarantee of the specific projects that would be funded, and no investment analysis that justifies the inclusion of any given project.

Raising taxes in an attempt to avoid financial problems will aggravate existing inefficiencies of the highway system.

Taxes cost the economy more than just the amount of revenue generated for public uses.

The irretrievability of converting cash into concrete makes highways a relatively high-risk investment. This risk is typically ignored in most cost/benefit analyses.

The lack of return-on-investment analyses of prospective highway investments increases the riskiness of public expenditures on highways.

Complying with the tax code may place significant additional burdens on the private sector. These burdens are typically ignored in most cost/benefit analyses.

The efficiency and equity of highway finance could be improved by charging drivers directly for their use of the roads.

Kansas has, and can, maintain a fiscally sound highway finance system without the need for revenues generated from taxes other than user fees, such as the quarter-cent transfer.

## *Should We Invest More or Less?*

The issue is not whether having highways is good for the economy. One would be hard pressed to find anyone to argue that having no highways would be better for the economy than having some highways. The pertinent question is: How much more than "none" should this "some" be?

For those in the business of providing highways, it may be tempting to assert that the ideal "some" is always "more than currently exists." However, such an assertion is intellectually indefensible and financially imprudent. A more realistic appraisal will likely demonstrate that, in some instances, we need more highway capacity, while in others we do not need what we already have. Investing funds where we need more capacity would be a wise use of resources, whereas investing funds where we already have

excess capacity would be a poor use of resources. Determining which condition pertains to any particular use of funds is the key investment issue facing transportation decision makers.

### *Needs Studies and Task Force Reports are Worthless*

When it comes to providing guidance for investment decision making, traditional "needs studies" and citizen "task force reports" are worthless for several reasons. In these studies and reports, existing road networks are taken as an unalterable given, so the maintenance and preservation costs of this system provide the baseline of costs for most of these efforts. Then the portions of the road network that are failing due to poor roadway condition or inadequate capacity are assumed to need improvements, so the cost of making these improvements is added to the baseline maintenance and preservation costs. Finally, on top of these costs are added any prospective new roads that are deemed necessary to accommodate growth in traffic or community development.

A clear recent example of this public exercise is the product of the Kansas Transportation 2000 (KT2K) study group. In keeping with their administrative charge, the group held 12 town hall meetings across the state to assess the public's transportation needs. Citizens appearing at the various open meetings throughout 1998 presented arguments for transportation infrastructure improvements amounting to more than \$17 billion. Although the final KT2K report to the Governor noted that "many presenters indicated that their requests had been pared down to reflect true needs", the study group's recommendation settled on a comprehensive eight-year program requiring \$4.3 billion to be spent in addition to current revenue.

Inevitably, these traditional methods of assessing prospective highway investment produce an escalating spiral of higher and higher "needs" with every iteration. Legislators are typically confronted with the purported "need" to impose substantial tax increases just to try to "catch-up" with the accumulating needs backlog. Suspecting that the "needs" figures being reported may be exaggerated, legislators are often reluctant to impose the tax increases implied by these studies and reports. However, uncomfortable with totally rejecting the pleas of the highway lobby, legislators often compromise by offering a tax increase smaller than these studies and reports demand, but larger than many taxpayers would like. The result is a ratcheting-up of tax rates that neither solves the highway finance problem nor pleases constituents.

### *Flaws of Typical Cost/Benefit Analysis*

An alternative to the welfare-based "needs study" and "task force report" approaches to assessing the merits of highway investment is a more business-like "cost-benefit" analysis. Such an analysis would look upon highways as investment assets which generate a return that justifies the expenditure of funds to create, improve, or maintain these assets. However, an accurate estimate of highway costs and benefits is essential in order to make the correct investment decision; estimates which may be impossible to ever calculate in the context of government spending. For private-sector businesses, the calculation is made simpler by virtue of the fact that sales revenues serve as the measure of benefits. For public-sector highway agencies, the calculation is complicated by the lack of direct sales revenue as a clear measure of benefits.

Some analysts use the lack of sales revenue for public-sector highways as a justification for making their own estimates of what these benefits might be. The "more conservative" of these analysts confine their estimates of benefits to those enjoyed by the highway users. These would typically be comprised of savings in vehicle operating costs (e.g., less fuel burned by vehicles because a new route is shorter than the older route previously used), safety gains (e.g., a new road is predicted to lower accident rates), and time savings (the cumulative minutes of shorter travel time due to a faster route between destinations).

The "less conservative" analysts may add other economic benefits to the calculation. Typically, these might include the employment impact of highway construction, the indirect impacts on other segments of the economy as successive ripples of the initial highway expenditures spread through the community, and the stimulation of the local economy due to improved transportation. The most well publicized Kansas

example of this is a study commissioned by the State Department of Transportation that considered the economic effect of the 1989 Kansas Comprehensive Highway Program.

Analysts in this study reviewed \$2.86 billion in construction projects approved under the 1989 statewide program and separated them into six different types of highway improvements. The value of highway contracts in each category was then increased by an "output multiplier" factor to arrive at what the study calls "output (i.e. production) impact" for each of the six types of road work. For example, the contract value of one category of highway improvements was \$647 million. That figure was raised by an output multiplier of 2.671768 to determine that projects in this grouping resulted in \$1.73 billion of output impact. When the output impacts of all six categories were added together, the \$2.86 billion translated into \$7.37 billion of production -- the economic activity in various consumer markets produced by the increased consumer spending of people employed on highway program projects.

#### *Less Conservative Cost/Benefit Analysis*

Both of these methods, the conservative and the less conservative, inflate the benefit side of the equation. The "less conservative" analysis technique is more easily criticized. Any investment that includes its own cost (i.e., the amount spent on construction) as a benefit (i.e., the jobs supported by the expenditure) cannot fail to show a surplus of benefits over costs. Even the most poorly conceived highway project would appear to generate more benefits than costs. A state or community relying upon such an analysis technique would embrace an endless sequence of tax increases until economic disaster brought a halt to the process. Adding the indirect economic impacts merely extends and exacerbates this distortion.

Highway stimulation of the local economy is a proverbial "chicken and egg" conundrum. Obviously, a highway to nowhere is incapable of sustaining economic development. On the other hand, when a highway is built in conjunction with other elements of economic development, it may be a crucial component. However, it is not possible to ascertain accurately how much of any economic growth is because of any particular component contributing to that growth. Nor can we easily determine whether a different investment choice (i.e., something other than highways perhaps an income tax rate reduction) would have resulted in a greater economic stimulation.

#### *More Conservative Cost/Benefit Analysis*

The substantial deficiencies of the less conservative cost/benefit analysis technique persuade many that a "more conservative" approach is warranted. While it is true that confining the cost/benefit calculation to user benefits is less distorting, it still, nonetheless, biases the analysis in favor of highway expenditures.

The key source of bias derives from the fact that "consumer surplus" is smuggled into the benefit side of the equation while being ignored on the cost side. Consumer surplus is the increment of benefit that accrues to consumers because the price they pay for a product or service is less than the value received. Using the estimated highway user benefits (e.g., vehicle operating cost savings, safety gains, and time savings), rather than what highway users pay for using the highways, plugs the consumer surplus into the benefit side of the calculation.

If we are going to add consumer surplus to the benefit side of the equation, we should also add it to the cost side. This means we would have to include the consumer surplus foregone on money that is taxed away from people to fund the highway program. The problem is that we don't know what this foregone consumer surplus might have amounted to.

#### *Time Savings*

We have no objective basis upon which to compare the relative value of time saved on a trip with anything else. A common practice has been to assume that the value of time saved can be estimated by

summing up all the minutes saved on the millions of trips made and multiplying this figure by an imputed hourly wage. The validity of this practice is highly suspect. Research published by the American Association of State Highway and Transportation Officials indicates that the value of saving a few minutes is only a fraction of the hourly wage rate. The same research also showed that the value of time saved depends upon the trip purpose. Since time-value estimates are typically calculated without regard to these two elements, the resulting estimate of benefits is likely to grossly overstate the real benefits.

### *Traffic Safety*

Anticipated safety gains may also be suspect. The phenomena of "accident migration" and "risk compensation" both indicate that the assumed safety gains from a new or improved roadway may be substantially offset by altered patterns of travel and/or driver behavior. For example, the elimination of a safety hazard in a particular segment of roadway is often followed by the "migration" of accidents to another location along that roadway. Eliminating a "dangerous curve" on one segment of the road allows vehicles to travel at a higher speed through this segment than they may have previously thought safe when the dangerous curve existed. This higher speed through this improved section will result in a higher speed entering the next segment of roadway. The previously "safe" road segment then experiences an increase in accidents because of the higher speed.

Risk compensation is a more generalized phenomenon. To the extent that drivers perceive that the safety of a road has increased some of them will feel confident enough to assume increased risk. Drivers may feel more relaxed and be less alert or may drive faster than they did when the road was perceived as more dangerous. The end result is that the actual safety gains will be smaller than the static analysis of the "fix" to the dangerous site implies. So, just adding in estimates of reduced accidents calculated by the design engineers will systematically overstate the potential safety gains of highway investments.

### *Operating Costs*

Similarly, the operating cost savings may also be exaggerated. For example, fuel efficiency for cars tends to peak at around 50 miles per hour. To the extent that an improved roadway might actually boost speeds above this level, drivers will be burning more fuel. So, whether there are operating gains or not hinges on outcomes that may or may not be given an appropriate evaluation by those eager to make the road improvements.

Hard as it is to estimate the potential benefits of a highway improvement, it is far more difficult, perhaps impossible, to calculate the potential benefits foregone by using scarce resources for a highway project. Considering that the range of alternative non-highway uses for the funds expended on highways is wide, perhaps even infinite given a continuum of apportionments to various alternatives, we are confronted with an insoluble problem. That is, since money that might be spent on highways could be spent on almost anything else, and probably would be given the variety of human preferences, it is not feasible to measure the cumulative consumer surplus values foregone. So, since we cannot solve the problem of how to calculate the foregone consumer surplus, we should discard the methodology.

### *Return-on-Investment Analysis*

Well, if we can use neither the traditional "needs study" nor the "cost/benefit analysis" methodologies to guide highway investment decisions, what can we use? Here is where we take a page from the financial-analysis techniques of the private sector. We should evaluate highway investments on the same basis that private-sector businesses evaluate investment decisions: by comparing costs to earned revenues. Just like the private sector, our costs will be the expenditures we must make on building, improving, and maintaining our assets, and our revenues will be the fees paid by our customers for the use of the roads.

### *Calculating Revenues*

Attributing fees to particular roadways will require a few calculations to be made. Unlike private-sector businesses, we do not charge directly for use of the highways. Rather than paying directly for each mile of travel, highway users are typically taxed per gallon of fuel or are assessed lump-sum vehicle registration fees and license taxes. The sum of these fees must be allocated to the roads on the basis of vehicle miles of travel and according to traffic volume and composition. Earnings rates per vehicle mile of travel can be estimated by dividing the revenues collected from given classes of vehicles by the vehicle miles of travel for these vehicle classes. The earnings for any given roadway segment, then, would be calculated by multiplying these earning rates by the volume of traffic in each vehicle class.

### *Calculating Costs*

The earnings by each road segment could then be compared to the costs for the segment (including capital and maintenance costs over some investment horizon or life cycle). Segments that generated more revenues than costs could be accurately perceived as the "cash cows" of the highway system. The investment decision here is fairly simple: one should continue to feed the "cash cows." Maintaining and improving these segments helps to ensure a favorable cash flow to the highway agency. On the other hand, segments that generated costs larger than revenues could be perceived as "money losers." The investment decision here is a little more complex. It may be that the roadway in question is a candidate for divestiture (i.e., removal from the investment portfolio). It may be that the roadway in question should be carried as a "loss leader" (i.e., a product that is itself unprofitable, but contributes to the profitability of another product). It may be that the roadway merits a "price" increase. These are the same types of investment decisions faced by private-sector firms.

### *The Clumsiness of Tax Financing*

Admittedly, the scope for decision making in the public sector is hampered by the clumsy nature of tax financing. Since taxes are not prices, per se, we cannot adjust them with the same degree of precision private businesses employ to adjust their prices. Thus, the public-highway agency can be confronted simultaneously with excess demand on an under-priced roadway, excess capacity on an over-priced roadway, and no latitude to make the obvious price corrections. As long as this condition persists, we will continue to get far less than optimal performance out of our highway system. Under-priced roads will suffer from periodic traffic congestion that wastes time and pollutes the air. Over-priced roads will continue to consume resources for maintenance and preservation while providing benefits to too few users. The combined result is inefficiency and waste of scarce resources.

### *Profit and Loss Statement for State Highways*

A quick overview of the financial condition of the Kansas State Highway System is provided by the accompanying table and graph of a "profit & loss" statement for roads under the state's jurisdiction. The graph should be construed as indicative of the general trend rather than as the equivalent of an audited income statement of the sort that appears in a business corporation's annual report. More-detailed and accurate figures can and should be produced before any decision to adjust tax rates or implement other fees is made.

Two things differentiate this statement from the annual reports on the state highway system published by KDOT. First, only revenues generated from user taxes and fees are counted on the credit side of the ledger. Since our objective is to determine if the state is making good investments, we must rely upon the only customer-feedback information we have. User taxes and fees serve as a proxy for customer purchases of the product. Non-user revenues say nothing about the value of the product. In fact, non-user revenues can serve to dilute and contradict customer feedback by propping up services that generate more costs than benefits.

Some may contend that the automatic state transfer of one-tenth of aggregate sales taxes (i.e. the "10 percent transfer") to the Kansas State Highway Fund is not properly labeled as a user fee. However, in

settling on this funding component in 1989, Kansas lawmakers estimated that approximately 10 percent of all sales tax collections come from purchases of automobiles, car repair services, vehicle parts for repair and maintenance, and other similar retail transactions that are directly related to highway usage. Since 1989, the Legislature, for unrelated state budgetary reasons, has repeatedly and arbitrarily capped or reduced this particular stream of taxes to the State Highway Fund so that it currently represents around 7.6 percent of sales taxes (almost \$88 million). However, in presenting his plan for a new comprehensive highway program this year, the Governor reiterated this legislative intent behind creation of the 10 percent transfer and consequently advocated its return to the original percentage. Because of its relationship to motor vehicle operation, this highway tax source is fundamentally different from, and more economically sound than, the highway funds raised by the quarter-cent sales tax transfer to be discussed below.

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<b>EXPENSES</b>										
Maintenance	75	77	79	88	81	104	95	107	98	103
Administration	50	54	65	72	85	35	36	48	47	50
Law Enforcemt	26	30	35	34	44	36	39	40	41	41
Interest	21	20	18	14	26	45	51	57	57	57
Depreciation	146	154	166	178	186	201	224	245	272	297
Total Revenue	318	335	363	386	422	421	445	497	515	548
State User Taxes	165	172	153	208	222	241	202	249	245	271
10% Sales Tax Transfer	0	33	63	74	78	75	79	81	83	84
Federal Aid	135	123	166	152	113	125	203	185	185	212
Net Profit (Loss)	(18)	(6.75)	19.49	38.37	(8.97)	20.5	39.08	28.45	(1.8)	19.36

Second, the profit and loss statement includes a charge for depreciation of the capital assets. This standard business practice is designed to reflect the fact that these assets do not last forever. Assets get worn out or become obsolete. Setting aside funds to repair or replace these assets helps to ensure that a business can continue as an ongoing concern. Traditional highway-agency financial statements do not include allowances for depreciation. Consequently, inadequate preparations for the repair or replacement of deteriorating or obsolete facilities is the norm. The risk of a "binge and bust" cycle of public investment in highways is high. A massive investment binge is followed, albeit often by a considerable time lag, by a fiscal crisis as facilities reach the end of their designed life. By incorporating a depreciation allowance into the financial statements, we can get an early warning of future financial trouble.

#### *Indications of Financial Inefficiency*

The preceding graph can serve as a warning of future financial trouble for the state's highway system, but it can also indicate when highway users are not getting their full tax dollar's worth of product. For the ten years spanning 1988 to 1997, the Kansas State Highway System shows a fluctuation of profits and losses. Over the decade, these losses were relatively minor in comparison to state highway expenditures, and particularly so when compared to other states which have relied much more heavily on borrowing to finance their highway improvements.

However, this data indicates that the Kansas highway system has been generating what may be considered excess profits. In fact, since enactment of the 1989 highway program, the six positive years of operation each realized an average profit of \$27.5 million while the three negative years each brought an average loss of \$5.8 million. To put this result in other terms, Kansas motorists paid between one and two cents tax for each gallon of fuel above the level of that tax needed to finance state highway projects during this period. This conclusion becomes even more stark when one considers the \$86 million the State Highway Fund also receives from the quarter-cent sales tax demand transfer a non-user-fee tax source.

Actually, at least two interpretations of this excess profit circumstance are possible. Either taxes were too high for the level of work performed, or more highway improvements should have been undertaken with the tax revenues available. Furthermore, in the context of the 1999 political push for a new transportation program, yet another interpretation is valid: lawmakers should insist on the maximum use of existing revenues dedicated to transportation before taxes are raised in the name of additional improvements.

#### *Cutting Losses*

If our conclusion regarding some of these roads is that they should never have been built or are no longer needed as State Highways, our objective would be to minimize our future losses. This suggests scaling back on any plans to expand the system. Each route would need to be evaluated to determine how best to minimize losses. In some cases, plans to build may be abandoned entirely. In other cases, it may make more sense to finish some logical connection to the existing road system so that the earning capacity of the route would be maximized. This would be the case where projected losses (including the cost of any additional construction) were expected to be smaller with a connected route than an abandoned route.

#### *Raising Taxes*

If our conclusion is that the roads are under-priced, our objective would be to find a way to raise the price. The traditional tax-financing methods do not lend themselves to discrete pricing of road access. More typical are omnibus highway financing packages that offer to raise various taxes and fees by varying amounts. This type of approach is implied in the report of the Kansas Transportation 2000 Study Group, but it is explicitly advocated in formal proposals now before the Kansas Legislature.

Raising various categories of taxes will do nothing to remedy the problem of simultaneous under-pricing of some roads and over-pricing of other roads that dooms the state's road network to hopeless inefficiency. If we raise the overall cost of using the highways, it is true that some roads will be brought closer to an economically efficient price level. However, other roads that are already over-priced will be raised further from an efficient price level. Consequently, the added cost of higher taxes may well exceed the added benefits Kansans are trying to achieve by building these roads. Worse yet, if we turn to non-user sources of revenue, we will be further subsidizing inefficient uses of the highway system. When highway users do not have to pay the full cost of what they use, they are encouraged to consume more than is economically justified. The most obvious manifestation of this is the increased traffic congestion and the air pollution caused by insufficient pricing of road use during peak travel periods.

#### *Political Maneuvering*

Unfortunately, the omnibus highway program strategy does nothing to rectify such misallocation of

resources and only makes matters worse. Following the politically successful Kansas precedent of 1989, today's highway advocates are strongly averse to specifying any particular project that would be funded through a new statewide program. To do so within the enacting legislation would very clearly identify the "winners and losers" from among parochial lawmakers trying to secure highway projects in their districts. Naturally, this would make enactment of a statewide program more difficult than if legislators were enticed to vote for it under the hope of eventually enriching their home districts. Consequently, the 1989 program and the 1999 legislation outline only broad categories of work with a maximum aggregate multi-year appropriation set for each category.

This approach exacerbates the problem because of its lack of articulated priorities. Taxpayers do not know what they are paying for other than the categorical amounts that KDOT is permitted to spend. True, KDOT has objective administrative procedures in place for prioritizing projects and is mandated to consider the local economic impact of some types of proposed projects. And occasionally, as legislation for a statewide program works its way through the lawmaking process, advocates within the state administration will even produce maps that highlight road segments targeted for assistance under the bill.

Such maps, however, are constantly changing, are not officially part of the legislation being debated, and offer no guarantee to anyone. This fluidity of priorities was discussed at length in a 1995 report by the Kansas Legislative Division of Post Audit. In reviewing KDOT-prioritized projects that were bypassed in favor of lesser priorities, the report cited KDOT authorities explaining that "project selection becomes a judgmental decision, influenced by, but not solely dependent on, the data shown in the Department's prioritization system." The report noted that even after the 1989 program was enacted, a map produced by KDOT highlighting 1,600 miles of road work was described by the Department as being only for illustrative purposes and did not represent any commitment to specific projects. Most importantly, though, nothing resembling a return-on-investment analysis is performed for any given highway segment to justify the allocation of resources.

#### *Pernicious Effects: The Quarter-Cent Sales Tax Transfer*

Some sources of highway finance can even have pernicious effects. An example is the quarter-cent sales tax increase of 1989 that was earmarked for highways. This levy, which is not related to highway use, is distinguished from the 10 percent sales tax transfer that represents sales taxes collected from motor vehicle related purchases. As a result of the general sales tax increase (i.e. the "quarter-cent transfer"), efficiency and equity in transportation financing are damaged.

A general sales tax used to finance highways acts as a subsidy to highway users, and such a subsidy encourages more demand for highway space and services than would exist if users had to pay the full cost of their use. This additional demand aggravates traffic congestion and its attendant ills of wasted time and air pollution. On the commercial side, the sales-tax subsidy hastens wear-and-tear from heavy vehicles that do not pay the full cost for their use of the roads. These factors foment inefficiency in the way resources are invested.

As is the case with most subsidized beneficiaries, highway users will be encouraged to demand more than the highway agency can provide. Highway users may even become cranky and obnoxious in finding fault with how this perceived entitlement is delivered. Meanwhile, the quarter-cent sales tax will disproportionately affect lower income persons, many of whom are too poor to own a car. In short, the burdens will not be allocated in proportion to the benefits. This is inequitable.

The prospect of unintended, yet pernicious, effects resulting from state tax policy should give pause to the bland assumption that simply increasing the rate of established taxes is a safe or wise course of action. Even if we care little or nothing about whether highways are financed or operated efficiently, we should give some attention to the potential impacts of our financing mechanisms on other economic, environmental, or social values.

## *The Burden of Taxation*

The potentially pernicious effects of tax policy are not the only item that should be of concern in making tax policy. We also need to take greater cognizance of the burden of taxation. Too many cost/benefit analyses of proposed government expenditures completely overlook this burden. All too often, it is assumed that the amount of the taxes collected is the cost of the government expenditure. This neglects to account for both the opportunity cost of resources consumed by the government and the burden of compliance with the tax code. Money taken from taxpayers to fund government expenditures could have been used for another purpose. That purpose could have provided significant returns on investment. The loss of such opportunities which results from resources taken via taxation needs to be considered when setting tax policy. A common means of accounting for these lost opportunities is to insert a "cost-of-capital" component into cost/benefit analyses of government funded projects.

### *Opportunity Cost-of-Capital*

Estimating an appropriate cost-of-capital is a task that is frequently botched in government cost/benefit analyses. One source of confusion in determining the appropriate allowance for the cost-of-capital is the interest rate on government borrowing. Sometimes, if the government project involves no borrowing, if it is "pay-as-you-go," a cost-of-capital rate of zero may be assumed. This is incorrect. Regardless of whether the government does or doesn't borrow any money to fund a project, the cost-of-capital is never zero. There are always unexploited opportunities in the private sector that will yield a return greater than zero.

Another frequently made error in determining the relevant cost-of-capital is to assume that the rate of interest that government pays when it does borrow money is the appropriate estimate of opportunity cost. If we were making a cost-of-capital calculation for a private business, the rate of interest the firm had to pay to borrow money could be used as a fair estimate of the cost-of-capital. This same rule-of-thumb does not apply to government borrowing, though, for two factors work to discredit using the government's borrowing cost as an estimate for the true cost-of-capital. First, government bonds are usually tax-free. Those who lend money to the government by buying these bonds are willing to accept a lower gross interest rate because the interest they receive will be free from tax liability. In contrast, any interest earned on a loan to a private business will not be tax-free. So using the tax-free rate that government bonds carry will understate the true opportunity cost of government expenditures.

Second, government bonds also often enjoy a lower interest rate because the risk of non-repayment is deemed lower. This lower risk rarely has anything to do with the prospective use of the funds. In the private sector, non-repayment risk is intimately connected to the probabilities of success for the business venture borrowing the money; consequently, businesses that can borrow at lower rates have earned these lower rates by virtue of demonstrated success in prior business ventures. The same cannot be said for public-sector bonds whose low interest rate can be attributed solely to the proficiency of the tax collector. Unlike private-sector interest rates, it says absolutely nothing about the merit or feasibility of the proposed use of the funds.

The appropriate cost-of-capital rate will be one that reflects the fully taxable interest rates paid by businesses engaged in projects with a similar risk. Generally speaking, building highways under the current system is a relatively high-risk venture. After all, the resources committed to highways are cast in concrete. If a mistake is made, there is little salvage value in a misplaced roadway; it is not a mobile asset that can be converted to another use easily. In comparison, an investment in transportation vehicles would have a higher salvage value. If the intended use does not prove profitable, the vehicles can be sold and moved to where they could produce a profit. So, from a society-wide perspective, an investment in a highway should have a higher cost-of-capital than an investment in a trucking business.

In fact, the risk inherent in committing resources to concrete public highways is increased by the failure of highway agencies to evaluate the investment returns of prospective expenditures. Consequently, the cost/benefit analyses that are typically performed are ill-suited to guide decisions toward financially viable

investments.

### *Tax Compliance Burden*

Another frequently overlooked cost of government programs is the compliance burden of taxation. Taxpayers must not only forfeit money to the government tax collector, but they also must comply with filing and enforcement requirements. In some instances, these compliance costs can be substantial. For example, Professor James Payne, in his analysis of the federal income tax, estimates that the actual compliance cost is 65 cents for every dollar of revenue that is collected. While no such similar analysis has been done for the Kansas highway-tax structure, it should be apparent that since the cost of compliance is not zero, the total burden of these taxes is greater than the amount of the tax collected.

### *An Alternative to Higher Taxes*

If across-the-board higher tax rates are not the answer to Kansas' highway-finance problem, then what is? Assuming the criteria of efficiency and equity, two options are at the forefront of an optimal solution. The first, and most obvious, of these options would be to reduce (or not increase) highway spending. As it is shown previously in this paper, an end needs to be made to the "binge and bust" cycle of state spending. An accurate return-on-investment analysis needs to be completed before any more money is expended on Kansas highways.

Just like the current objective "pothole counting" analysis that KDOT instituted roughly 15 years ago, an investment-based approach could be implemented by administrative action. It is primarily a financial accounting exercise and traffic monitoring, made possible by the development of new technologies, would allow analysts to accurately allocate the user fee revenues.

New technologies also create a promising opportunity for efficient, widespread road pricing. The invention of transponders (for example, a KTAG monitor) has greatly facilitated toll road administration and driver convenience. This change enables a creative financial alternative through a privatized highway system and corporate ownership of roads.

A phased program could provide for non-Interstate road mileage to be auctioned-off each year, perhaps with each privatized segment being operated for a limited time as regulated utilities by the state corporation commission. Road owners would be able to track drivers and bill accordingly. A driver would only pay for that which he or she used without supporting the entire highway system, and taxes currently earmarked for road maintenance and construction could be gradually eliminated.

In addition to becoming a leader in highway technology, Kansas could also see other benefits to a privatized system. Kansans would see a reduction in their taxes, lower interstate transportation costs, and a smaller state bureaucracy. The roads would be better maintained and improved under a private-sector management. (Appendix A)

In the meantime, Kansas should do its utmost to employ a return-on-investment analysis for each highway segment and allocate existing user fee oriented revenues accordingly. If the state were to do so, new options in the bigger picture of state economic performance would become apparent. Kansas has maintained an overall fiscally sound highway program during the last decade if one disregards the tax revenues from the quarter-cent sales tax transfer. However, if the quarter-cent transfer had never been established, excess profits would still have occurred. And, regardless where any of the funding comes from, Kansas has failed to most efficiently distribute revenues to the proper priorities within the overall highway system.

In other words, the current level, or even a somewhat enhanced level, of state highway improvement projects could be financed without the need of the \$86 million generated by the quarter-cent sales tax. With an investment-based frame of mind, those dollars could be freed from their highway earmarking and

could then be applied to their most economically productive use perhaps by way of a general tax reduction.

By either reducing outrageous spending practices or moving roadways out of the "commons", we would improve the incentives for wiser use of transportation resources. Both options create potential ripple effects that cannot be fully anticipated at this time, but, given the significance of transportation in our economy they are apt to be large and quite positive in the long run.

**John Semmens** has worked for the Arizona Department of Transportation since 1976 in a variety of capacities. Currently, he is a project manager in the Department's Research Center. It should be noted, however, that the views expressed in this paper should not be construed as representing the official position of the Department. Over the last 20 years, Mr. Semmens has authored over 200 reports, papers, and article on various transportation related topics.

Myron Calhoun, Ph.D., is a faculty emeritus for Kansas State University, where he taught from 1971 until early 1997. Dr. Calhoun has earned AA, BS, MS, and Ph.D. degrees from Graceland College, the University of Kansas, Colorado State University, and Arizona State University, respectively. All are engineering degrees. Dr. Calhoun was honored as a Fulbright Lecturer and spent a year teaching in Nigeria, Africa. He is married and has three children.