# ASSESSMENT OF PUBLIC PERCEPTION OF USER-BASED FEES AND TOLLS TO FINANCE TRANSPORTATION INFRASTRUCTURE IMPROVEMENTS

(Project Report)

# DRAFT

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**Key Words**

User-based fees, toll roads, transportation financing, survey data.

# Summary


## Introduction

With aging infrastructure and declining purchasing power of tax receipts new mechanisms of financing transportation alternatives are gaining increasing interest. Fuel taxes are and have been for some time the primary source of transportation finance in United States. Fuel taxes are fixed amounts that rarely change and which lose purchasing power over time as prices escalate. In addition, improvements in fuel economy can further erode the revenue stream from the gas tax. This study explores the public's attitude about user based fees collected through tolls that are directed at specific infrastructure projects using the Inland Empire region of California as a case study. The premise of this research is that tolls can complement existing funding sources for improving infrastructure.

Public perception of such directed user based fees as tolls has traditionally been considered a barrier in the wide scale implementation of these financing mechanisms. However, according to a recent publication from National Cooperative Highway Research Program, public perception of user based fees may not be as negative as once thought (Zmud, 2008). This study identified and addressed the research need for a framework to assess the general public's perception of user-based fees and tolls as instruments of transportation finance.

## Study Approach

The public's perception of toll roads was assessed from a survey administered in the Inland Empire region of southern California. The survey was designed to address issues identified in the literature as associated with the conduct of surveys of public perception. One set of the inputs used to design the survey questionnaire derived from stakeholder interviews that were conducted before the survey. These interviews provided expert opinions about the questions that need to be answered in gauging the public's perception of toll roads. The survey results were analyzed and conclusions drawn to guide decision-making about the implementation of toll facilities specifically in the Inland Empire and more generally elsewhere.

## Digest of Existing Knowledge on Toll Roads

The review of literature suggests that on some issues public opinion has shifted considerably over time. For example, opinion on gas tax increases as a measure of increasing revenue for transportation infrastructure improvements has grown to be considerably negative since the early 1980's. Opinions also seem to differ considerably based on region and demographics. It seems that even if the public in general has a favorable opinions of toll roads a more vocal opposition

from concerned interest groups (e.g., trucking companies) may result in shifts in public opinion. Therefore, prior to the public opinion survey the study first interviewed various interest groups and experts for their concerns.

**Stakeholder Opinions on Toll Roads**

This study unearthed a wide spectrum of opinions and insights from representatives of various stakeholders in the Inland Empire region. Broadly the responses in these interviews broke down along expected lines. For example, the Auto club representative deemed truck traffic to be a major cause of congestion and the trucking company mentioned too much commuter traffic. Some of the issues identified in the literature also came up in these interviews. The California Department of Transportation (Caltrans) maintains that toll facilities, if not managed effectively, may discourage ridesharing. Caltrans also is aware of the social equity issues: for instance – are these facilities only for those who can afford them? Support would come from current users who understand the advantages of the facilities, specifically the improvement in travel time.

The mayor of Riverside noted that congestion in the Inland Empire is heavily dependent on where you are and the time of day and noted SR-91 as a particularly congested corridor. Based on this observation from the mayor a question about congestion perception on various highways in the inland empire was added to the public survey. According to the mayor, offering choices is the key to political palatability. The Auto club and Caltrans are also of the opinion that free alternative routes should be available. While the auto club prefers a broad base of taxes (i.e., the gasoline tax) to pay for the roads the club recognizes the need for alternate revenue sources. In terms of toll revenue the club prefers that these revenues are used for improvement within the corridor where they are collected.

A transportation consultant who worked on various toll road projects provided some of the most insightful commentary on the issues. He noted the success of SR 91 toll road experiment in the Los Angeles area and noted that a significant chunk of revenue is collected from occasional users who choose the toll road only a few days a week typically when running late. He also noted that equity concerns can be somewhat addressed if users of the same road or lane pay for the facility and there is a toll-free option available. This discussion led to the inclusion of a time value of money question in the user survey.

On the subject of toll facilities vs. managed lanes the consultant noted that because there is a lot of experience with toll roads, one can get fairly accurate forecasts of traffic and revenue on a toll-road. However, it is harder to forecast the traffic and revenue on an express lane because it is so dependent on the level of congestion in the adjacent freeway. He also says moving to “no cash” and an all electronic payment system will increase efficiency. It is an interesting contrast from the opinion expressed by the trucking industry representative who stressed the need to have attendant lanes to help out the drivers from out of town who may end up in the managed toll

lanes by mistake. Finally, the consultant also pointed out that some folks may be opposed to toll roads due to the perception that it is double taxation. He pointed out that the federal gasoline tax, which has not been increased since 1993, only has a fraction of the purchasing power that it used to have. To support increased travel in the context of this reduced purchasing power toll roads at least need to be considered.

## User Preferences, Perceptions and Opinions on Toll Roads

### *Demographics and Travel Behavior in the Region*

The general survey of the population used multiple media including phone, internet and paper questionnaire to capture a wide cross-section of the population in the Inland Empire region. To correct for the self-selection bias common in this genre of study the investigators weighted the data using a multi-stage weighing procedure. The use of weights to match the demographic information in the survey with known information from census data and other sources improved the reliability of the conclusions from this research. The survey revealed that the respondents in the region relied mostly on cars for most of their trips; no other mode attracts any significant share of trips. While in the overall sample about 83% of the respondents always had an automobile available the availability varied by age group. Fewer of the youngest and oldest age cohorts always had an auto available compared to middle aged cohorts who almost always had an auto available. The responses from the survey about the most congested corridor matched the opinions of experts interviewed and identified SR 91 near Corona as the most congested corridor in the region. Since toll roads are a public policy issue, respondents' view of government role in the economy was also sought in the survey. Survey responses were consistent with the known voting patterns of the Inland Empire region. A 45% plurality reported that the government's role was more than what is needed. At the same time, a large share of respondents would like to see increased spending on transportation.

### *Support for Toll Roads*

The objective of this research was to assess the public's perception of tolls and toll roads. It was found that two attributes of toll roads which the majority of respondents agreed upon were: i) toll roads are less congested than freeways (55%); and ii) toll roads are expensive (54%). It did appear that a solid majority (60%) of respondents will not agree to a toll of $5.00 or more per trip even for a travel time savings of 40 minutes and higher. It would be interesting to observe the response to this question in a few years under a better national/regional economic climate. Toll roads also did not rank high as the measure for dealing with congestion; less than 10% reported toll roads to be one of the top two ways to deal with congestion. A slight majority (52-54%) oppose tolls for new roads/lanes and HOV lane to HOT lane conversion. Since the need for infrastructure financing might lead to public private partnerships in the future, the survey instrument included a question on attitudes about public/private ownership/operation of the

facilities. Nearly half (47%) showed no preference on ownership and operation of toll roads while 43% preferred public ownership and operation. In all, approximately 57% of the respondents were accepting of at least private operation of toll roads. This finding indicates that public private partnerships may be an acceptable idea. It is interesting to find that a significant majority of respondents (58%) would like the toll revenues to be used for general transportation infrastructure improvements.

*Factors Affecting Toll Road Perceptions*

One of the factors investigated was respondents' perception of privacy issues. We did not find these concerns to be high among respondents. This conclusion was inferred from the high proportion of respondents (73%) who consider video enforcement of tolls reasonable as well as from the higher than expected support for mileage based fees. In terms of the factors that strongly effect the public's perception about toll roads, respondents' experience with southern California toll roads was the most significant. A positive experience with the existing toll roads in southern California made respondents more likely to support tolls for new roads/lanes as well as for HOV lane to HOT lane conversion. In addition, income levels and miles driven per day were significant in all four logistic regression models developed in this research. However, examining the model coefficients closely revealed that the relationship is not monotonous in nature.

*Detailed Findings from the Logistic Regression Models*

Binary logit models were estimated to test the likelihood of support for the various propositions included in the survey. The propositions include support for: (a) instituting tolls on new facilities, (b) conversion of high occupancy vehicle lanes to high occupancy toll lanes, (c) private operation of toll roads, and (d) restrictions or non-restrictions in the use of toll revenues. A model was run for each of these four propositions. Other propositions examined from the descriptive survey data include: charging variable tolls, charging higher tolls for commercial vehicles, electronic vs. attended toll collection, video enforcement etc. Three independent variables (income level, miles driven per day, and past experience with southern California toll roads) were consistently significant and thus appeared in all four logit models. Other independent variables tested include age group, education level, home ownership or rental status, and respondent's view on the existing level of congestion. The following results are noteworthy:

- Respondents' perception of overall congestion is expectedly related to their attitude about toll roads. Respondents who believe that truck traffic is a problem are less likely to support toll roads.

- It appears that those aged 25 to 34 are the group that would, in general, consistently support the propositions.

- It may be generalized that those in the middle income groups are inclined to support the establishment of toll facilities, but are inclined to oppose a wide distribution of toll revenues.

- The comparative results appear to suggest generally that those who drive less than 20 miles a day are inclined to support toll facilities. On the contrary, it is those who drive for more than 30 minutes a day who may be inclined to support toll facilities.

- Respondents who hold the view that there is at least some level of congestion are generally inclined to support toll facilities.

- Not surprisingly those who have a positive experience with toll facilities are inclined to support their establishment. Respondents with a positive experience with toll roads are also likely to support a wider distribution of toll revenues while those with a negative experience are highly likely to oppose a wider distribution of revenues. Note that experience with southern California toll roads is one of the three independent variables that are significant in all four models. This finding is consistent with other studies which have reported that past experience with toll roads is a significant determinant of people's perceptions.

- It is interesting that those who find the camera enforcement of tolls to be reasonable are more likely to support toll roads while they are less likely to support a wider distribution of revenues. These respondents are likely regular users of the toll roads who want the tolls to be enforced and would like to see the toll revenues go toward improvement of the same toll roads.

*What a Decision Maker Should Do*

The findings of this study provide insights into the challenges decision makers need to be aware of. At the same time respondents' opinions reveal new opportunities as well. For example, the understanding that in the Inland Empire region past experience is a key to supporting future toll road projects is critical. This is a factor that is somewhat under the control of the decision makers. Hence, if and when the first toll road project is implemented in the region, it should be done with extreme care since the first project's success or failure will have an impact on people's opinions about toll roads well into the future. For example, for the first project drivers should be provided with multiple options for paying tolls including attendants. In the survey a majority of respondents did prefer to have the option of toll attendants while paying tolls; 52% preferred a combination of electronic and attended toll booths while 24% preferred only attended toll booths.

Some of the public opinions are not so straight forward. For example, while respondents were not averse to private operation of toll roads a clear majority (58%) wanted to have a wider

distribution of toll revenues. If wider distribution is desirable then it may be difficult to privatize ownership/operation of the toll roads and the decision makers need to move carefully in that regard.

Another issue examined in our survey was privacy concerns. While the respondents did not seem as concerned about privacy at this stage, investigators suspect that if a specific proposal on mileage based fee comes up these issues may become front and center. Hence, decision makers may need to assess opinions about privacy issues with a specific proposal at hand. Similarly, at this stage there is a large support (48%) for higher tolls on commercial vehicles. However, a specific proposal may lead to a vocal campaign from interest groups which may alter public opinion. Nevertheless, this research provides a base from which to identify the changes in opinion that such campaigns might instigate.

**Future Research**

This study has created a base for a longitudinal study in the inland empire region to assess how the public's perception about toll roads might evolve in the future. It is noteworthy that the study took place during a period of slow economic growth, which may be responsible for unwillingness by respondents to pay tolls to save on travel time. How the willingness to pay changes with changes in economic outlook is an interesting subject to track. In addition, as the state and local government budget crises get more attention from the public, attitudes about toll roads may evolve further. It will be insightful to observe these evolutions over time. The results of the studies should provide further insights to state agencies and toll road operators alike.

# 1 Introduction

## 1.1 The Project

With aging infrastructure and declining tax revenues new mechanisms of financing transportation alternatives are of increasing interest. Transportation projects, such as highway construction etc., are primarily financed through fuel taxes, which constitute a form of user fees. Improved fuel economy is likely to erode the revenue stream from the gas tax. This study explores the public's attitude about user based fees collected through tolls directed at specific infrastructure projects in the Inland Empire region. These tolls can complement the existing funding sources for infrastructure improvements. The findings are based on stakeholder interviews as well as a public survey conducted during September through November 2010.

## 1.2 Problem Statement

Fuel taxes are, and have been for some time, the primary source of transportation finance in United States. California has historically been a leader in mandating technological improvements in transportation, which means that fuel-based revenue stream(s) may be negatively impacted, making it even more difficult to fund California's infrastructure. This research is aimed at assessing the public's perception of specifically directed user based fees collected as tolls as a financing mechanism for infrastructure improvements in the Inland Empire region of Southern California. The term "user based fees" in the remainder of this report refers to these specifically directed user fees collected in the form of tolls. These fees are distinguished from taxes in that taxes are, for the most part, levied on the general populace (i.e., are broad based) while these fees are levied on the group that is using a particular facility.

Public perception of such user based fees has traditionally been considered a barrier in the implementation of these financing mechanisms. However, according to a recent publication from National Cooperative Highway Research Program (NCHRP), public perception of user based fees may not be as negative as once thought (Zmud, 2008). In any event, there is a need for a framework to accurately assess the general public's perception of user-based fees and tolls as infrastructure financing mechanisms. Therefore, assessing public opinion on this issue and identifying what information might make users more accepting of such propositions are important research questions. The objective of this research was to develop and implement a survey instrument to assess the public perception of tolls as a financing mechanism in the Inland Empire region of Southern California. Based on an observation by Dill and Weinstein (2007) it was also important to note how support varies by demographics, attitudes, and previous experience. Such analysis of population sub-groups can help predict future acceptance of revenue options as the population changes, for example, by becoming older and more ethnically diverse.

## 1.3 Study Approach

The public's perception of toll roads was determined from a survey administered in the Inland Empire region of southern California. The survey was designed to address issues identified in the literature as associated with the conduct of surveys of public perception. One set of the inputs used to design the survey questionnaire was the result of stakeholder interviews that were conducted before the survey. These interviews provided expert opinions about the questions that

need to be answered in order to accurately gauge the public's perception of toll roads. The survey results were then analyzed in order to assess the public's current opinion on the issue of financing. The survey is designed in such a way that it can be administered over time to get a meaningful longitudinal database from which one can track the evolution in the public's opinion over time. This report documents the literature review conducted to identify the relevant past research in the area, the stakeholder interviews, as well as the survey development process and analysis of survey data. Conclusions were drawn to guide decision-making about implementation of toll facilities in the Inland Empire region of California.

## 1.4 Report Organization

The study began with an extensive review of related literature, which is described in the next chapter. The objectives of the review are twofold: one was to find documented answers to the relevant questions about public perceptions of toll roads; the other was to identify issues to address in stakeholder interviews and in the survey of residents of the region. The findings from the reviews are summarized in Chapter 2 and an appendix to the chapter. The literature review was used to develop a stakeholder interview questionnaire. The details of the questionnaire, the identification of experts along with a summary of findings are provided in chapter 3. The stakeholder interviews and list of experts interviewed can be found in an appendix to chapter 3. Chapter 4 describes the preliminary description of the survey instrument followed by analysis of the survey data. The exact survey instrument can be found in an appendix to the chapter. Chapter 5 of this report provides conclusions and scope for future analysis.

# 2 Literature Review

## 2.1 Past Studies on Public Perception of Toll Roads

This chapter provides an overview of published literature that relates to the research questions on public perceptions about toll roads. The literature search enabled the study team to identify issues to be addressed in interviews with stakeholders and in the formulation of questions in the resident survey conducted as part of this study. The studies reviewed here are categorized into two groups: (a) those that assessed public perceptions of toll roads and other transportation financing mechanisms nationwide or in multiple states; and (b) the studies that were conducted in specific states. During the literature review, particular attention was paid to the public's perception of the utility of tolls and managed lanes, as well as their opinions on forms of toll collection with an emphasis on the applications of newer technologies. In addition, the authors looked at the methodologies used in the conduct of the surveys for these studies.

## 2.2 Studies Synthesizing Survey Results from Multiple States

In this section we document research efforts that have synthesized public perceptions of toll roads and other financing mechanisms in multiple states. One of the most comprehensive studies in this regard was conducted by Higgins (1997). Higgins (1997) analyzed the results of public opinion polls spanning 13 years from 1983 to 1996. Polling locations included California (8), Hawaii (1), Minnesota (1), Oregon (1), and London, U.K. (1). The author found that reaction to tolls was dependent on how tolls were defined and presented; when no additional information was given to the public, support was low. However, the buy-in form of congestion pricing, whereby existing or new HOV capacity is made available to solo drivers at a price, had considerable support. Polls comparing congestion pricing, tolls, and higher gas taxes revealed that congestion pricing was the least popular option, and raising the gas tax was the most preferred option. Higgins concluded that if only presented as a way to reduce gridlock, manage traffic, or improve air quality, congestion pricing is unlikely to be popular. However, presenting pricing as a means to access new/restricted capacity (e.g. HOV buy-in or new lanes), free passage for carpoolers, and targeting specific rather than area-wide facilities appeared to increase public support. It is very likely that the opinions, especially on the gas tax's popularity, may now have shifted since Higgins' 1997 study. The polls cited in that study were conducted at the time of dropping gas prices while today we largely have rising gas prices.

More recently, Zmud & Arce (2008) reviewed 110 nationwide studies seeking public opinion on tolling and toll roads primarily from the year 2000 and later. It was concluded based on the review that the public wanted to see value and reacted to tangible and specific examples rather than abstractions. In general, the public cared about the use of the revenue and learned from experience. Overall, the public viewed tolls more favorably compared to taxes. It marked a shift from the opinions reported by Higgins (1997). Zmud & Arce (2008) also reported that support for tolling was noted in 94% of cases when additional information was provided, compared with 48% of cases in which no additional information was presented as part of the survey question. These findings indicate that the public does use knowledge and information available when forming their opinions on tolling.

Ungemah & Collier (2007) reviewed various case studies of toll roads and managed lanes in California, Texas, and Minnesota. For California they focused on assessing public perception of variable tolling. It was noted that while the idea of variable tolls on SR 91 Express lanes in California was initially unpopular (with only a 45% approval rating), it became popular over time with about 60% approval. The surveys in the region showed some opposition to toll financing due to 'unfairness' even as 69% of commuters believed tolls were an effective means to address congestion problems, and this percentage increased as commuters witnessed the travel time savings in both the high occupancy toll (HOT) and general purpose lanes. Similar goodwill was found for the I-15 HOT lanes (FasTrak) facility in San Diego. It was one of the original pilot projects of the Congestion Pricing Pilot Program and the first dynamically priced HOT lane facility in the world. Even though higher-income groups were more likely to be supportive of the program; at least 60% of respondents from all income groups approved of the FasTrak program (Ungemah & Collier, 2007). Their review of opinion surveys in Texas, however, revealed that the majority of the public remained skeptical of added toll lanes on non-toll roads (Ungemah & Collier, 2007). In one of the surveys cited, 71% of residents opposed tolling on existing roads and 51% opposed tolling on new roads. Also, 75% of subjects felt that tolls should be reduced after construction costs are paid-off.

Ungemah & Collier (2007) also reported that MnPASS I-394 HOT Lanes project was initiated as a public–private partnership and the facility opened in spring 2005. A survey was conducted in December 2004 to assess public perceptions of the upcoming I-394 HOT Lanes. Echoing findings from the San Diego surveys, 64% of respondents thought the MnPASS concept was a good idea with only 28% opposed. It was concluded that overall value pricing and tolling were more acceptable on new facilities than existing ones. Since managed lanes and HOT lane projects result in more choices for the driver, they are more likely to be seen as an improvement on the existing facility.

Burris and Goel (2009) conducted a review of various HOT lane case studies in California, Minnesota, Colorado, Washington, Texas, Utah, and Florida. One of the concerns about HOT lanes has been that they might discourage the practice of carpooling. It was also one of the concerns expressed in the stakeholder interviews conducted as part of this study. However, for the I-15 HOT lane users in San Diego, it was found that carpooling was the previous mode of travel for only 4% of them. It indicated that few carpools were broken up by the HOT lanes.

Burris and Goel (2009) noted a fall 1996 survey conducted with SR-91 Express Lane users in Los Angeles with similar conclusions. In Denver on the I-25 HOT lanes, the large majority (77%) of carpoolers who used the Express Lanes did so simply because they already carpooled and only 17% were carpooling in order to use the Express Lanes. Also, the majority of the respondents in each mode type either "strongly agreed" or "somewhat agreed" that Express Lanes enabled them to leave later for their destinations.

On the SR-167 HOT lanes in Seattle, Burris and Goel (2009) found that carpoolers, on average, had higher incomes than those who drove alone. In Katy, Texas, a stated preference survey of bus riders on board transit buses (running in the same corridor as the two HOT lanes) found that most would *not* switch mode from transit to HOT lanes. It was also found that the paying SOVs (Single Occupancy Vehicles) in the HOT lane were most often well educated, between 35 to 54 years old, and had high incomes. An interesting finding regarding paying HOT lane users was

that evidence of higher safety on HOT lanes was one of the influencing factors (in addition to travel time) for travelers.

Iseki, Taylor, & Demisch (2009) conducted case study reviews of various latest road tolling technologies in California, London, Singapore, Germany, Austria, Oregon, and Iowa. They found that the following policy factors most often determined the type of technologies adopted: (1) the geographical scale of the network, and (2) the complexity of calculating the toll for each user. As the geographical scale and fee complexity increase, system designs generally become more elaborate and require incorporation of newer technologies. In addition, tradeoff between speedy implementation and complexity of technologies, future expansion, and privacy, were also influential.

## 2.3 Studies from Specific States

### 2.3.1 California

Dill & Weinstein (2006) included results from two phone surveys of California adults in January 2006 and March 2006 respectively. It was found that Truck-only toll (TOT) lanes and HOT lanes were the only options supported by a majority of respondents. TOT lanes are a relatively new idea but are under serious consideration in several regions. Tax and fee increases were not popular, consistent with the other polls reviewed. The least unpopular tax or fee option was to increase the annual vehicle registration fee by varying amounts depending on how much the vehicle polluted and its gas mileage. This option was supported by 44.1% of respondents, compared to the 31.5% that supported a flat increase of the registration fee. Support for increasing gas and sales taxes was about the same. Support for TOT lanes was high likely because the survey indicated that trucks would be required to use them thus separating trucks from personal vehicle traffic. However, possible future vocal opposition to the concept by the trucking interests may negatively affect public opinion about them. It was also found that people living in regions with toll roads and HOT lanes were generally more supportive of these concepts. Since the inland empire region does not have toll roads but have SR 91 in the Los Angeles area it will be interesting to contrast the results from our study with Dill & Weinstein (2006). It was also found that the younger adults were generally more supportive of tolls and mileage fees.

### 2.3.2 Colorado

Ungemah, Swisher & Tighe (2005) conducted detailed interviews discussing high-occupancy toll lanes with 21 residents of Denver, Colorado. The researchers found a strong interest in HOT lanes and the respondents saw I-25 HOT lanes project as a test case for developing clear guidelines to evaluate and revise HOV lanes. While only one person was completely opposed to the implementation of HOT lanes; many participants viewed HOT lanes as a temporary solution. The participants felt that HOT lanes should not replace other ongoing mobility plans for the community. A telephone survey also showed that almost twice as many residents and commuters on I-25 were in favor than opposed to HOT lanes. However, since a large portion of respondents were undecided the need for correct and complete information was identified.
Therefore, participants in the open houses organized by Ungemah et al. (2005) were given detailed information and opportunity to ask questions about the HOT lanes concept before they were asked for their opinions.

### 2.3.3 Florida

Abdel-Aty & Abdelwahab (2001) conducted a toll road origin-destination travel survey for the purposes of helping others conduct future surveys. 99% of mail-in and internet respondents provided their name and address for a savings bond drawing, showing high interest in the incentive itself and correlation with the response rate. 100,960 surveys were distributed at toll plazas, and 66,189 surveys were mailed to random E-Pass users. 21,137 responses were received (12.7% response rate), and 2.5% responded via the internet. 7,529 responses were recorded for non-E-Pass users (7.5% rate), and 13,608 responses for E-Pass users (20.6% rate). The researchers found that Internet responses were more complete than others (76%), followed by non E-Pass (46%), and E-Pass (40%). Average completion time was 6.7 minutes for internet responses increasing to 10.22 minutes for older individuals.

### 2.3.4 Indiana

Davis and Sinha (2008) studied factors affecting willingness to pay for HOT lanes in the state of Indiana. It was found that the proportion of carpoolers on I-69 was 19%. It was also observed that respondents on average perceived 69% of their I-69 trips to be congested out of an average 7.26 trips per week. It led to the inference that drivers perceived greater congestion on I-69 than actually existed. It was also found that travelers, on average, would be willing to pay $0.60 to save 10 minutes and $0.26 to save 3 minutes for work trips. The investigators included similar questions on time value of money and proportion of congested trip in the survey instrument used in this research allowing for the results to be compared.

### 2.3.5 Minnesota

Buckeye et al. (2009) studied user perceptions of different fee lane concepts in Minnesota through focus groups. These fee lanes concepts are summarized in Table 2-1.

Table 2-1: Concepts tested in a focus group by Buckeye et al. (2009)

| Concept | Details |
|---|---|
| *Concept A* | During peak periods *one* FEE lane, *two* regular lanes, and conversion of shoulder to a *third regular* lane |
| *Concept B* | During peak periods *two* FEE lanes, *one* regular lane, and conversion of shoulder to a *second regular* lane |
| *Concept C* | During peak periods *three* FEE lanes, and conversion of shoulder to a *fourth FEE* lane |

The researchers concluded that overall a FEE Lane road pricing system similar to the concepts listed in Table 2-1 will require an extensive education and marketing campaign. Particular focus must be placed on describing the necessity of FEE Lanes, their operational and performance benefits, and the rules such as how to safely use a shoulder lane.

Lari & Buckeye (1996) measured perceptions of road pricing through multiple sources of information. These sources included a citizens' jury held over a 5 day period, focus groups, and opinion leader interviews (arranged with various local elected officials, legislators, social organizations, business leaders, and public agencies). To gather the opinions of the general public, 1031 personal interviews were conducted using multimedia computer stations located at

19 sites. A statewide public opinion telephone survey with 500 respondents was also conducted. The citizens' jury panel recommended that spot tolls (i.e. toll facilities) be considered only if the revenues were clearly dedicated to the original project, with a sunset provision to end the toll after the investments have been recovered. All day tolling appeared to be preferred over peak-hour tolling, bringing attention to the preference for simplicity. While the focus group had support for measures such as gas tax increases a statewide public opinion telephone survey found less than 25 percent support for the mileage-based tax concept and only slightly higher support for raising the gas tax. The researchers concluded that the concept of toll facilities was more likely to garner support if the revenue collected was earmarked solely for improvements on that particular facility.

Most participants believed that congestion pricing would not change driver behavior, as people would have already found alternatives if they existed. There was also concern that attempting to shift some drivers out of the peak period would cause hardships because most business schedules are as flexible as possible already. Those most severely affected would be shift workers who are generally lower paid. Participants in the interactive video survey process preferred the peak period-only toll concept, although the use of toll revenues only in tolled corridors did not make congestion pricing more attractive to this group. This finding contradicts that of the focus groups, which preferred the peak hour and off-peak toll concept. Both groups favorably viewed the concept of using toll revenues to reduce property tax burdens. It is an unrealistic expectation that congestion pricing and mileage-based-tax concepts can overcome all public objections. Success in implementing either of these strategies will therefore depend not on reaching public consensus but on gaining "informed public consent."

Zmud, Bradley, Douma, and Simek (2007) studied the public's attitudes and willingness to pay for tolled facilities. They found the "base" value of time (VOT) to be $9.63, but there were several additional "modifier" variables that were related to either lower or higher willingness to pay. These factors are listed in Table 2-2.

Table 2-2: Factors Affecting Value of Time (Zmud et al., 2007)

| Factor | Effect on Value of Time (VOT) |
|---|---|
| *Income* | No significant difference in VOT is found between the income groups below $50K and between $50K and $100K (the base group). However, it appears that willingness to pay rises sharply with income above the $100K level, and is $6.45 (about 70%) higher than the base level for those with income above $125K. |
| *Age* | Relative to the base age group of 45 to 65 years, younger people have higher VOT and older people have lower VOT, on average. This is presumably due to a busier lifestyle for younger people –particularly those with children. |
| *Trip purpose/time of day* | The willingness to pay for time savings in the AM commute and for work-related non-commute trips is about $3/hour higher than the base, while the VOT for the PM commute is less than $1 higher than the base. The value for non-work trips in the PM peak is about $2/hour lower than the base group. |

| Factor | Effect on Value of Time (VOT) |
|---|---|
| *Trip distance* | Relative to medium-distance trips, trips of less than 10 miles are related to a significantly lower value of time, while trips of more than 20 miles have significantly higher value. |
| *Time saved* | The willingness to pay for each marginal minute of time saved may also depend on the total amount saved. The marginal willingness to pay for 15 and 20 minute time savings is about $2/hour (about 3.5 cents/minute) lower than for the base levels of 5 and 10 minutes. |

The researchers also noted a positive association between experience with the road pricing project and positive attitudes towards it. It was also noticed that in the stated preference survey done before respondents were provided any HOT lane context, their responses were "homogenized" to some extent. However, after the actual HOT lane system was introduced respondents likely had a much better idea of whether or not they would be willing to pay the toll in specific situations. It resulted in a wider variance in their responses.

Zmud, Peterson, & Douma (2007) presented preliminary before and after results of the I-394 HOT Lane Panel Survey. The researchers found no significant change in acceptance of the MnPASS concept among panel members between the Wave 1 and Wave 2 interviews (61% versus 59%, respectively). In 2005, about six out of ten respondents (59%) indicated that allowing single drivers to use the carpool lanes by paying a toll was a good idea. Survey respondents were asked for the reasons behind their opinions on these MnPASS acceptance questions in an open-ended manner. The main reason that panel members favored the idea was that it was a better use of carpool lanes (representing 23% of all panel members). Other frequently mentioned reasons included adds capacity to roadway (17%), saves time for busy people and only users pay (10% each), time is money (6%), eases congestion (5%), and toll used during peak hours (3%). About three out of ten respondents thought it was a bad idea. The main reason that panel members thought it was a bad idea was because "it only benefits the rich" (representing 9% of all panel members). Other frequently mentioned reasons included carpool lanes should be free for all (6%), it's inefficient (4%), carpool lanes should only be used for carpools (3%), gives too much money to the road agency (3%), carpools are not encouraged (2%), and will not work (2%).

Focusing on views of toll collection, the researchers found that paying MnPASS customers were particularly satisfied with the details of having a MnPASS subscription. Virtually all (95%) were satisfied with the all electronic toll collection, ease of opening an account (92%); using a credit card to replenish the account (93%), and the ease of installing the MnPASS transponder (92%). Communications appear to be handled well with virtually no complaints about the staff at the Customer Service Center or about the MnPASS website. About one-of-five paying customers reported dissatisfaction with the clarity of prices on overhead signs or with the toll amounts that vary with traffic levels. Broad support and overall satisfaction with the I-394 MnPASS Express Lane project was concluded. Between six and seven out of ten believed that allowing single drivers to use carpool lanes by paying a toll was a good idea. A nearly equal amount of support came from lower-income households as higher-income households. Satisfaction among MnPASS customers was particularly high – whether users were paying (SOVs) or not (carpoolers and bus riders). Nearly all users (almost nine out of ten) reported no problems with merging into the

tolled lanes. The majority of users felt that paying the MnPASS toll to avoid congestion was a good value.

### 2.3.6 Texas

Burris et al. (2007) analyzed reaction to the managed lane (ML) concept by various groups of travelers. It was reported that approximately 70% of respondents expressed an interest in managed lanes and this interest did not differ significantly based on trip purpose. Of toll payers who participated in the survey, 73% indicated interest in using MLs, while interest fell to 68% in contrast among participants who were not paying any tolls. 67% of respondents with household incomes of less than $25,000 were interested in using MLs, while 79% of respondents with household incomes greater than $100,000 expressed interest. The only group that varied significantly (56% interested in using MLs) from the overall population comprised those who marked "other" for ethnicity; this may pose some challenges. Among the remainder of the group surveyed, African-American respondents expressed the lowest level of interest (69.5%) and Caucasian respondents had the highest level of interest (72.7%). The results also demonstrated that the main opposition to the concept of MLs did not arise from requiring a potential user to provide a credit card and install a transponder in his or her vehicle to access these MLs, or a higher perceived complexity of these facilities compared to general purpose lanes (GPLs). This research found that interest in MLs was highest among Texas residents in metropolitan regions, with 70% of travelers expressing interest in using MLs. Existing carpoolers identified the ability to drive alone as more important than the ability to carpool. Texas travelers overwhelmingly supported the idea of prohibiting large trucks from using MLs and favored the use of MLs because they provided operational performance superior to that of GPLs.

Burris et al. (2008) investigated the impact of tolls on high occupancy vehicles (HOVs) using managed lanes to better estimate the potential impacts of eliminating or reducing the preferential treatment of HOVs. A survey was performed in two Texas metropolitan areas, Houston and Dallas, which have both high levels of congestion and numerous HOV lanes. The value of time (VOT) for travelers was found to be $12.60 per hour. This value seems reasonable compared to other studies and national guidance, which is generally in the range of $10 to $15 per hour. The researchers used a mode choice model to predict the impact of converting a HOV lane to a HOT lane (where all travelers pay a toll). The model found that travelers were relatively insensitive to price. It was determined that the overall percentage of HOV-2 and HOV-3+ vehicles in the traffic stream decreased by only a small amount when a toll was required for them to use the HOV lane. However, this did represent a significant portion of those modes (over 9 percent in the specific scenarios examined) and did result in a 10 percent increase in HOT lane revenue. Therefore, elimination of preferential treatment for HOVs has significant implications and becomes a difficult policy decision.

Collier & Womack (2005) analyzed public perception of tolling in a small, rural area, finding a surprisingly indifferent attitude toward tolling among many of the stakeholders. Many felt that tolls made sense in large urban areas but were unsure of implementing tolling in a city such as Tyler. Most did recognize the funding dilemma and were supportive of Loop 49 as a toll road, if all other options had been exhausted. Other options that were suggested for exploration included expanded federal funding, a greater return of federal gas tax money paid by the state of Texas, more streamlining of TxDOT at the administrative level, or a local option sales tax. The notion of building Loop 49 as a toll road in order to expedite the project was positively perceived.

Independent contractors were opposed to tolling, while company drivers were more accepting of the idea, particularly when their companies covered toll costs.

Members of a focus group in this same study felt that toll roads were convenient in some situations (primarily larger cities), but that Tyler was not big enough for a toll road and would not pay to use it. They indicated that stopping at a toll booth wasted time. Another group similarly viewed tolling as not necessarily a bad idea, but inappropriate for Tyler. There was concern that if tolls were implemented on the road that any other funding opportunities would disappear. A third focus group was generally opposed to toll roads unless there was no other mechanism for project implementation. Approximately half of survey respondents thought of tolling as a good financing mechanism, and approximately one-third had a negative view of tolling. However, the majority of the people surveyed thought tolling the loop would discourage motorists from using it, with almost a third of the respondents strongly agreeing that tolling would be a deterrent to use. 45 percent of those surveyed agreed that tolling would allow tax dollars to be spent on other projects, 29 percent were neutral, and 25.5 percent disagreed. Approximately equal numbers of respondents favored and opposed using the gasoline tax in lieu of tolling, with a very high neutral response.

Stakeholders believed that electronic toll collection was a good method of collecting tolls and would reduce the cost of operations. No one saw any problems with video enforcement of electronic toll collection. Survey respondents were asked to agree or disagree with the statement, "the use of cameras to photograph plates is a reasonable way to enforce toll collections." While 20.3 percent disagreed, two-thirds of the respondents agreed and approximately 25 percent strongly agreed. Most interviewees said that it would take time to learn how electronic toll collection would work in practice, and that it would be important to educate the public. On the other hand, there was moderate concern about not having an attended toll booth. Quite a few stakeholders suggested that it would be necessary to have an attendant at least initially. Stakeholders were presented with the option of an automatic coin machine. Most agreed this was adequate if the automatic coin machine had a dollar bill changer and could give receipts, but some believed that the older population of Tyler would insist on having a manned toll booth.

Three toll collection options were presented to the respondents: cash, an electronic toll tag using an account system, or an electronic toll tag using a prepaid system similar to a phone card. For the 170 respondents who indicated a preference, the most highly preferred option was cash. Cash was checked by 59 percent of the respondents, followed by the toll tag account system by 23 percent, followed by the toll card system by 17 percent. In slight contrast, the first focus group preferred the option that would allow a traveler to purchase a sticker tag from a kiosk. The traveler could add whatever amount of money he thought would be needed for his use. This option would support travelers that make few or infrequent trips on Loop 49 or those that do not wish to establish an account to acquire a transponder. The group felt there was not a great need for a manned toll booth once people learned how the road operated, and that unmanned booths would keep the costs and toll prices down. The second focus group expressed familiarity with electronic toll collection, and was also supportive of the sticker tag concept. They did not think the kiosk should be located in the travel lane because this would slow down traffic. One person thought the sticker tags could be a "revenue enhancer" like a gym membership where people would pay up front for a service and then not use it. Additionally, no one in the group was

concerned with a privacy issue associated with video enforcement. The third focus group did not indicate a preference to the sticker tag versus a transponder, but was accepting of electronic toll collection. There were again no privacy issues raised over video enforcement. This group, however, indicated a strong preference for an attended tollbooth, feeling that it was an important service to provide to travelers. The leadership of the Tyler/Smith County area recognized the transportation funding crisis and was willing to pursue tolling as a means to complete construction of Loop 49. Generally, there was a begrudging acceptance of tolling Loop 49 if there were no other options for financing. The public was supportive of electronic toll collection, and privacy related to video enforcement was not an issue. There was a slight concern about unmanned toll booths but the majority believed education on the operations could overcome this.

Kockelman et al. (2006) studied public perceptions of pricing existing roads in Texas. Very few issues in the follow-up survey generated consensus among respondents. The two statements offering at least 70% agreement were: (1) higher tolls for larger, heavier, or higher emission vehicles are a good toll road feature, and (2) dedicated heavy-vehicle lanes should be added to highways. Support for *conversion* of existing (non-tolled) roads to tolled roads ranged from 45% (when toll revenues are used to improve other area roads) to 58% (assuming congestion could be reduced). 26% of respondents indicated they would support conversion of existing roads to toll roads for all seven scenarios, while 18% indicated they were opposed to toll conversion in all cases. Frequent toll road users were more likely to support toll conversion. 41% of respondents indicated that they would change their route to avoid tolled sections of highways if congestion pricing were implemented, 34% indicated that they would change nothing about their current travel and location choices, 18% said they would drive less during times when tolls were in effect, and 6% indicated one of five other options (which included changing child care or school locations, changing residential location, walking or biking more, using transit more, and carpooling more). There was wide support (83%) for dedicated truck lanes.

Some focus groups in this same study found Dallas and Houston residents to be relatively receptive to road pricing, due to past positive experiences with toll roads. However, other focus groups expressed skepticism, with three of the groups comparing the state lottery to toll roads. Since the participants believed that lottery revenue was to have contributed to school funding and did not, they do not believe that toll road revenue will contribute to funding other construction projects. Many participants believed that informing the public about gas taxes and the benefits of toll roads would be a key to persuading others to support tolling; 59% of participants indicated on a survey form that the focus group experience had changed their perceptions of toll roads in a favorable way. 5.4% responded that they were in favor beforehand and remained so, and 13.5% indicated that they remained neutral. 22% indicated that their negative perceptions of tolling had not changed.

The researchers concluded that regular toll road users and more frequent rush hour drivers were more supportive of new transportation policies, while long-distance commuters, males, and those who have lived in their regions for many years tended to be less supportive. Tolls were preferred to gas taxes, as is the improvement of existing roads to building new ones. Simply educating Texans about the costs of roadway construction and maintenance, current revenue sources, and the benefits of tolling should increase support for tolling. For the seven hypothetical conversion-to-tolling scenarios, support ranged from 45% (when using toll revenues to improve other area

roads) to 58% (when congestion will be reduced). Analyzing response to congestion pricing, 41% percent of respondents indicated they would change their route to avoid tolls, 34% favored doing nothing, 18% preferred driving less during rush-hours, and 6% chose one of five other options.

Li (2007) looked at potential users' opinions on managed lanes. There was lukewarm agreement among occasional (non-daily) users that premium pricing would be "worth it." Overall, the group viewed managed lanes and HOV lanes as an immediate and flexible option for dealing with congestion, even at a regional level. Without hesitation, most participants indicated that they would be willing to pay to use it, at least once in a while. It was also noted that the term 'managed lanes' appeared to be the most promising way to approach the issue with this group. Although the participants generally opposed the idea, they indicated a willingness to pay for HOT lanes as a time-saving and convenience device when they had an emergency or were late for a meeting.

A group of commercial vehicle drivers thought that many regular drivers would view tolls as double taxation. After they became acquainted with the managed-lane concept, this group reached agreement that it would be "nice to have the option" of using managed lanes, especially if they were running late. This coincides with the opinions of the HOV/transit focus group. A mixed user group similarly decided that they would be more willing to pay tolls when they had a meeting or something of similar importance.

On the subject of toll collection, the SOV user group rejected the idea of an attended booth, as lanes would be impossible to implement without some sort of toll tag technology. Most agreed that some sort of credit or debit system should be required for a toll tag, and presumed that occasional users would not be able to access the lanes without a cash payment mechanism. The HOV and Transit User Group agreed that electronic toll collection would be necessary, but were not sure exactly how it would work. They raised the same questions the SOV group did, wondering how technology could differentiate between one-person and two-person vehicles, whether a person had paid or not, and how the lanes would be enforced. The group also debated whether it would be best to prepay or to have a credit-type system for payment. Some thought it would be easier to go with credit, but others thought that might leave the system open to the abuse of some drivers who might run up high bills and not pay, passing on the expense to others. The commercial vehicle user group believed that toll tags would be a convenient option for businesses and considered the toll tags worth paying for, but there was little difference of opinion over the use of an upfront deposit or credit card as payment methods. The group agreed that the use of an upfront deposit or credit card method depended on people's preference and it would be good to have options to choose from. The mixed user group thought that toll tags were a good tool and had no privacy concerns or issues with using credit cards to pay for them.

Li concluded that before the concept of managed lanes was explained those who were unfamiliar viewed it as a new tax and reacted negatively. A very useful observation from the focus group discussion is that the words "choice," "option," "preference," and "value price" were frequently used and welcome in conversations, whereas such words as "toll" or "fee" were not. Privacy issues resulting from the use of toll tags did not seem to be a major issue or concern of the

participants in this study, who generally agreed that ETC is necessary for successful implementation of managed lanes.

Macias et al. (2008) surveyed the I-30W corridor users as part of a project to develop a value pricing program. On general views of managed lanes, 60 percent of respondents believed that they saved between one and nine minutes when using the I-30W MLs. This is consistent with the reported travel time savings of approximately one to five minutes. This shows that the users have an accurate perception for the times savings benefits when using the MLs. The primary responses for using the managed HOV lane were to "avoid congestion" and "save time." The combined response for these two similar answers was 59%. It was concluded that: 1) the goals of the managed lanes should be established early in the project; 2) if the phasing of the construction is perceived to have significant impacts on the travel patterns in a corridor, then this should be identified early; 3) if general purpose capacity is being added at the same time as the managed lane, then expectations on benefits must be adjusted to account for the reduction in congestion that the new general purpose lane capacity will provide; 4) the use of a control corridor is an effective way to supplement the evaluation methodology; 5) a value pricing evaluation will benefit from strong public outreach; the use of surveys, interviews, and focus groups are effective ways of getting public input on user needs of managed lanes.

Oswald et al. (1995) conducted a broad survey, looking at the Texas public opinion of toll roads. 58.7% of respondents preferred new tolls over new gas taxes (41.3%). 52% chose tolls because they are a more direct way to get drivers to pay for their road use, 8.7% favored tolls because of previous good experiences with them, and 29.5% preferred tolls because they were reluctant to see fuel taxes raised. It was found that the implementation of Electronic Toll Collection (ETC) and automatic vehicle identification (AVI) systems can have a positive influence on toll road acceptance. However, only 11.1 percent of the 440 toll road users report that they are currently using ETC. This low rate of delay-reducing technology illustrates that ETC systems still have a long way to go in achieving market penetration. The survey findings in this study reveal that tolling is an acceptable approach to addressing the highway funding dilemma in various areas and situations across the state. Adjusting for gender bias, Texans favor toll roads over increases in motor fuel taxes 61.7 percent of the time. Moreover, increased education about the benefits of Electronic Toll Collection (ETC) systems should increase this number, since 28.4 percent of the persons favoring motor fuel tax increases over tolling did so because of anticipated toll collection bottlenecks. If these bottlenecks can be eliminated, then support for toll roads in lieu of increases in motor fuel taxes could be as high as 72.6 percent. The survey results also clearly demonstrated greater support for tolling in urban areas.

Podgorski & Kockelman (2006) also conducted a broad survey of public perceptions of toll roads in Texas. Residents of smaller urban and rural areas (the Valley region, Lubbock, and General Texas) were found to be more supportive of the exclusive use of toll tags, and tolling existing roads. Valley residents were particularly opposed to raising the gas tax, preferring rush-hour tolls (57%) over raising gas taxes (19%) by the greatest margin; (24% had no preference). On the statement "Drivers should not have to pay tolls for new roads": 51% agreed, 12% were neutral, and 37% disagreed. When the question was changed for *existing* roads, 71% agreed, 7% were neutral, and 22% disagreed. Support for HOT lanes was split, with 52% in favor. Older persons, males, those who travel to work on toll roads and those who live very far from their workplace

had a greater tendency to support HOT lanes. There is considerable support (66%) for exclusive use of toll tags for collection, rather than allowing any manual payment. A consensus was developed on a number of toll road issues among Texans, such as attending to existing infrastructure first, keeping existing roads toll-free, reducing tolls after roadway construction is paid, keeping revenues within a region, charging higher tolls for trucks, not applying higher tolls for SOVs, and not implementing congestion pricing.

Results of San Antonio focus groups (2005) considering public acceptability of express lane options for I-35 found that all focus groups strongly opposed the idea of dynamic pricing. Most participants also felt that the price of tolls paid (up to $8.00 on an example project in California) was "outrageous" and did not believe anyone in San Antonio would be willing to pay that amount. Two of the focus groups stated that San Antonio was not at a point where it needed value priced lanes. The participants did agree that having the option to use express lanes might eventually be a good idea to avoid congestion. Two of the focus groups were concerned that the "free lanes" would not be maintained. A few participants mentioned that it might be more useful for the managed lanes to be truck-only lanes. When asked if they would use value priced lanes if implemented the participants replied they might "if the price was right." All of the focus groups were in favor of HOT lanes over express toll lanes because it would reward or encourage carpooling and public transportation.

The Wayland Baptist University focus group mentioned they were in support of HOT lanes; however, express toll lanes would be easier to enforce. This group also mentioned there should be a convenient method for drivers to acquire the toll tag, suggesting roadside kiosks, convenience stores and even area hotels as possible sales points. Since San Antonio draws large tourist traffic, many believed that the idea of all-electronic toll collection would not help congestion and that tourist drivers should have the option of entering the toll lanes without having to acquire the toll tag. Some focus groups voiced concern about electronic enforcement being used for purposes other than tolling such as speeding; however there was overall limited concern. Some felt San Antonio was not ready for value priced lanes yet, while others liked the idea of having an option to avoid congestion. The price of the toll was the deciding factor of whether the participants would use the lanes or not, agreeing it depended on individual circumstances that vary from day to day. All participants were opposed to variable pricing and strongly opposed to dynamic pricing.

Zhou et al. (2008) surveyed trucking companies to assess the impact of incentives on toll road use by trucks. On general views of tolled facilities, the researchers found that the performance of a facility (in terms of both revenue and reduced congestion on alternate routes) is greatly influenced by its ability to attract heavy vehicles. Truckers search for the minimum cost in choosing their route and therefore tend to avoid toll roads. In 2004, the Ohio Turnpike Commission raised the speed limit from 55 mph to 65 mph for heavy trucks in order to lure trucks back to the turnpike, and this resulted in a 10 percent increase in truck traffic. Private carriers (where the company's primary business is not transportation, but transports its own goods) were found to be the most likely to use a toll facility. Many incentives to use the toll road need to be offered, but those that reduce the cost of using the toll road are most effective. Five cost-related incentives included in the stated preference portion of the survey for further study include: 1) Off-peak discount; 2) Fuel price reduction; 3) Every $X^{th}$ trip on SH-130 is free; 4)

Free X hours use of in-cab auxiliary units; 5) Reduce price of truck wash by $X. The toll facility must be able to generate significant time savings, and it appeared from the initial interviews of drivers that savings must be in excess of 15 minutes per $10 toll. Owner-operator and for-hire truckers rated reduced fuel price as of extremely high importance. Smaller companies (owner-operators) largely preferred the non-toll route, citing the fact that the toll came directly out of their pocket and the difficulty of passing on the cost to their customers. Larger companies indicated they were more likely to carefully weigh the benefits and costs of using the toll route when making their decision, rather than avoiding toll roads in general. The incentives that most interested the truckers were off-peak discounts, followed by a free trip after a number of paid trips. The average value of travel time savings was found to be $44.20 per hour.

## 2.4 Conclusions

Appendix 2-1 includes a table that lists various studies from the literature reported in this chapter. The review of literature suggests that on some issues public opinion has shifted considerably over time. For example, opinion on gas tax increases as a measure for revenue generation has grown to be considerably negative since the early 1980's. Opinions also seem to differ considerably based on regional demographic. As discussed in the literature review it seems that even if the public in general has favorable opinions of the toll roads a more vocal opposition from the concerned interest groups (e.g., trucking companies) may result in shifts in public opinions. Therefore, prior to the public opinion survey conducted in this study (See chapter 4) we first interviewed various interest groups and experts for their concerns. In the next chapter the questionnaire provided to these experts is discussed along with their opinions.

# 3 Stakeholder Interviews

## 3.1 Stakeholder Cross-section

In order to gain insight and perspective from the many stakeholders in the inland empire area, outreach efforts were inclusive and directed at a broad assortment of stakeholders. A complete list of organizations and representatives invited to participate in the survey is attached in Appendix 3-1 of this report. It may be observed that the investigators were successful in getting representatives from all the desired interest groups, except for large corporations that have warehouses in the region. It may be observed that 4 different corporations were contacted.

The six (6) agencies, organizations, and businesses that elected to participate in the survey include: District 8 of the California Department of Transportation (Caltrans), the City of Riverside, the University of California (UC) at Riverside, the Automobile Club (AAA) of Southern California, Jack Jones Trucking, Inc., and Parsons-Brincknerhoff. Participants from Caltrans and Parsons-Brincknerhoff represented transportation planning professionals. Participants from AAA and Jack Jones trucking represented the driving public and area trucking companies respectively. The mayor of the City of Riverside represented elected officials and the participant from UC Riverside represented major employers in the region. The following subsections summarize the opinions and perceptions of these representatives about user-based fees, gathered in both telephone and email interviews. The interview consisted of 17 questions and the complete questionnaire may be found in Appendix 3-2. The questions range from congestion in the inland empire region, toll roads, and stakeholder group's opinion on how the general public feels about toll roads.


Figure 3-1: Word Map Based on Recurring Frequency in the Stakeholder Interviews

Figure 3-1 shows a word art map of the questionnaire. The larger the word, the more often it was repeated in the interview. Note that truck, road, pricing and tolls expectedly were the focus of this interview. Also, note that the terms "group" or "group's" are emphasized as well. It was

done in order to ensure that the interviews reflect respective interest groups' opinions about these issues and not necessarily personal opinions. With that said, it is acknowledged that it is neither possible nor always desirable to completely exclude personal opinions of the interviewees. In the following sections of the chapter we have detailed each interviewee's response to these categories of questions. Their responses were vital in design of the resident survey instrument employed in this research.

## 3.2 Caltrans: Daniel Kopulsky, Senior Transportation Planner

### 3.2.1 Congestion

Caltrans focuses on state facilities, and views the current levels of congestion as largely the result of the housing cost differential in the region vis-a-vis the concentrations of employment opportunities. Mr. Kopulsky noted that the western area of the Inland Empire (SR-91, SR-60, I-10 and I-15) has had the highest volumes for years; however, there has been a great increase in congestion in the I-215 corridor in recent years. Additionally, commercial trucking is anticipated to increase greatly in the future with improvements in trans-pacific shipping. In his opinion the Alameda Corridor East project may alleviate some of the increase.

### 3.2.2 Toll Roads

Road pricing is a tool in the toolbox that can affect driver behavior. It is a direct user fee. He mentioned that Caltrans believes that there has to be at least one free alternative to a toll facility. Therefore, Caltrans prefers managed lanes or HOT lanes as opposed to the entire facility being a toll facility. The concept of congestion pricing would be used on these facilities as drivers choose to use these facilities based on congestion as much as cost (e.g. if the freeway is not congested, most drivers will not use the toll facilities).

Caltrans does not express a preference on whether the facility is publicly or privately owned; however, a private entity would need to have an agreement with Caltrans. On the topic of electronic vs. attended toll booths, Caltrans prefers both electronic detection and some toll booths. He said "We encourage the electronic detection as it is more cost efficient, but the alternative of a toll booth is necessary for the occasional user of the facility." The San Francisco-Oakland Bay Bridge was cited as an example of how this kind of situation is handled.

### 3.2.3 Public Perception

Mr. Kopulsky believes that the public may positively view "toll facilities as an alternative to avoid congestion. It also provides revenue for facility maintenance and potential improvements." On the negative side, however, some believe that "toll facilities, if not managed effectively, may discourage ridesharing. There are also social equity issues, i.e. are these facilities only for those who can afford them?" Support would come from current users who understand the advantages of the facilities, specifically the improvement in travel time. Most trips in the Inland Empire are longer than in other regions and toll facilities can help reduce the time length of these trips.

Pricing has become more popular in the last 15 years with the experience of the SR 91 HOT lanes. The County Commissions, who were not completely supportive of the Southern

California Association of Governments' efforts 15 years ago, seem more supportive of pricing. Riverside County drivers who are the greatest users of the toll facilities in Orange County would rather see toll revenues be used in Riverside County. Current toll facilities help in very congested corridors, however, they may not lead to a drop in congestion unless rideshares are discounted or are allowed on the facilities for free. It helps in terms of public perception that the FasTrack can be universally used on all California toll facilities. On the other hand having some of the current toll facilities not being connected to each other (e.g. SR 91 and SR 241) is not helpful.

## 3.3 City of Riverside: Ronald O. Loveridge, Mayor

### 3.3.1 Congestion

Mayor Ronald Loveridge provided his input on the issues of congestion and road pricing from the perspective of personal experiences as well as that of an elected official. Mr. Loveridge sees congestion in the Inland Empire as heavily dependent on where you are and the time of day, but points out SR-91 ("the Corona Crawl") as a particularly congested corridor. Also, as the Inland Empire population increases, he sees road congestion as a problem that will only continue to increase. While Mr. Loveridge notes there is a large number of trucks on SR-60 trying to get to the Diamond Bar and beyond, he does not see their presence as a problem.

### 3.3.2 Public Opinion

Tolling and pricing have been proposed for a long time, but political difficulties that have kept them off the agenda. In this region, he believes the public favors freeways over toll ways, but that it is necessary that we "try to encourage people to make choices about how many, when they drive, who they drive with, how far they drive and using alternative modes. We need to figure out ways to encourage and discourage certain travel behaviors. If we're going to be adding 6 million more people to Southern California, we may have to look towards pricing to help shape traffic."

While residents of the Inland Empire do not currently experience toll roads on a day-to-day basis, Mr. Loveridge believes they are familiar with the concept. "We know there's a toll road issue going down SR 91 to Orange County, but aside from that there is no variable pricing on any other freeways in the Inland area. I think fundamentally it's not an issue yet. If you ask people would they would like to ride free or like to pay they would tell you they would like to ride free." Personally, he feels that "the toll roads examples in Orange County seem to work. I have used them at times. I think there's a positive judgment of them."

Loveridge doesn't believe opinions vary greatly as to the type of project (e.g., toll road, HOT lane, truck only toll lanes, managed lanes, cordon pricing, congestion pricing), or whether the road is publicly or privately owned. "We've accepted the toll roads on SR 91, but with the obvious caveat that most people don't take toll-roads, they go with standard freeway choices. The problem is, until traffic gets to a place where people find themselves like deep in Los Angeles it's hard to get excited by toll roads and pricing. I see the likelihood of acceptance much greater if you get to the I-405 and deep into Los Angeles, it seems to me there would be an interest in trying to regulate the traffic flow by pricing it. It's harder out here because the traffic, for the most part, it's less dense."

Asked about different methods of toll collection, Loveridge pointed out, "Electronic is obviously faster. If you look at what they do in Orange County, they give you a choice. Maybe it's a choice to go with either one that's the best way." He similarly sees the necessity of offering choices as the key to political palatability. "If personal choices remain I don't see an objection to different ways of funding. The difference obviously in the Orange County is that when you get the toll roads, you have no choice, you've got to pay. But every economist always looks at pricing as one of the major answers to the traffic movement, but in political terms it's been very difficult because people don't want to pay more taxes, don't want to pay more costs and there's always been social equity arguments. If there are no choices when freeways go from freeways to toll ways, I think then you get a pushback or backlash. Again, the only toll roads within hailing distance for us are the SR 91, and into Orange County, and I've never heard any objections to either one."

Mr. Loveridge believes media attention needs to be directed. "Until we have specific proposal before us, it's very difficult to get a handle on public judgment and public opinion. And we don't have any immediate policy calls for tolling as far as I know in the Inland area." While he believes some may have negative perceptions about toll roads based on income inequities and paying twice for roads (in taxes and in tolls), he notes these are abstract arguments and currently moot points. "People are not talking about pricing and tolling, it's just not part of any conversation that I hear. And I think you've got to get proposals out, and then you begin to see how to bounce this around."

## 3.4 The University of California (UC) at Riverside: Irma Henderson, Alternative Transportation Manager

### 3.4.1 Congestion

Irma Henderson is responsible for administering the alternative transportation programs for the staff, faculty, and students at the UC Riverside (UCR) campus. Currently about 40% of the UCR student population purchases a commuter parking permit. Henderson agrees that the Inland Empire experiences a lot of congestion, and sees it as mainly the result of vehicles traveling across the county lines (i.e. between Los Angeles and Orange counties and between Riverside and San Bernardino counties). Congestion is worse, she notes, the closer you get to the other counties and at the major interchanges (i.e. around 15/91, 60/15, 215/60/91). Henderson believes current commercial truck traffic is a valid concern. "There is a lot of truck traffic that is created by the railroads and warehouses that we have here in the Inland Empire. It does create a lot of vehicle activity. Also, accidents involving semi-trucks have a greater impact on traffic than regular vehicle accidents."

### 3.4.2 Toll Roads

Henderson notes that in her personal experience, "I travel often between Orange County and Riverside via the 91 Expressway. I only travel on the toll roads. In my opinion, congestion pricing for toll roads is very effective. I think we should have more of them." Asked about whether public opinion would vary depending on if the facility was publicly or privately owned and operated, she felt "from past experience, since the 91 Expressway changed ownership, it has been more effective. While more expensive, it successfully performs as an expressway." Henderson felt that the combination of electronic and attended toll booths works well, as there is sometimes a need to address the consumer.

### 3.4.3 Public Perception

On the positive side, Henderson points to the argument 'time is money'. She said "the amount of time that is spent on the road, in traffic, is a waste of valuable resources. There is also the air quality argument, due to the amount of vehicle emissions that are released by having cars idling in traffic." Counter arguments she envisions are that "toll roads only serve those with economic means. Those who cannot afford to pay the toll still have to manage their commutes in traffic (although the traffic is significantly reduced by the vehicles that are not on the regular lanes as a result of the existence of the toll road.)"

## 3.5 Automobile Club of Southern California: Craig Scott, Transportation Policy Specialist

### 3.5.1 Congestion

Craig Scott, a government affairs staff member for the Auto Club of Southern California, provided input on behalf of his organization. The Auto Club views the growth of traffic congestion in the Inland Empire as a major quality of life issue for the area, and points out the SR 91 corridor as having the worst levels of recurrent congestion.

Scott sees "the tremendous volume of goods being moved through the Inland Empire, both by truck and by rail, truck traffic is certainly a contributor to the area's congestion problems. Traffic back-ups caused by freight trains crossing major roadways at-grade are another major source of congestion in numerous locations across the Inland Empire."

### 3.5.2 Toll Roads

As a general principle, the Auto Club believes that roads should be toll-free and funded through a broad-based user fee, like the gas tax. However, it also recognizes that the needs for transportation improvements greatly exceed available revenues and, given political resistance to raising user fees, toll roads provide an alternative way to implement critically needed infrastructure improvements. Where tolls are implemented, reasonable alternative toll-free routes should be available and the toll revenues generated should be used only for improvements within the toll corridor. Tolls should not be imposed on existing capacity.

The Auto Club is familiar with a number of toll facilities including the toll road network in Orange County, the SR 125 toll road in San Diego, and the HOT lanes on I-15 in San Diego and on SR 91 in Riverside. The new toll roads have provided much needed connections in the regional freeway network and the HOT lane projects have been successful in providing additional capacity in major corridors and providing motorists with the choice of staying in the free lanes or paying the toll to receive a commensurate benefit in terms of reduced travel times and greater reliability. The Auto Club opinion also varies by the type of project. Each type of project mentioned has differing costs and benefits to motorists. Even projects within the same category can have substantial differences in the way in which they are operated that could impact the Club's position. While the Club has established general principles on toll facilities, the individual merits of each proposal must be analyzed carefully.

On the topic of public versus privately owned facilities, Mr. Scott noted, "Our primary focus is on the characteristics of the facility itself and the benefits it may provide to motorists. In terms of ownership, public toll roads may result in lower tolls because public toll facilities, if properly structured, have lower costs because a profit margin doesn't have to be built in on top of other

operating costs and have lower bond debt service costs because public facilities have access to tax-exempt interest rates on construction bonds used to build the facility. In addition, a public agency would most likely be more open to public involvement regarding future plans for improvements and changes to the toll schedule."

AAA supports the use of high-speed electronic toll collection systems because such systems minimize congestion at the toll plazas, increase safety, and improve traffic flow. However, electronic toll collection systems must include strong data security features to protect motorists' right to privacy.

### 3.5.3 Public Perception

Mr. Scott believes that the media can certainly be effective in shaping public opinion. The media can play a key role in communicating the purpose of the project, how the proposed facility fits in to the rest of the transportation system, what the costs to motorists will be, and what the benefits of the facility will be in terms of travel time savings and other quantifiable measures. If the message is successfully communicated, public support can be generated for a worthy project.

While there are a variety of arguments supporting the use of pricing and tolling, the most basic is that it is the most direct "user pays" approach to building new facilities. If you don't use it, you don't pay for it. Tolling and road pricing can be very appropriate mechanisms for funding new roads and expanding existing roads; however, pricing must be done in such a way that overall mobility in the corridor is improved. In a constrained financial environment, tolling provides a way of getting facilities built many years in advance of when they otherwise would be built using existing revenue sources.

Arguments against road pricing and tolling are more prevalent in relation to proposals to price or toll existing facilities. The public feels that they are being forced to pay a second time for facilities that were initially built with their tax revenues. Pricing proposals can be viewed as punitive measures against motorists if applied to existing facilities without any additional capacity or service improvements to provide motorists that have to travel to a certain location for work or other purposes with an alternative way to get there. It also can be argued that tolling is a more expensive way of providing infrastructure since borrowing is required to provide the money up front to build the facility adding substantial financing costs that must be paid by the users of the facility over time. Assuming funding was available, the facility could be built at a lower overall cost on a pay-as-you-go basis using traditional gas taxes.

The best way to build support for toll roads or HOT lanes is through a public education effort that clearly explains the costs and benefits of the project to the public. If the public sees a substantial benefit in terms of congestion relief and improved travel times and reliability as compared to the cost in terms of tolls to be charged, it should be possible to build support for the project.

## 3.6 Jack Jones Trucking, Inc.: Valerie Liese, President

### 3.6.1 Congestion

Valerie Liese is the President of Jack Jones Trucking, Inc., which is both a full-load and a partial-load truck operator. From her experiences as a businessperson and operator, she views congestion as a fact of life in Southern California. While certain areas are more prone to

congestion than others, Ms Liese sees passenger vehicles as more of a contributor to congestion than truck traffic.

### 3.6.2 Toll Roads

Ms Liese feels that tolls should not be imposed on any existing capacity. If an extra lane is added for trucks only, then it may be tolled, but trucks should still have the option of using the preexisting, non-tolled lanes. She and many others in the industry are very familiar with existing examples of road pricing/toll roads, and hold negative perceptions of them. However, these opinions do vary with the type of project, based on opinions from industry meetings. Ms Liese does not have an opinion on public versus private ownership of the facilities, but does prefer attended toll booths over electronic tolling due to the possibility of non-local drivers accidentally entering the tolled lanes.

### 3.6.3 Public Perceptions

Ms Liese does not identify any arguments in favor of toll facilities, but notes that as a truck operator, "my customers have told my sales staff they will not pay any extra charges for us to use toll roads. They say it is a convenience to our drivers, not them." She does not believe that support for toll roads or HOT lanes will be generated in the Inland Empire, as residents are already taxed enough.

## 3.7 Parsons Brincknerhoff: Kent Olsen, Project Director

### 3.7.1 Congestion

Kent Olsen is a project director at Parsons Brincknerhoff, and a consultant to both the San Bernardino Associated Governments (SANBAG) and the Riverside County Transportation Commission (RCTC) on HOT lanes or toll-road projects. In his weekly commuting from San Luis Obispo County to San Bernardino via Interstate 10, Mr. Olsen has experienced Inland Empire congestion firsthand. He feels that congestion is particularly bad at Interstate 10 around I-215, on I-15 down to SR-60, and on I-215 going south into Riverside County where it connects to SR 91.

Trucks contribute more to the traffic congestion because trucks are so long and they have a slow acceleration so you get behind one it just compounds the congestion caused by automobiles. Also when you're approaching interchanges like I-15 there's a lot of truck movement there so they create congestion from one freeway to the other just because of the number of trucks making the transition lane.

### 3.7.2 Toll Roads

Looking at current infrastructure, the best example for HOT lanes of course is SR-91 in Orange County. It's been open 15 years, it was the first real application of HOT lanes, and it was built under a public/private partnership and is now owned by Orange County Transportation Authority. Every year they do surveys with costumers and they have probably a 90% approval rating. The users of that highway really like it. And what they are finding is that most of the revenues are not coming from people that use it every day. It comes from people when they really need to. If they use it every day during peak periods it can get expensive. And some people do. But a lot of people use it when they are late for a meeting or late getting home or late picking up their child at daycare. The key thing about it is that it gives you an option; you don't have to

use it. You don't pay for it if you don't use it, but if you really need it, a reliable, fast, travel time is available and you can pay for it.

If you want an example of a toll-road, the Eastern Transportation Corridor and the Foothill Transportation Corridor in Orange County are examples of new highways built that are completely all toll roads and not just an express lane on an existing highway. In that project they have 4 million dollars of investment, and all that was done without any state money. That's an example of really needed transportation facilities built without any state money. They're well used, people that use them really like them, and they are close to capacity on the Eastern Transportation Corridor during peak periods. They'll probably have to look at raising the toll during peak periods. Right now it's the same toll through the whole day.

Congestion pricing brings a real advantage to change behavior at the times at which you drive, to get better utilization out of a very extensive facility that we have here in Southern California, by getting people to drive off peak. And above all we do get the support from environmental communities, because it does discourage unnecessary travel. If you have to pay a toll every time you go somewhere you're more likely to combine trips and not make extra trips. Express lanes are designed to always flow freely and thereby allow at least two lanes of traffic to flow at highway speed so you don't have cars sitting in congestion and generating more air pollution. It does take a couple of lanes and making them flow freely to reduce the amount of air pollution being generated.

Mr. Olsen's opinion on toll roads depends on the type of project. Not every new highway works as a toll road. There has to be a demand for the improvement that you're providing. If you're just building a new highway in an area where the politicians would like to have one, or real estate developers would like to have one so they can develop land, that probably cannot be financed. You won't have the amount of traffic you need to sell toll revenue bonds in order to finance the project. So his attitude and opinions are more related to the purpose or need of the project. HOT lanes in general are harder to finance than toll-revenue bonds because there's so little experience with those in the United States and in the world. There is a lot of experience with toll roads and you can get fairly accurate forecasts of traffic and revenue on a toll-road, but it's harder to forecast the traffic and revenue on an express lane because it's so dependent on the level of congestion in the adjacent freeway.

Mr. Olsen has been advising all of his clients to use electronic toll collection. "We haven't designed any toll roads that have toll plazas because you are increasing your operating cost and you are decreasing the commodity you are selling to the customer, which is basically time. And you really turn off users when they have to wait in a line to pay cash or use a toll road. I'm a hundred percent in favor of no cash being allowed. We are also seeing improvements in technology for optical reading of license plates so there are actually some projects in the world where the transponders can read your license plate and they can bill you at home or you can call up a number… and put it on your credit card."

### 3.7.3 Publicly vs. Privately Owned and Operated

One of the major factors that Mr. Olsen sees as shaping public opinion/public perception of a privately owned toll road is when a foreign company is in charge of one of those projects. There is talk in the public sector and the private sector, and there is a lot of public opinion against that and that translates into political opinion that the profits being made on the project are going

somewhere else out of the community. By the same token in a publicly owned toll road the public sector is taking a lot of risk on whether the project is financed or not. It takes a larger upfront public investment, and it doesn't bring in the equity investment of a private company that a toll road would. There is some public perception that a privately owned public highway is a bad thing, especially when the owner of that is a foreign company. That is something that politicians have to come to grips with if they want to develop the projects as public/private partnerships.

The pros of a private toll-road is that you have private companies putting equity into the project, taking the risk on the project, and doing most of the work. On a public toll-road you have the public sector taking the risk. You have the public sector putting in the initial investment. But if there is excess revenue in the future, the public gets to keep that and that excess revenue from the toll-road can be used for another transportation improvement for the area.

### 3.7.4 Public Perception

In Mr. Olsen's experience, "On the several projects I've worked on when we've had to do public opinion polls I've found in general nobody likes toll-roads. So it's an educational process to get people to understand that there are no public funds to build new capacity. So then you say ok, so if we need new capacity how do you fund it? And you say a way we have done this in the past is to increase gasoline tax, so no one wants to do that. And go we could increase the sales tax, and go through all the other options no one really wants to increase taxes in any way. And what you end up with is: if you really need new funding for new capacity the best place to get it is to have the users of that new capacity to pay for it. In principle, it's a more fair use for a source of revenue to build new capacity."

He mentioned that one of the reasons why there's so much congestion in Southern California on the freeways is that everyone wants to travel at the same time. "With toll-pricing like the SR-91 project, we can have a variable tax during the day. If you want to travel during the peak period, you're going to have to pay a lot more, and that will encourage people to go on off-peak periods when we charge less to get better utilization out of the transportation facilities we have built."

Over the last ten years, Mr. Olsen has seen a real shift in the elected officials and decision makers in terms of their attitudes for HOT lanes or toll-roads. Since there is no more federal funds really for new capacity, and that the sales tax revenue that any of these agencies are taking in to pay for new capacity is way below what they forecasted it; they are forced to look for other sources of revenue like tolls. This shift in attitude is due to the economy. So they really have no alternative if they want to meet their commitments to the voters.

Considering arguments in favor of road pricing, Mr. Olsen would consider the SR-91 extension into Riverside County that is currently being worked upon. "The argument there for that road pricing is there isn't enough space or money to widen SR 91 into the number of lanes to handle the capacity so that it can always flow freely. So what our client is doing in order to meet one of their objectives of providing mobility is building express lanes to give people the option, when they need it, to pay money or fees to avoid traffic. So while it costs money to use, you only pay for it when you use it, and you only need to use it when it's worthwhile to use. So that when you're in a real hurry and you need to get to a destination on time you have the option of paying money to get through. You would never have that if all we did was build more freeways. You can't build enough to provide enough for free flow traffic."

Among the primary arguments Mr. Olsen commonly hears is that “we already pay for highways with our gasoline tax, now you are going to make us pay tolls too, so you're charging us twice.” But what people don't realize is that the gasoline tax, the federal gasoline tax, hasn't been increased since 1993, and so the buying power of that is a small fraction of what it was, at the same time the amount of people travelling has increased by a large percentage. And so it’s a matter of education to get people there to realize that the money they're paying, the gas tax they’re paying, is way too low and yet there’s no sentiment to increase it to a dollar a gallon or whatever it should be, so the toll roads are the only way to build a new capacity.

Another argument he hears is that “this serves the rich people only, us poor people that have to work for a living can't afford to pay tolls every day.” An earlier study found that people with all average incomes use the express lane, but only use it when they need it, and most of the revenue comes from people that only use it two or three times a week.

There were some complaints of late that with electronic toll collection that “you know you’re invading my privacy, you know exactly where I was at a certain time because you took my toll and recorded it”, and that's the truth, but every time you use a cell phone or credit card, people know exactly where you are and when. Privacy really is not something people have much of left.

Mr. Olsen would generate support through an education process to get people to realize the level of taxation they have that is dedicated to transportation, where that money is going now and why the transportation problem is so severe. “I would guess right now if you did a poll you wouldn't find that congestion was the number one problem, you would find economy and the jobs the number one problems, but it wasn't too long ago when the economy was stronger that congestion might have been the number one problem. So it's a matter of educating; making people aware of what the options are if you need more revenue for transportation and if you let them come to their own conclusions most people would support toll roads. But if you ask “do you support toll-roads” without any kind of education, if I asked, 70 or 80% would say “no I don't like toll-roads.” So they have to realize that it’s either that or no additional capacity. And I use the term additional capacity because we’re not building very many brand new highways anymore in California. Most of these are expanding capacity on existing highways.”

## 3.8 Conclusions

This chapter describes a wide spectrum of opinions sought from various stakeholders’ representatives in the inland empire region. Broadly the responses in these interviews broke down along expected lines. For example, the Auto club representative deemed truck traffic to be a major cause of congestion and the trucking company mentioned too much commuter traffic. These interviews were insightful, none the less. Some of the issues identified in the literature also came up in these interviews. Caltrans maintains that toll facilities, if not managed effectively, may discourage ridesharing. Caltrans also is aware of the social equity issues, i.e. are these facilities only for those who can afford them? Support would come from current users who understand the advantages of the facilities, specifically the improvement in travel time.

The mayor of Riverside noted that congestion in the Inland Empire is heavily dependent on where you are and the time of day and noted SR-91 as a particularly congested corridor. Based on this observation from the mayor a question about congestion perception on various highways in the inland empire was added to the resident survey. According to the mayor, offering choices

is the key to political palatability. The Auto club and Caltrans are also of the opinion that free routes should be available. While the auto club prefers a broad base of taxes (i.e., the gasoline tax) to pay for the roads they recognize the need for alternate revenue sources. In terms of toll revenue they prefer these revenues are used for improvement within the same corridor.

Mr. Olsen working as a consultant on various toll road projects provided some of the most insightful commentary on the issues. He noted the success of SR 91 toll road experiment in the Los Angeles area and noted that a significant chunk of revenue is collected from the occasional users running late and using toll roads only a few days a week. He also noted that equity concerns can be somewhat addressed if users of the same road or lane pay for the facility and there is a toll-free option available. This discussion led us to include a time value of money question in our survey.

In terms of toll facilities vs. managed lanes Mr. Olsen noted that due to a lot of experience with toll roads, one can get fairly accurate forecasts of traffic and revenue on a toll-road. However, it is harder to forecast the traffic and revenue on an express lane because it is so dependent on the level of congestion in the adjacent freeway. He also says moving to No cash and all electronic payment system will increase efficiency. It is an interesting contrast from the opinion expressed by the trucking industry representative who stressed the need to have attendant lanes to help out the drivers from out of town who may end up in the managed toll lanes by mistake. Finally, Mr. Olsen also pointed out that some folks may be opposed to toll roads due to the perception that it is double taxation. It should be pointed out to these folks that the federal gasoline tax, which hasn't been increased since 1993, only has a fraction of the purchasing power that it used to have. To support increased travelling in the context of this reduced purchasing power toll roads at least need to be considered.

# 4 Survey of the General Population in the Inland Empire

## 4.1 The Survey

This chapter introduces the survey conducted to capture user preferences on transportation financing mechanisms with special focus on toll roads/lanes. The survey also tries to capture various demographic characteristics and political views to discern their relationships with user opinions about toll roads. In addition, the past experiences with the toll roads are also sought in order to assess the impact personal experience has on people's attitudes about the toll roads. The chapter presents descriptive statistics from the survey as well as detailed analysis of the survey data in the form of multinomial logistic regression models. The descriptive statistics are helpful in identifying people's perception about several relevant issues while the modeling effort towards the end of the chapter provides inferences for the factors affecting these attitudes.

### 4.1.1 Survey Administration

A general user survey was administered to residents of the Inland Empire region using the internet, phone, and distribution of hard copies of the survey instrument at locations within the region. The phone numbers were obtained from Scientific Telephone Samples (STS), a firm based in Orange County, California. The web responses were obtained through emails sent from the Leonard Transportation Center at CSU San Bernardino. The link to the online survey was provided by the investigators in the email. In addition, the surveys were also distributed at selected locations including existing toll booths and weigh stations and randomly selected commercial locations. Each of these methods targeted the following groups of residents from the region: (a) randomly selected residents through phone numbers procured from STS; (b) Residents selected at several commercial locations such as vehicle service stations in the region; (c) truckers who were intercepted at existing toll booths and weigh stations; and (d) faculty, staff and student affiliates of a major employment center, the California State University, San Bernardino. For interviews over the phone, respondents were provided the option to take the survey online if they so chose. Others who picked up the printed questionnaire were also given the option to fill it out on the spot or mail it back in a return postage paid envelope, which was also provided. Approximate 60% of the surveys were completed online, a quarter of the surveys were completed over the phone with random digit dialing. The remaining survey responses were obtained from the hard copies distributed in the region. It is worth mentioning that most of the hard copy surveys were filled on the spot and no return envelopes were received by the investigators. In all, 190 useable responses were completed. Inferences in general would be accurate to within 7% for a 95% confidence interval. The solicitation of the survey through a variety of methods did provide a sample of wide cross-section of residents of the region. However, as with any survey of this kind there is always a self-selection bias which was overcome by weighting the sample. Appendix 4-1 shows a copy of the survey instrument. The survey is divided into six sets of questions in sections A through F. These sections and corresponding number of questions are listed in the Table 4-1. In the instruments the questions are numbered in the X-i format; with X (A through F) representing the section and i (1, 2, 3…) representing the order of question within that section.

Table 4-1: The Survey Design

| Section | Subject of Questions within the Section |
|---|---|
| A | Demographics |
| B | Travel Behavior |
| C | Congestion in the Region |
| D | Views on Politics and Transportation Financing |
| E | Toll Roads and HOT Lanes |
| F | Toll Collection |

### 4.1.2 Sample Data and Weighting

A multi-stage weighting technique was applied to the sample data. The first stage calculated weights based on the distribution of case study area residents by the age cohorts applied in the user survey (which reflects ranges used by the US Census). This is to account for the fact that certain ages in the distribution were over-represented while others were under-represented relative to the same distribution in the census. The 2010 distribution of residents by age and gender was retrieved from the California Department of Finance web site and applied. The second stage corrected for the fact that more males were represented in the survey than females compared to the Census. A third stage corrected for the distribution of educational attainment among survey respondents compared to Census data. Survey respondents were over-represented in the higher education brackets. A fourth stage corrected for the distribution of respondents by tenure, that is, owners vs. renters. The survey over-represented the proportion of owners. Appendix 4-2 shows details on the distribution of seniors by age, gender, education and tenure in the sample and in Census data as well as the weights that were derived.

## 4.2 Demographic Characteristics

In this section the participant characteristics are described from non-missing observations. The statistics in the section are based on the weights assigned to each observation according to the procedure described in the previous section. As expected, almost all the respondents had a driver's license and reported that they had access to automobile either always or most of the time. In the weighted data the gender distribution was 47% male and 53% female. Also, as expected, for the inland empire the shares of transit, walking and bicycling modes are miniscule compared to the auto mode.

### 4.2.1 Age Distribution

The survey targeted respondents who were 18 years old or above. Thus the first age cohort is 18-24 years. Table 4-2 shows the relative distribution of ages of survey respondents in the region. Note that this distribution is based on the weights applied to each observation and not from the raw counts of the 190 responses. The table caption also notes the corresponding question in the survey instrument for ease of reference. It is worth mentioning that in the analysis section where these variables are used as input to the multinomial logistic regression models some of the variables are consolidated into fewer categories.

Table 4-2: Relative Age Distribution of Respondents (A2)

| Age Group | Percentage Distribution (weighted) |
|---|---|
| **18-24** | 17.15 |
| **25-34** | 23.99 |
| **35-44** | 23.02 |
| **45-54** | 15.50 |
| **55-64** | 5.39 |
| **65-74** | 2.30 |
| **75+** | 12.65 |

### 4.2.2 Income Distribution

In the raw data we observed a higher percentage of the high income individuals possibly related to the fact that a higher number of responses for this survey were obtained online. However, in the weighted data shown in Table 4-3 the percentage reflects the income distribution in accordance with the income groups reported in the census data.

Table 4-3: Income Groups of Respondents (A5)

| Annual Income | Percentage Distribution (weighted) |
|---|---|
| Less than $25,000 | 36.65 |
| $25,000-49,999 | 33.53 |
| $50,000-74,999 | 8.06 |
| $75,000-99,999 | 10.14 |
| $100,000-124,999 | 4.38 |
| $125000+ | 7.25 |

### 4.2.3 Education Characteristics

In the original sample the share of higher income and higher educated individuals was higher than the census information obtained for this research. However, as shown in Table 4-4 the weighted sample composition matches well with the census information. Also, the expected correlation between education level and incomes the relationships of these variables with attitudes about toll roads need to be examined carefully.

Table 4-4: Respondents by Educational Background (A4)

| Education | Percentage in the Weighted Data |
|---|---|
| Less than High School Diploma | 25.26 |
| High School Diploma/GED | 29.75 |
| Some College | 32.62 |
| College Graduate | 8.80 |
| Graduate School/Graduate Degree | 3.57 |

## 4.3 Travel Characteristics and Congestion Perception

### 4.3.1 Vehicles Available

The overwhelming majority of respondents (82.65%) always had an automobile available for travel. Among the rest, 5.34% had the personal car available most of the time and 12.01% have it available occasionally; (see Table 4-5). Figure 4-1 shows the distribution of auto availability by the corresponding age group. While other travel modes were explored in the survey (see the question B1 of the survey questionnaire in Appendix 4-2). It appeared that the share of motorcycles, bicycle, and public transit was miniscule compared to the auto mode reflected in the large portion of respondents reporting zero trips for these alternative modes during the previous months. It is consistent with the travel patterns expected for the inland empire region, which is dominated by suburban commuter travel to the larger Los Angeles Metro area.

Table 4-5: Auto Transport Availability for Survey Respondents (B2)

| Auto Transport Availability | Percent |
|---|---|
| Always | 82.65 |
| Most of the time | 5.34 |
| Occasionally | 12.01 |

It may be observed in Figure 4-1 that while almost 100% of the middle age groups always have the auto available, it is the not the case with the younger and older demographic. Hence, the variation in opinion on tolling that may seemingly be related to age group could also result from the auto availability statistic.

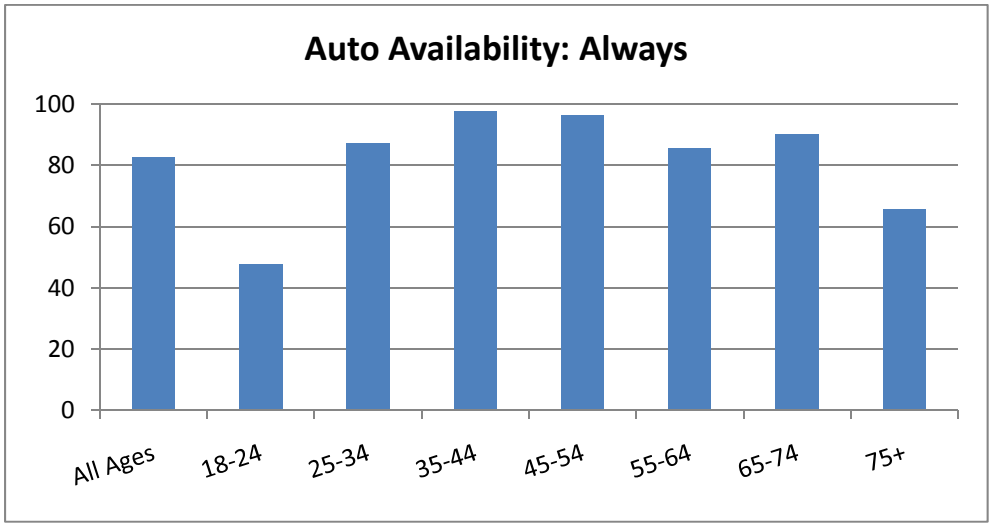


Figure 4-1: The Proportion of Respondents Who Always Have Auto Transport Available By Age Group

### 4.3.2 Driving Distances and Durations

Drivers' opinion of toll roads is known to vary by the distance they drive. Therefore, we included questions on driving distances and durations. The distributions are shown in Table 4-6 and Table 4-7 respectively. It can be observed that over 70% of the respondents drove over 10 miles per day indicating a large percentage of commuters.

Table 4-6: Distribution of Miles Driven Per Day (B3)

| Number of Miles Driven Per Day | Percent |
|---|---|
| ≤ 10 miles | 29.721 |
| 10 miles < Duration ≤ 20 miles | 21.446 |
| 20 miles < Duration ≤ 30 miles | 12.929 |
| 30 miles < Duration ≤ 40 miles | 7.2503 |
| 40 miles < Duration ≤ 50 miles | 6.8987 |
| > 50 miles | 21.754 |

Also, close to 60% of the respondents spent more than an hour per day driving (See Table 4-7). It is remarkable that about 36.51% spent more than 2 hours driving every day. It will be interesting to observe the opinion about tolling as a function of time and distance spent driving. Note that in the models discussed later in this chapter some of these categories have been consolidated to create input variables to the model.

Table 4-7: Distribution of Time Spent Driving (B4)

| Time Spent Driving Per Day | Percent |
|---|---|
| < 30 minutes | 10.347 |
| 30 minutes ≤Duration < 1 hour | 27.538 |
| 1 hour ≤Duration < 90 minutes | 7.1424 |
| 90 minutes ≤Duration < 2 hours | 18.465 |
| > 2 hours | 36.507 |

### 4.3.3 Congestion Perceptions

In addition to the driving distances and durations, we also asked the respondents about the proportion of driving they do during congested conditions. Response to this question along with the actual congestion on specific highways can be used to determine if there is a gap in congestion perception and reality. It is harder to do it in this scenario since this survey includes respondents from a larger geographical area instead of users of a particular highway. None the less, since only about 18% indicated that they drive more than 75% of the time in congestion; the perception seems closer to reality (See Table 4-8).

Table 4-8: Proportion of Congested Driving (B5)

| Proportion of Congested Driving | Percent |
|---|---|
| Less than 30% | 52.71 |
| Between 30 and 50% | 22.32 |
| Between 51 and 75% | 6.94 |

| Proportion of Congested Driving | Percent |
|---|---|
| More than 75% | 18.03 |

There were two more questions that related to the perception of congestion. One was about the overall view of congestion while the other was about the quality of respondents' personal trips. As expected the answers were correlated but not exactly identical. The proportion of respondents who perceived the congestion to be severe in general and the proportion of respondents who rate the quality of their personal trips to be unsatisfactory/very unsatisfactory was very close (See Table 4-9).

Table 4-9: General View of Congestion and quality of personal trips (C1 and C2)

| General View of Congestion | Percent | Quality of Personal Trips | Percent |
|---|---|---|---|
| **No congestion** | 5.22 | **Satisfactory/ Very satisfactory** | 38.03 |
| **Mild** | 15.68 | **Slightly satisfactory** | 32.93 |
| **Moderate** | 58.12 | **Slightly unsatisfactory** | 7.50 |
| **Severe** | 20.98 | **Very unsatisfactory/ Unsatisfactory** | 21.55 |

A significant majority in the weighted data also agreed that the truck traffic was a problem in the inland empire region. The distribution of respondents agreeing and disagreeing with the question is shown in Figure 4-2.

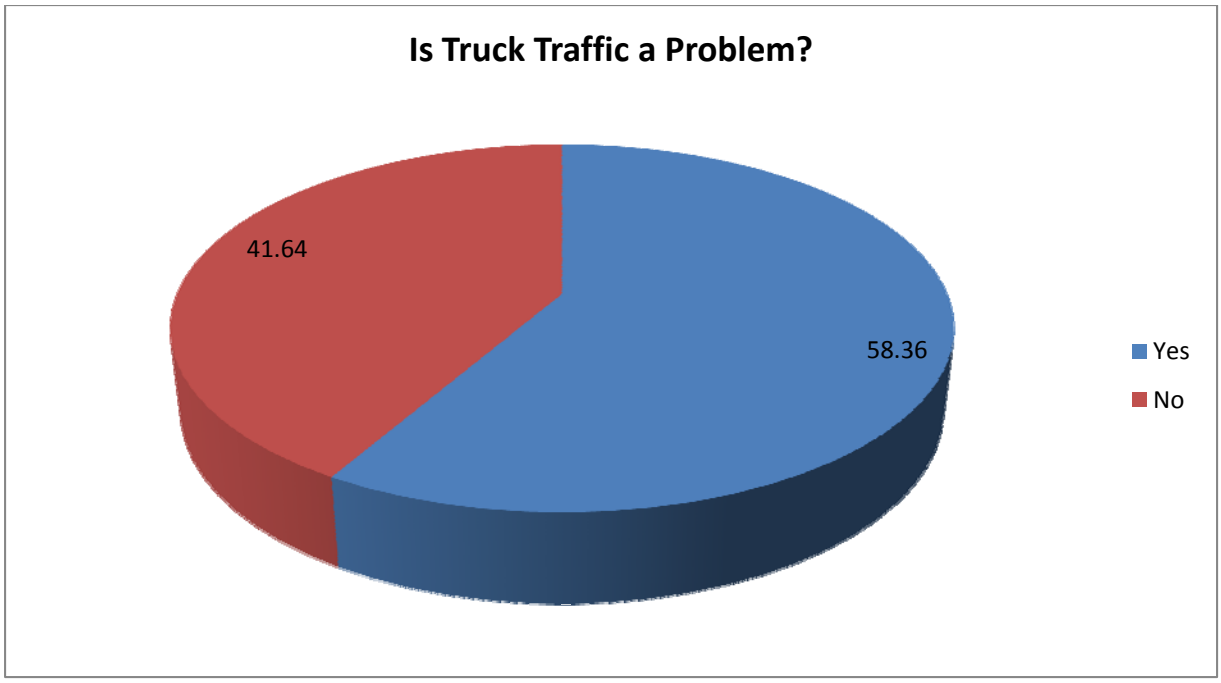


Figure 4-2: The Perception of Truck Traffic as a Problem (C6)

As pointed out in the study the perception of toll roads invariably depends on the context of the project (Zmud Bradley, Douma, and Simek, 2007). Hence, it is important to identify corridors with the most significant congestion issues. In this study, the respondents who were aware of the respective highways among the 17 major corridors listed in the survey rated SR 91 near corona as the most severely congested freeway in the region by a significant margin (see Figure 4-3). This is consistent with the conversation we had with the stakeholders discussed in the last chapter.

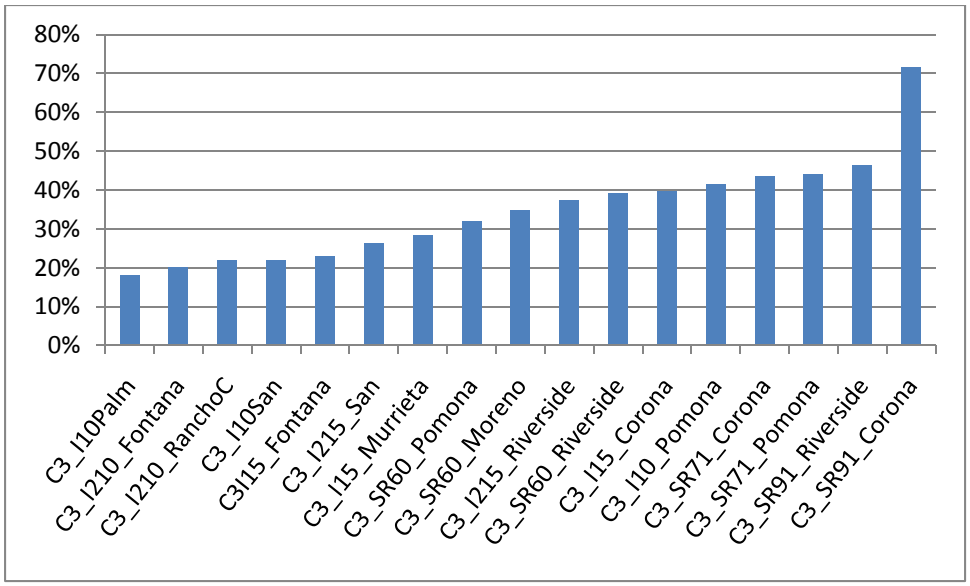


Figure 4-3: The Perception of Traffic Congestion on Various Corridors in the Inland Empire (C3; Higher Percentage Indicates Worse Congestion Perception)

### 4.3.4 Paying for congestion

An important question related to the severity of congestion is the willingness to pay to avoid congestion. It is also related to the question of time value of money. This information was sought from the respondents by asking them the amount of money they will be willing to pay to save a given range of time. The results are depicted on Figure 4-4.

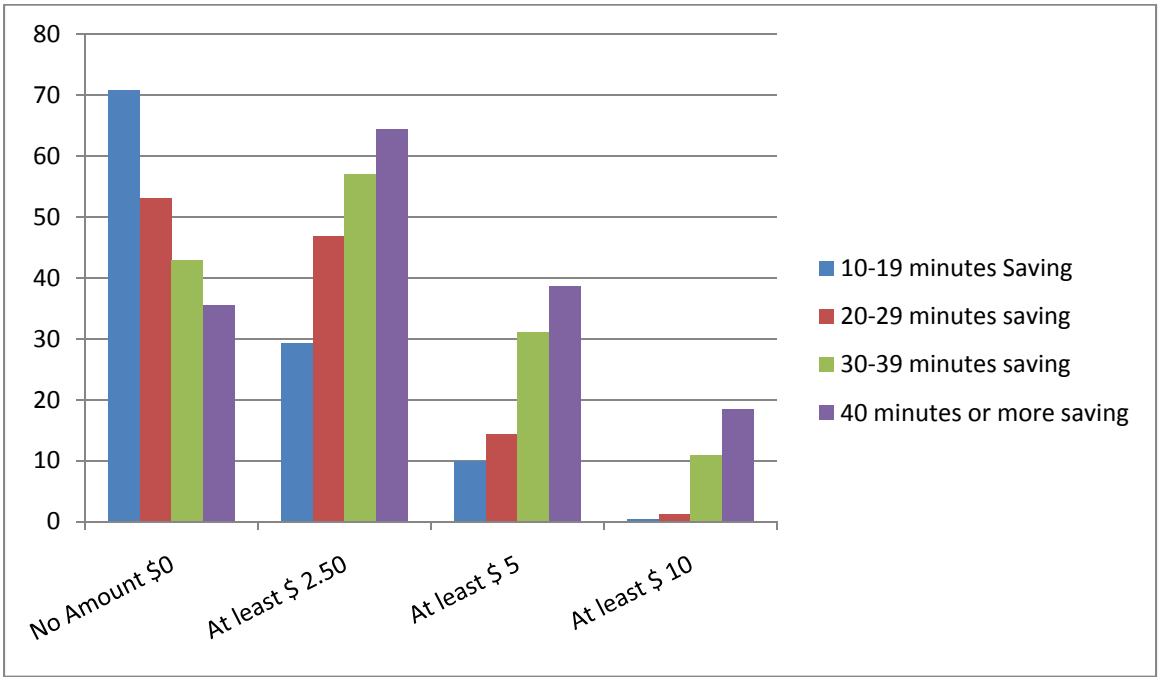


Figure 4-4: Willingness to Pay a Certain Amount for Given Travel Time Savings (C4)

The figure shows that more than 70% of the respondents are not willing to pay anything to save 10-19 minutes per trip and slightly over 50% are not willing to pay any amount to save 20-29

minutes. However, if more than 30 minutes per trip will be saved a majority is willing to pay at least $2.50 with a smaller percentage ready to pay even more. Note that the question (C4) include the option of paying $15 and $20 as well but since only a tiny percentage were willing to pay that amount those numbers are excluded from this chart. It shows that regardless of the travel time savings any per trip toll of $5.00 or more will not be widely acceptable to the public. Less than 40% are willing to pay $5 or more even for a travel time savings of 40 minutes and higher.

### 4.3.5 Ways to Alleviate Congestion

In question C5 the respondents were asked to rank five ways to deal with congestion. Charging tolls for solo drivers was the second most popular measure. By this measure toll roads/lanes are the least popular with very high percentage of respondents identifying it as 5th preference and very low percentage of respondents identify it as first or second preference. Similarly, public transportation was also fourth or fifth choices for majority of respondents. It should be noted that this question was presented to respondents before the sections on transportation financing (Section D), and background on toll roads (Section E). All responses for this questions based on the weighted responses are provided in Figure 4-5.

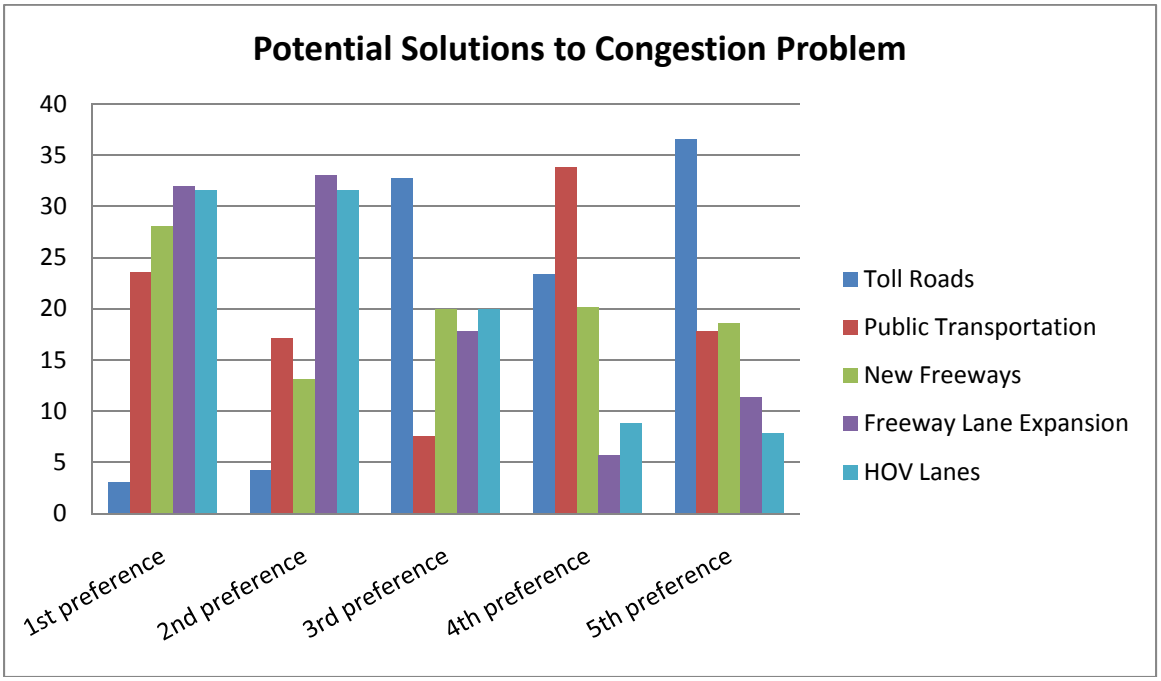


Figure 4-5: Potential Solutions to Congestion Problems (C5)

To clearly observe the popular solutions to the congestion problem the results are summarized in Figure 4-6. The figure shows the percentages of respondents who identified the alternative in their top two choices for each of the five alternatives. It appears that the overwhelming preference is to add to existing facilities in the form of expansion of existing roadways or new roadways. Prominent among the choices for expansion are the addition of carpool (or HOV) lanes or even HOT lanes, both of which might be more acceptable solutions to the residents compared to building new toll roads or public transportation.

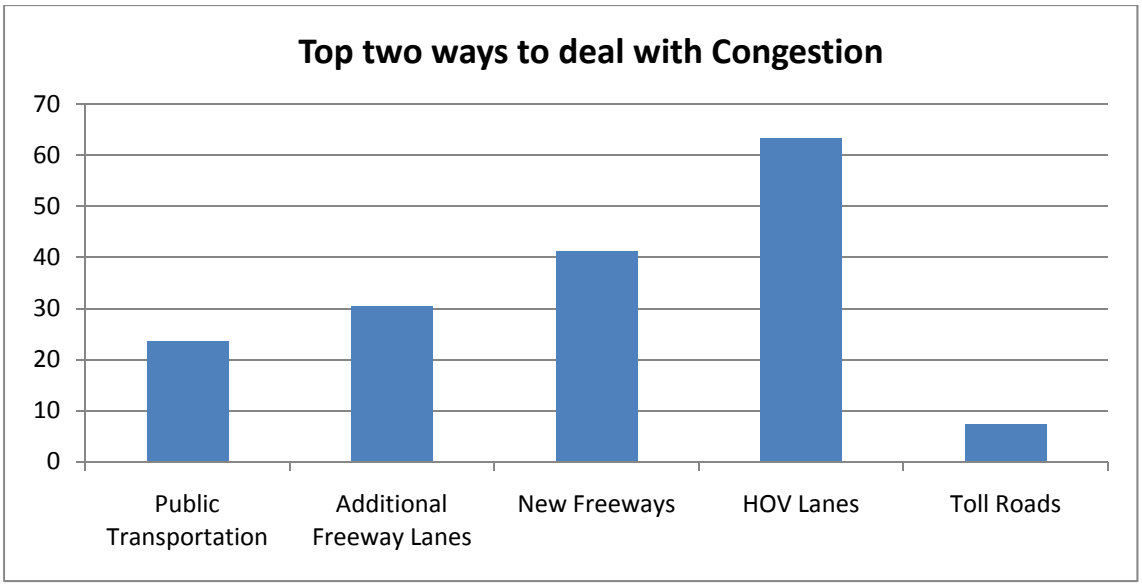


Figure 4-6: Top Two Ways to Deal with Congestion (C5)

## 4.4 Political Views

### 4.4.1 Government's role in the economy and Taxes

The idea of toll roads has political implications and therefore it is critical to examine respondents' political views since these views are likely to be related to their opinions on the issue. The questions in section D of the survey instrument helped investigators examine that.

Table 4-10: Role of the Government in the Overall Economy (D1)

| Role of the Government in the Economy | Percent | Role of the Government (Consolidated Categories | Percent |
|---|---|---|---|
| Too little | 21.94 | Less than needed | 34.89 |
| Less than I prefer | 12.95 | | |
| Just right | 20.05 | Just right | 20.05 |
| More than I prefer | 26.20 | More than needed | 45.06 |
| Too much | 18.86 | | |

The questions about the role of the government in the economy were asked since the toll roads have been known to be perceived as ways to boost revenues for the government. Hence, a public perception of government role could relate to whether toll roads are acceptable or not. Table 4-10 shows that approximately 45% of respondents felt the government plays a larger than necessary role in the economy. It will be interesting to note what happens to this question and its relationship to toll road opinions over time since at the time during which the survey was conducted the sentiments against government spending may be higher than usual. The survey

results also conform to relatively more conservative voting patterns of the inland empire region compared to the state of California as a whole.

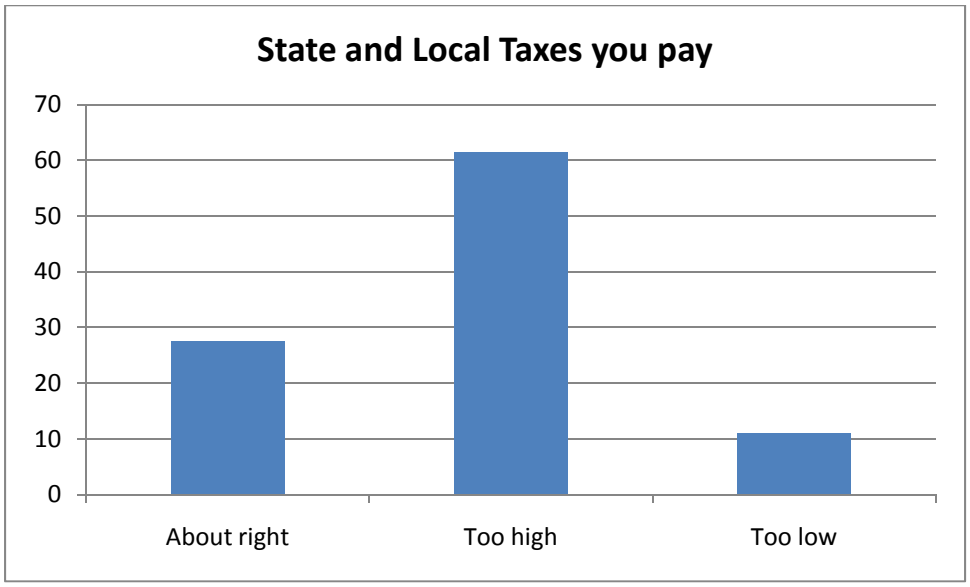


Figure 4-7: Perception of State and Local Taxes Paid By the Respondents (D2)

Two more questions related to political views were about the state and local taxes and transportation spending by the state and local governments. It was found that while the respondents think that their state and local taxes are too high (Figure 4-7); there is appetite for more transportation spending (Figure 4-8). The respondents will prefer to have the money moved towards transportation spending from the existing budget. It also leads to inference that small tax levied and specifically earmarked for transportation improvements may have some potential to be approved.

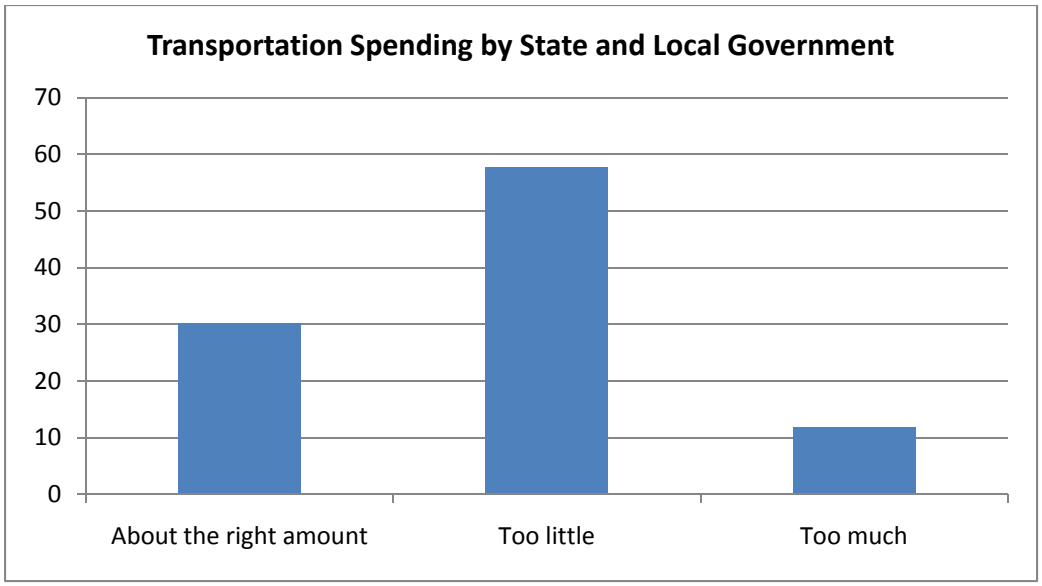


Figure 4-8: Perception of Transportation Spending by State and Local Governments (D3)

### 4.4.2 Ways to Deal with Transportation Funding Shortfalls

When specially asked about how to deal with funding shortfalls, sales and gas tax increases were the least popular alternatives. Increasing the vehicle license fee was the single most popular method (Figure 4-9). It was most popular likely because it was identified as a one-time fee. Charging tolls for solo drivers was the second most popular measure. This is consistent with HOT lanes as a popular measure for dealing with congestion (See Figure 4-6).

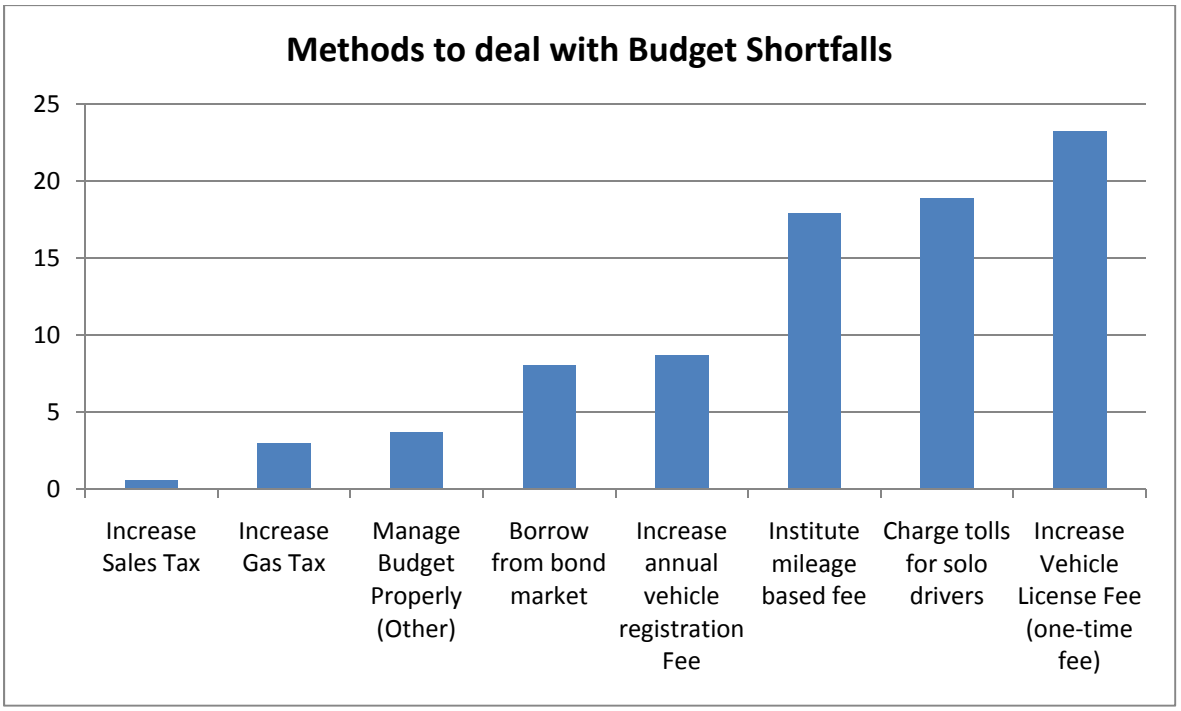


Figure 4-9: Methods to Deal with Budget Shortfalls (D4)

Instituting mileage based fee also found a surprisingly large support. One should be careful, however, with any inference about its overall popularity and acceptance among the general public. The question in the instrument did not try to measure opposition to each of these measures and there may be a significant vocal minority or even a majority that might oppose the mileage based fee if it ever comes closer to reality. It is an interesting question of future research but is beyond the scope of the present study on attitudes about toll roads.

### 4.4.3 Toll Revenue Expenditure

Respondents were asked whether the toll revenues should be used to fund the specific toll road or whether they should be used to fund general improvements.

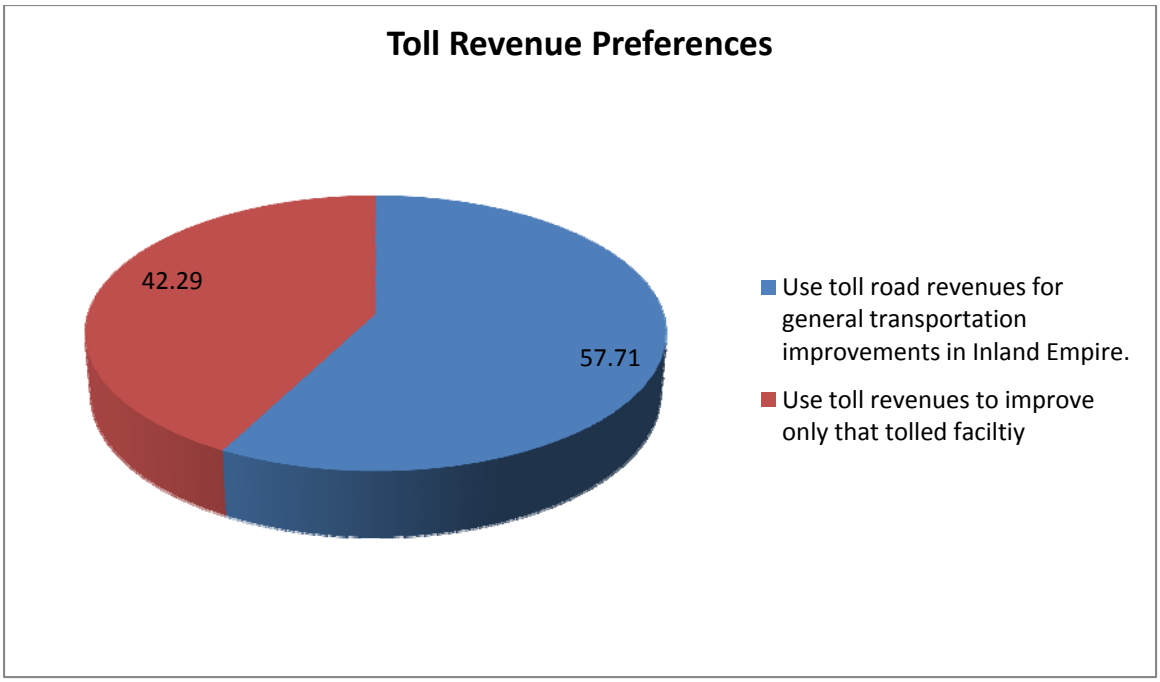


Figure 4-10: Toll Revenue Preferences (D6)

It is interesting that a significant majority of respondents want the toll revenues to be used for general transportation infrastructure improvements. This finding further underscores the previous finding that respondents generally support more spending on general transportation improvements in the region.

## 4.5 Perceptions about Toll Roads and HOT Lanes

### 4.5.1 General Views

The first question about the toll roads provided respondents six different statements. They were asked if they agreed with one or more of those statements. An almost equal majority of respondents agreed with the assertions that toll roads are less congested but that toll roads are more expensive. More than 45% also noted that they should not *have* to pay to use the road. It is a high barrier but indicates that if paying is an option and not a necessity then a higher acceptance of the idea can be achieved.

Table 4-11: Attributes of Toll Roads (E1)

| Attribute | Percentage of respondents agreeing with the attribute |
|---|---|
| Toll roads are less congested than freeways | 54.74% |
| Toll roads are expensive | 54.21% |

| | |
|---|---|
| I shouldn't have to pay to use the road | 45.15% |
| Toll roads are less convenient than freeways due to limited access | 36.31% |
| Toll roads will create economic opportunities | 19.50% |
| I've had bad past experiences with toll roads | 14.23% |

### 4.5.2 Support for Variable Tolls by Time of day or Vehicle Class

The support for variable tolling does not exist; in fact a majority (58%) opposes it with only 16.37% supporting it (Figure 4-11).

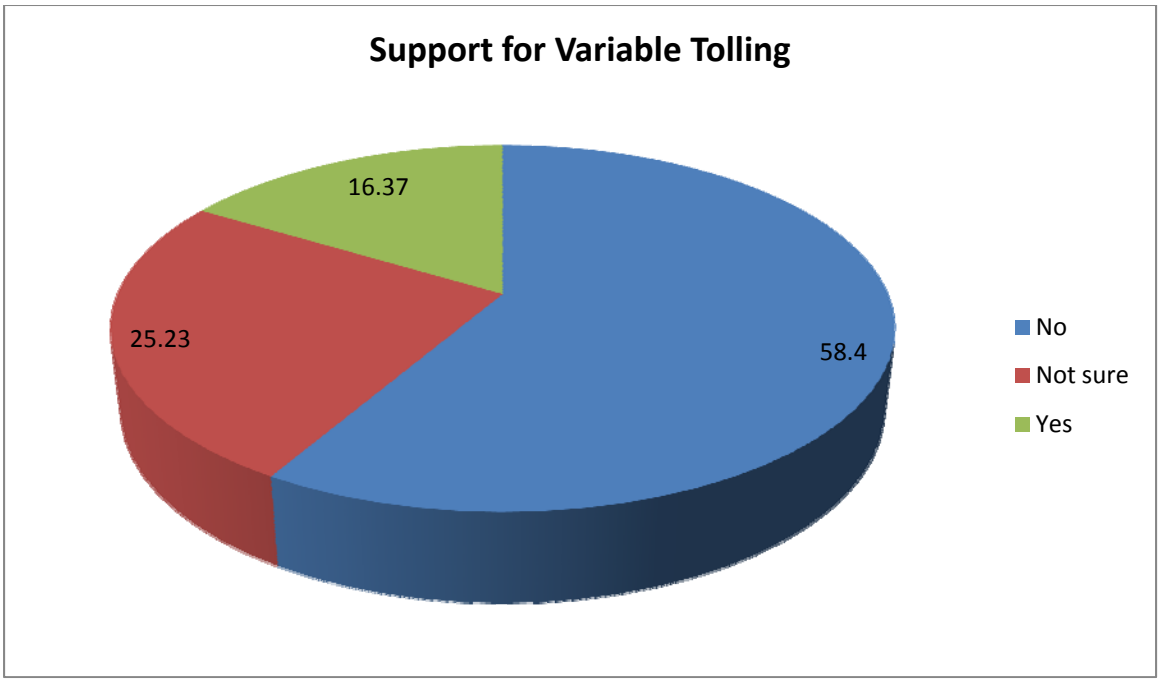


Figure 4-11 : Support for Variable Tolling (E2)

The support for higher tolls on truck and other commercial traffic was only a 48% plurality. A majority either opposed or was not sure about higher tolls even as the majority earlier identified the truck traffic as a congestion problem. It indicates that the public perceives the trucking industry as an important component of the area's economy and is at least wary of possibly alienating them with targeted higher tolls.

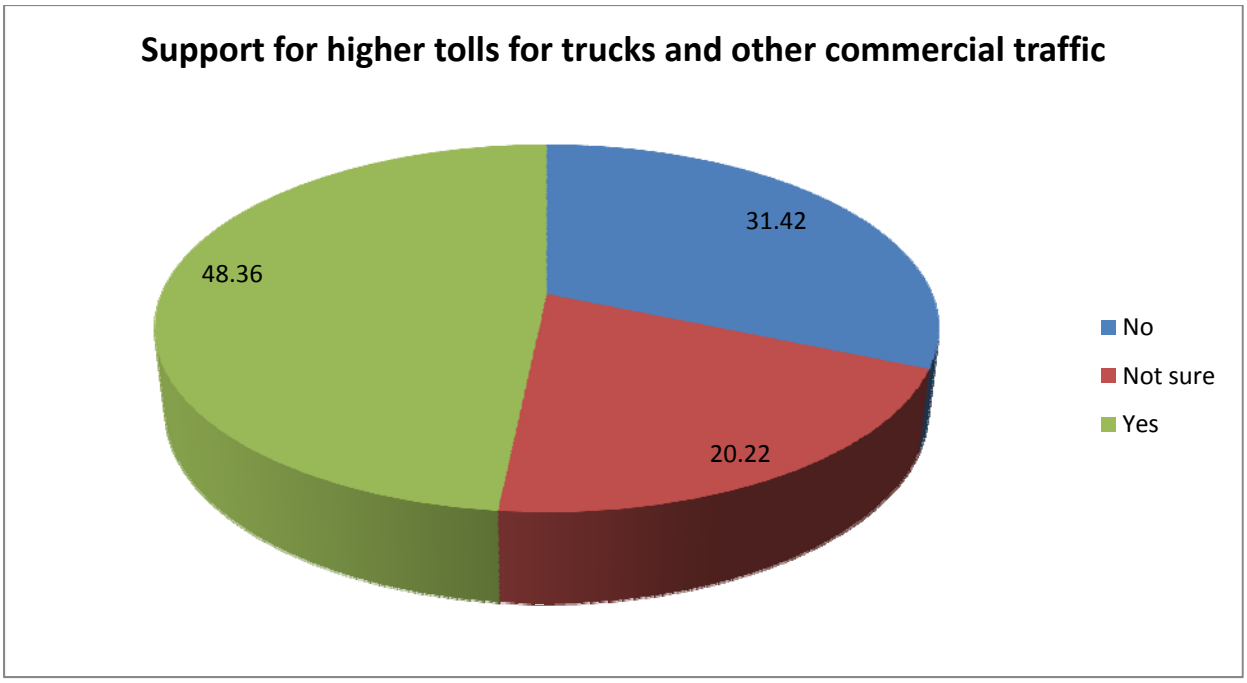


Figure 4-12 : Support for Higher Tolls for Commercial and Truck Traffic (E3)

### 4.5.3 Specific Applications for Toll Roads

It is known from the literature that the toll project's support depends on specific details of the project. While specific project details are not part of this research we did ask the respondents about common characteristics of new projects. For example, Figure 4-13 shows that 55% of respondents opposed charging tolls for new highways. A similar percentage (53%) opposed conversion of HOV lanes to HOT lanes (Figure 4-14).

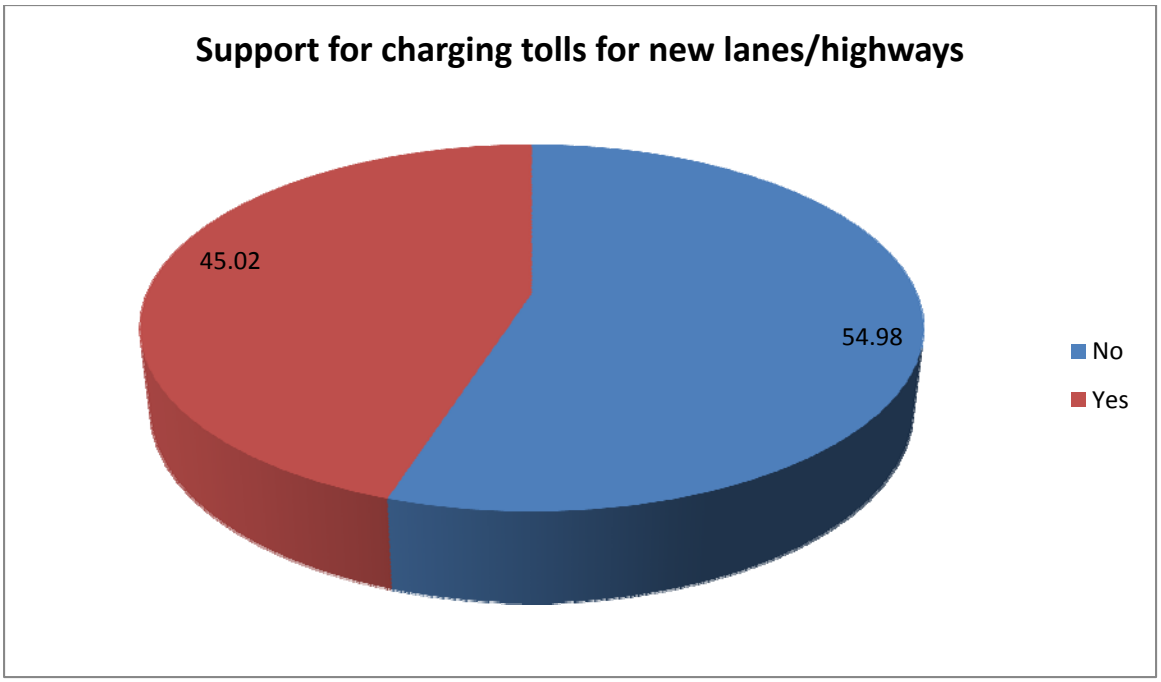


Figure 4-13 : Support for Charging Tolls for New Lanes/Highways (E5)

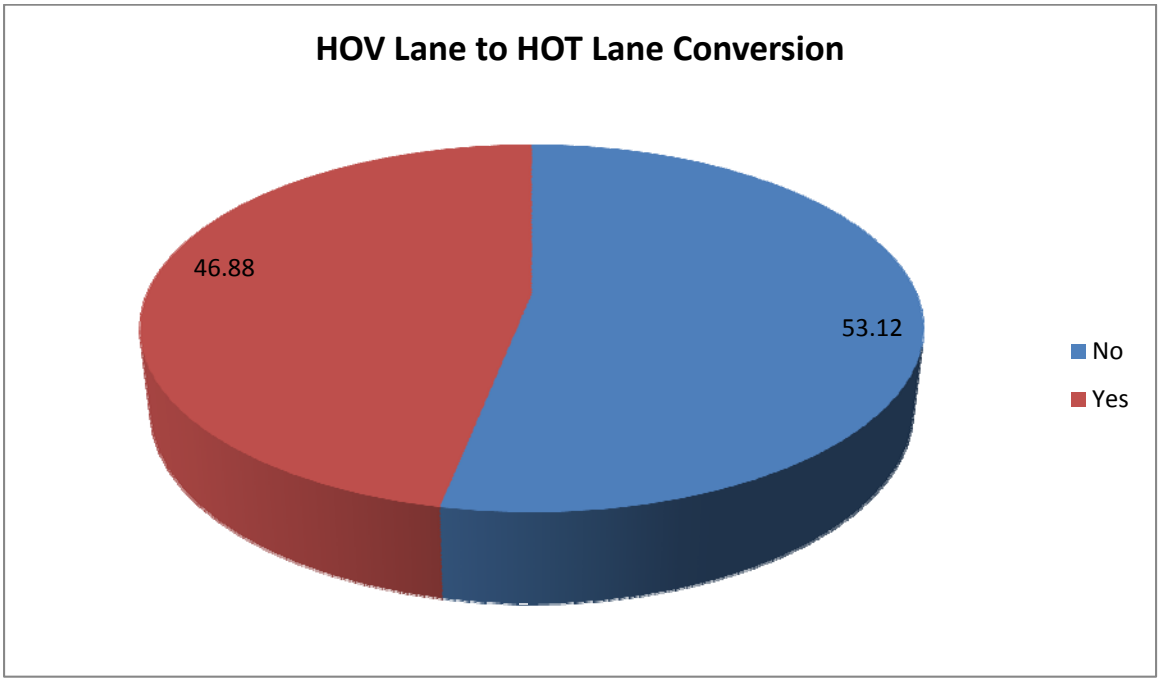


Figure 4-14 : Support for Converting HOV Lanes to HOT lanes (E6)

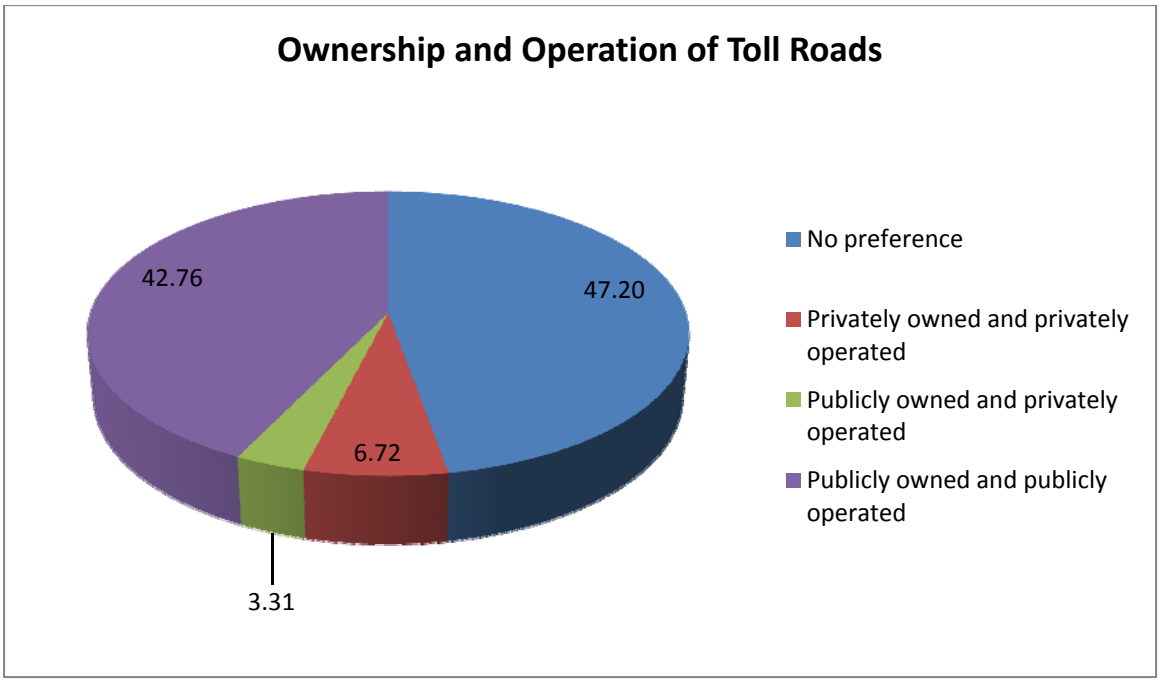


Figure 4-15: Preference on Operation and Ownership Of Toll Roads (E6)

It is interesting that in terms of toll roads the first option provided to the respondents was publicly owned and operated. It turned out that close to the majority has no preference indicating that a narrow majority could accept at least private operation of toll roads.

### 4.5.4 Experience with Major Southern California Toll Roads

The literature has shown that support for toll roads depends on past experience with toll roads. Among the respondents a significant proportion (slightly more than 1/3$^{rd}$) had no experience with the toll roads. Nearly equal proportions have had positive and negative experiences. It is interesting that very few (only 4.04%) have a mixed opinion of their experience on southern California toll roads. See Figure 4-16, which is created from question E8 in the survey instrument. The question cited various toll road projects from the southern California region.

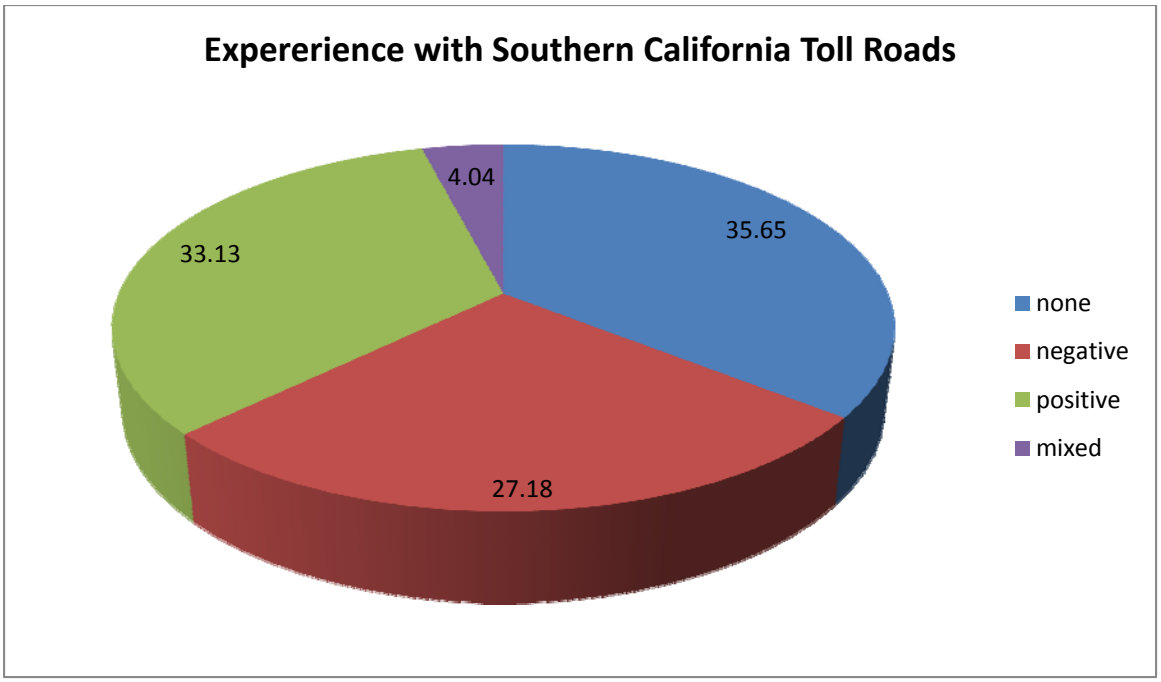


Figure 4-16 : Experience with Southern California Toll roads (E8)

## 4.6 Toll Payment Options

The last section of the survey asked about the mechanisms by which tolls are collected. Close to 1/5$^{th}$ of respondents had not paid the toll electronically (See Figure 4-17). It explains why the respondents felt the need for multiple options in terms of paying tolls. It was reflected in the fact that only 24% support electronic only tolls with 52% supporting both electronic and booth collection of tolls (Figure 4-18).

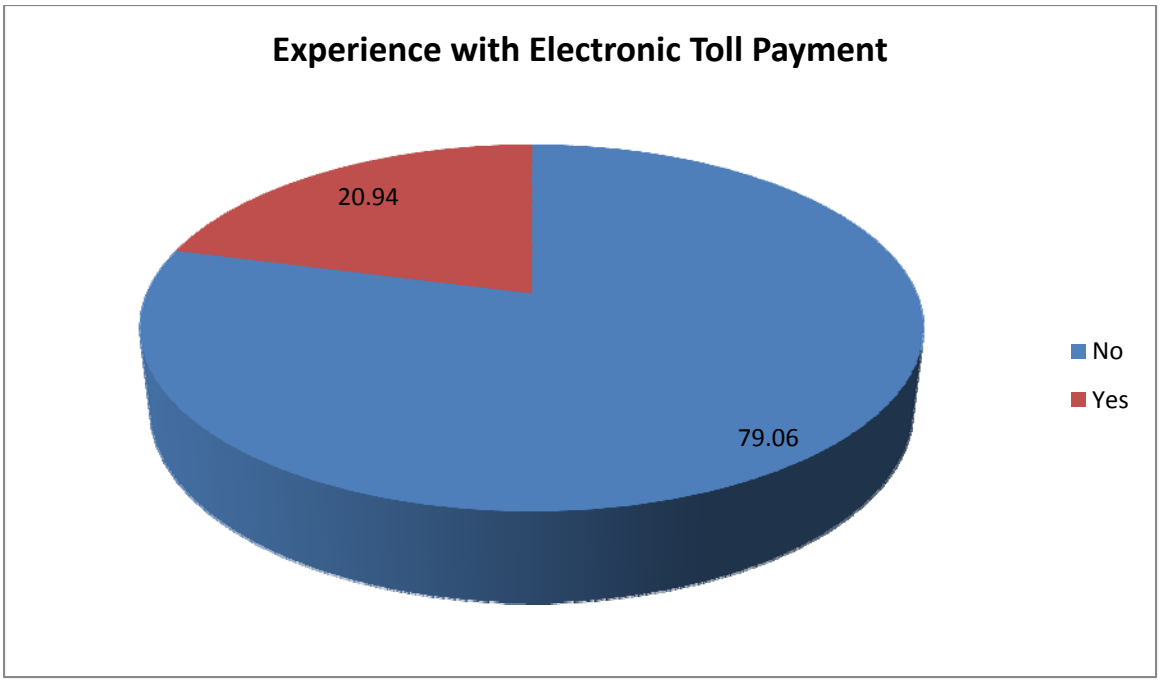


Figure 4-17 : Experience with Electronic toll payment (F1)

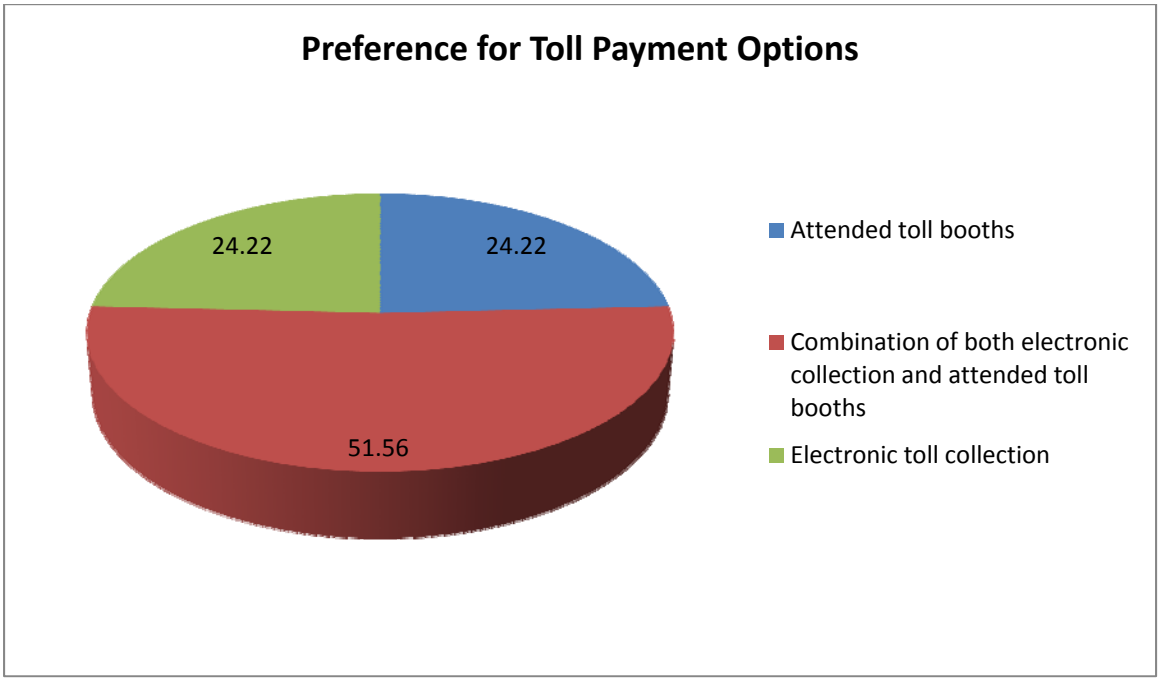


Figure 4-18 : Preference forToll Payment Options (F2)

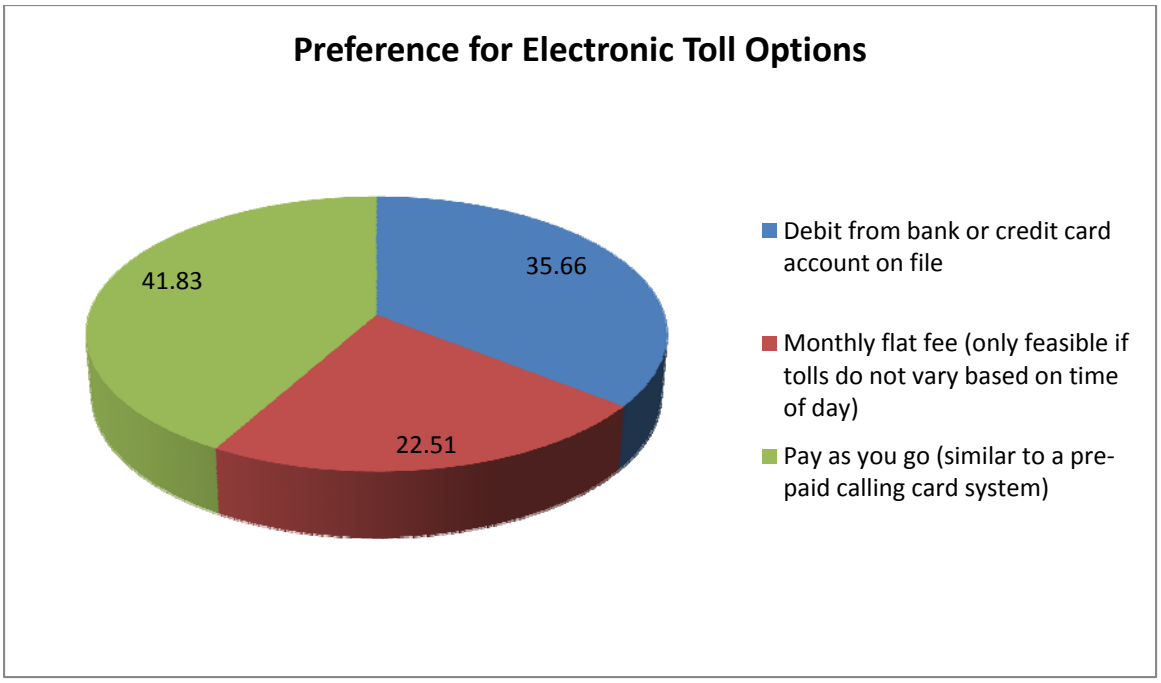


Figure 4-19: Preference for Electronic Toll Payment Options (F3)

A plurality of the respondents support Pay as you go system and a slight lower proportion of respondents were ready to accept the direct debit, which again indicates lack of privacy related concerns over these payments (See Figure 4-19). The lowest preference was for the monthly flat fee systems indicating that the large portion of the respondents don't expect to be regular users of the toll road system.

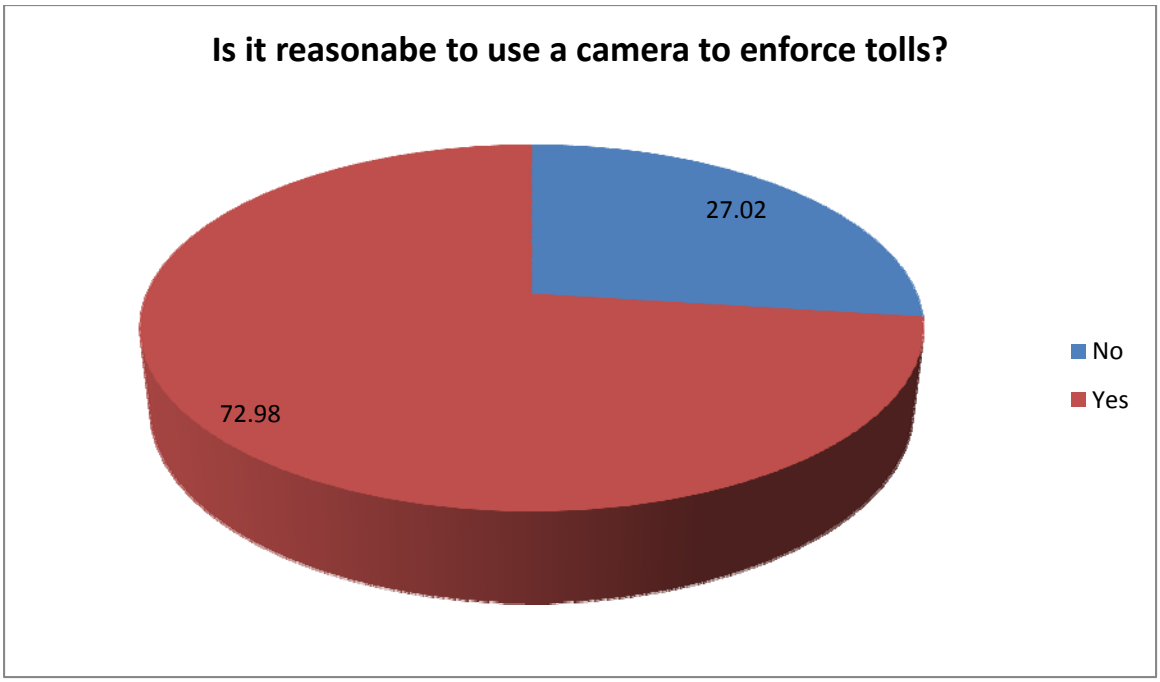


Figure 4-20 : Opinion about Use of Cameras to Enforce Tolls (F4)

Another question that has been raised in the literature was about privacy concerns. In our survey we found that almost 73% of the respondents thought it was reasonable to enforce the toll payments using camera. This combined with the fact that mileage based fee was one of the more popular solutions to deal with funding shortfalls seems to indicate that some of the privacy concerns are not as widespread as anticipated.

## 4.7 Logistic Regression Models

The next step in the analysis was to estimate logistic regression models using the, "surveylogistic" procedure of the SAS/STAT statistical package (SAS Institute, 2004). These models help assess the respondents characteristics and other factors associated with toll road preferences. The procedure provides the maximum likelihood estimates for model coefficients. All models estimated in this analysis are binary logit, meaning model coefficients indicate support or lack of support for a proposition. Positive values of coefficients indicate higher likelihood of support and negative values indicate higher likelihood of not supporting the proposition. A specific category is compared with the designated base category. The estimated models are described in subsequent sections of this chapter.

The two most important questions based on the research objectives of this effort were if respondents will support i) charging of tolls on new roads/lanes (E5) and ii) conversion of HOV lanes to HOT lanes (E6). In the logistic regression models, responses to these questions are used as binary dependent variables in the analysis. The independent variables used in the analysis are the information provided by the respondents in the weighted data. In addition to these two questions two more logistic regression models are estimated. The dependent variables for the two models were based on if the respondents will support i) using toll revenues for general improvements vs. only on the specific highway/facility where the toll is collected (D6), i.e., wider distribution of toll revenues and ii) at least private operation of toll roads (E7). Note that

while the responses to questions E5, E6, and D6 were in binary format and could be used directly to estimate the logistic regression model, there were four possible responses to question E7 of the survey instrument on ownership and operation of toll roads. These responses were transformed into a binary dependent variable, details of which are provided with the model details in relevant sections of this chapter.

### 4.7.1 Variables Selection Procedure

The independent variables used to explain the binary dependent variables are listed in Table 4-12.

Table 4-12: Independet Variables Used in the Logistic Regression Analysis

| Categorical Variable | Variable Categories | Categorical Variable | Variable Categories |
|---|---|---|---|
| **Age Group*** | 18-24 | **Hours Driven Per Day** | < 30 minutes |
| | 25-34 | | 30 minutes ≤Duration < 1 hour |
| | 35-44 | | 1 hour ≤Duration < 90 minutes |
| | 45-54 | | 90 minutes ≤Duration < 2 hours |
| | 55-64 | | > 2 hours |
| | 65+ | **Proportion of Congested Driving** | Less than 30% |
| **Education Level*** | College Graduate or Higher | | 30-50% |
| | Some College | | 51-75% |
| | High School Diploma/GED | | More than 75% |
| | Less than High School Diploma | **Quality of Personal Trips** | Very satisfactory |
| **Income Group*** | Less than $25,000 | | Satisfactory |
| | $25,000-49,999 | | Slightly satisfactory |
| | $50,000-74,999 | | Slightly unsatisfactory |
| | $75,000-99,999 | | Unsatisfactory |
| | 100000+ | | Very unsatisfactory |
| **Own/Rent** | Own | **Auto Availability** | Always |
| | Rent | | Most of the time |
| **Miles Driven Per Day** | ≤ 10 miles | | Occasionally |
| | 10 miles < Distance ≤ 20 miles | **Truck Traffic a Problem?** | No |
| | 20 miles < Distance ≤ 30 miles | | Yes |
| | 30 miles < Distance ≤ 40 miles | **Transportation Spending** | Too little |
| | 40 miles < Distance ≤ 50 miles | | About the right amount |
| | > 50 miles | | Too much |
| **Experience with So. Cal. Toll Roads** | None | **Government Role in the Economy** | Less than needed |
| | Negative | | Just right |
| | Mixed | | More than needed |
| | Positive | **Paid Toll Electronically** | No |

| Categorical Variable | Variable Categories | Categorical Variable | Variable Categories |
|---|---|---|---|
| **General View of Congestion** | Severe | | Yes |
| | Moderate | **Camera Enforcement** | No |
| | Mild | | Yes |
| | No congestion | | |

The asterisk in the table above indicates that the corresponding categorical variable was not used with the categories specified in the original survey instrument. The variable was used with the categories shown in

Table 4-12; with the new variable having higher numbers of observations in each of the resulting categories. Note that while all the listed independent variables were initially used in the analysis; some of these variables were excluded from the final logistic regression models based on their statistical significance in explaining the dependent variable.

The procedure used to identify the statistical significance was as follows: First, a binary logistic regression model was estimated with all variables listed in Table 4-12 included in the analysis. For all these variables the p-value corresponding to type 3 error analysis was estimated. The type 3 error analysis of effects is the Wald's test for the null hypothesis $\beta=0$. This is essentially testing for any difference between the categories of the same variable with respect to the target variable (SAS Institute, 2004). For any variable, a p-value higher than 0.10 indicates that at the 90% confidence level there is no significant difference in any of the explanatory variable categories. By examining the p-values corresponding to the type 3 error analysis, the variable with the highest p-value was removed from the model and a subsequent model was estimated. If the value of the Aikake Information Criteria (AIC), a measure of model fit (lower value indicates better fit), reduced for the revised model the next model was estimated by removing the variable with the highest p-value among the remaining variables. This procedure was repeated until the AIC parameter for the model did not reduce or all parameters in the model had a p-value less than 0.10. The same procedure was carried out for all four models. In the subsequent sections of this chapter the final models are discussed in detail.

### 4.7.2 Support for Charging Tolls for New Highways or New Highway Lanes

This model was estimated to assess the characteristics of the respondents who are more likely to support charging of tolls for new lanes/highways. Table 4-13 lists the variables included in the model based on the variable selection method described above. The variables shown in the table are in the order of significance with the most significant variable listed first. The most important variable is past experience with southern California toll roads, followed by age group and driving routines based on time and distance driven each day. Note that this is essentially testing for a difference between the groups of each variable. To observe the effect of different categories of these variables on the likelihood of supporting the toll roads/lanes; coefficients of the binary logistic regression models need to be examined. These coefficients are shown in Table 4-14.

Table 4-13: Variables Included in the Model: Support for Charging Tolls for New Highways or New Highway Lanes

| Variable | Wald Chi-Square | p-value |
|---|---|---|
| Experience with So. Cal. Toll Roads | 23.528 | <.0001 |
| Age Group | 19.596 | 0.0015 |
| Miles Driven Per Day | 19.055 | 0.0019 |
| Hours Driven Per Day | 16.098 | 0.0029 |
| Income Group | 15.831 | 0.0033 |
| Proportion of Congested Driving | 13.443 | 0.0038 |
| Education Level | 11.188 | 0.0108 |
| General View of Congestion | 8.9706 | 0.0297 |
| Camera Enforcement | 8.2008 | 0.0042 |
| Paid Toll Electronically | 6.6537 | 0.0099 |
| Government Role in the Economy | 4.4234 | 0.1095 |
| Truck Traffic a Problem? | 3.9888 | 0.0458 |

Note: Variables included in the model in order of significance based on type 3 error analysis

The table showing the model coefficient includes the parameter estimate, standard error, chi square test statistic and corresponding p-value. A p-value higher than 0.10 indicates that the variable category is not significantly different from the base case. A base case is the category against which all others are compared for the respective independent variable. Base case categories were selected as one of the extreme categories in the range on condition that the category has a sufficient number of observations. Individual model result tables identify the base case category for each variable., In Table 4-14, for instance, comparing the oldest respondent age cohort (65+; the base case) with the 25-34 age cohort indicates those in the latter age group are more likely to support tolls. It appears that respondents in the two cohorts, 35-44 and 45-54, are less likely to support tolls. Interestingly there are no significant differences between those aged 65+, and either the 55-64 year, or the youngest cohort (18-24 year age group). This lack of difference in their preferences might be related to the auto availability for these cohorts. Not only do the toll attitudes vary by age-group; the relationship is non-monotonous. It justifies the choice of using these variables on a nominal scale instead of ordinal scale.

In terms of income groups the respondents in cohort “Income>$100,000” (the base case) are not significantly different from the two income groups in the middle ($25,000-49,999 and $50,000-74999). The income group most likely to support new toll roads/lanes is between incomes $75,000-99,999. “Income<$25,000” are least likely to support new toll roads/lanes which reinforces the perception that the lower income individuals consider tolls to be akin to a regressive tax.

It is interesting that the relationship between driving duration/distance and inclination to support toll is not monotonous in nature. There is no significant difference between respondents driving more than 2 hours (the base case) and those driving less than 30 minutes per day.. However, those who drive between 30 to 90 minutes are significantly more likely to support tolls while those driving between 90 minutes and 2 hours are less likely to support tolls.

Similarly, there is no significant difference between the opinions of respondents driving more than 50 miles (base case), and of the two cohorts driving 30-40 and 40-50 miles. Respondents driving less than 10 miles are most likely to support tolls; while the respondents driving between 20-30 miles are least likely to support new toll roads/lanes.

Table 4-14: Maximum Likelihood Estimates for Model Coefficients: Support for Charging Tolls for New Highways or New Highway Lanes

| Variable | Level Comparison (Base Category) | Estimate | Standard Error | Chi-Square | p-value |
|---|---|---|---|---|---|
| Age Group | **18-24 (65+)** | 0.0314 | 1.0392 | 0.0009 | 0.9759 |
| | **25-34 (65+)** | 4.2115 | 1.3459 | 9.7915 | 0.0018 |
| | **35-44 (65+)** | -1.898 | 0.9976 | 3.6208 | 0.0571 |
| | **45-54 (65+)** | -4.32 | 1.227 | 12.397 | 0.0004 |
| | **55-64 (65+)** | -1.064 | 1.0867 | 0.9582 | 0.3276 |
| Education Level | **High School Diploma/GED (College Grad. or Higher)** | 5.4147 | 2.0158 | 7.2151 | 0.0072 |
| | **Less than High School Diploma (College Grad. or Higher)** | 2.0477 | 1.4581 | 1.9722 | 0.1602 |
| | **Some College (College Grad. or Higher)** | -2.603 | 0.8831 | 8.6872 | 0.0032 |
| Income Group | **$25,000-49,999 ($100,000+)** | -0.918 | 0.7801 | 1.3835 | 0.2395 |
| | **$50,000-74,999 ($100,000+)** | 1.1629 | 1.4172 | 0.6734 | 0.4119 |
| | **$75,000-99,999 ($100,000+)** | 5.1664 | 1.8021 | 8.2194 | 0.0041 |
| | **Less than $25,000 ($100,000+)** | -7.625 | 2.3493 | 10.533 | 0.0012 |
| Miles Driven Per Day | **≤ 10 miles (>50 miles)** | 3.3142 | 0.9014 | 13.517 | 0.0002 |
| | **10 miles < Distance ≤ 20 miles (>50 miles)** | -0.645 | 1.2203 | 0.2795 | 0.597 |
| | **20 miles < Distance ≤ 30 miles (>50 miles)** | -3.764 | 1.7954 | 4.3958 | 0.036 |
| | **30 miles < Distance ≤ 40 miles (>50 miles)** | 0.8304 | 1.1092 | 0.5604 | 0.4541 |
| | **40 miles < Distance ≤ 50 miles (>50 miles)** | 1.3094 | 0.9683 | 1.8286 | 0.1763 |
| Hours Driven Per Day | **< 30 minutes (>2 hours)** | -0.939 | 0.9657 | 0.9461 | 0.3307 |
| | **30 minutes ≤Duration < 1 hour (>2 hours)** | 1.3873 | 0.7118 | 3.7984 | 0.0513 |
| | **1 hour ≤Duration < 90 minutes (>2 hours)** | 5.5358 | 1.4515 | 14.545 | 0.0001 |
| | **90 minutes ≤Duration < 2 hours (>2 hours)** | -1.717 | 0.8943 | 3.6863 | 0.0549 |
| Proportion of Congested Driving | **30-50% (Less than 30%)** | -2.872 | 1.5179 | 3.58 | 0.0585 |
| | **51-75% (Less than 30%)** | 3.6911 | 1.4986 | 6.0669 | 0.0138 |
| | **More than 75% (Less than 30%)** | -4.388 | 1.4502 | 9.1563 | 0.0025 |
| General View of Congestion | **Mild Congestion (Severe Congestion)** | 1.2302 | 0.8099 | 2.307 | 0.1288 |
| | **Moderate Congestion (Severe Congestion)** | 2.6277 | 0.9277 | 8.0239 | 0.0046 |
| | **No Congestion (Severe Congestion)** | -6.455 | 2.3367 | 7.6322 | 0.0057 |

| Variable | Level Comparison (Base Category) | Estimate | Standard Error | Chi-Square | p-value |
|---|---|---|---|---|---|
| Truck Traffic a Problem? | **Yes (No)** | -1.444 | 0.7229 | 3.9888 | 0.0458 |
| Government Role in the Economy | **Less than I prefer (Just Right)** | 1.893 | 0.9241 | 4.1959 | 0.0405 |
| | **More than I prefer (Just Right)** | -0.059 | 0.7789 | 0.0058 | 0.9395 |
| Paid Toll Electronically | **Yes (No)** | -1.881 | 0.7293 | 6.6537 | 0.0099 |
| Experience with So. Cal. Toll Roads | **Mixed (None)** | 0.8443 | 0.8823 | 0.9157 | 0.3386 |
| | **Negative (None)** | -2.237 | 1.2514 | 3.1956 | 0.0738 |
| | **Positive (None)** | 4.1224 | 1.0696 | 14.855 | 0.0001 |
| Camera Enforcement | **Yes (No)** | 2.6122 | 0.9122 | 8.2008 | 0.0042 |

Respondents' perception of overall congestion is expectedly related to their attitude about toll roads. Respondents with the general view that there is "no Congestion" in the region were significantly less likely to support toll roads compared to the respondents who believe there is severe congestion in the inland empire. Those who view the congestion to be moderate are more likely to support new toll roads/lanes. At the 90% confidence level there is not a significant difference between the base case and those who believe congestion to be mild. Respondents who believe that truck traffic is a problem are less likely to support toll roads.

Respondents who believe that government's role in the economy is less than they prefer are more likely to support toll roads compared to the respondents who believe that the government role in the economy is just right (base case). There is no significant difference between the base case and the respondents who think government's role is larger than they prefer.

It can be clearly seen that the respondents with positive toll experience were significantly more likely to support tolls for new roads/lanes; while respondents with negative experience were significantly less likely to do so. Note that the base case for this variable is the respondents with no experience with southern California toll roads. The respondents with mixed experience aren't significantly different from respondents with no experience. The respondents who believe it is reasonable to enforce tolls using cameras are also more likely to support tolls in general.

### 4.7.3 Support for HOV Lane to HOT Lane Conversion

This model was estimated to assess the characteristics of the respondents who support conversion of existing HOV lanes into HOT lanes. It was found to be one of the more popular measures of dealing with congestion among the respondents earlier in this chapter. Table 4-15 lists the variables included in the model in the order of significance with the most significant variable first. To separate respondents who support HOV to HOT lane conversion vs. those who don't the most important variable is past experience with southern California toll roads. This was also the most significant variable in Table 4-13. However, the variables shown in Table 4-15 also include auto availability as the second most significant attribute in the model. The insight into different categories of variables on the likelihood of supporting HOV lane to HOT lane conversion can be obtained by examining the individual model coefficients listed in Table 4-16.

Compared to the oldest respondent age cohort (65+) the younger age cohort of 25-34 is more likely to support conversion to HOT lanes. This group was also more likely to support new toll roads/lanes (as discussed in the last section). The youngest age cohort on the other hand (18-24) is significantly less likely to support the conversion. It may be associated with this demographic group's commitment to the environment and perceived tendency of the HOT lanes to 'tolerate' single occupancy driving. It appears that respondents from the remaining cohorts are not significantly different from the base case (65+ age group), with all p-values higher than 0.10.

In terms of income groups the respondents with income more than $100,000 (the base case) are not significantly different from the lowest income group (income less than $25,000). The two income groups in the middle ($25,000-49,999 and $50,000-74,999) are significantly less likely to support the conversion. The income group most likely to support the conversion is again between incomes $75,000-99,999. Respondents in the same income cohort also favored the idea of tolls for new roads/lanes. It is interesting to note that the income group less than $25,000 are least likely to support tolls on new roads/lanes but are not as opposed to HOV lane to HOT lane conversion. A possible reason for that might be that the respondents in this cohort realize that the conversion does not affect the existing normal lanes.

A variable that was not significant in the model for new toll roads/lanes in the previous section was auto availability. Compared to the base case (respondents who always have car available) the respondents who have car available only occasionally are less likely to support the conversion. It indicates that these respondents prefer that single occupancy vehicles do not occupy the car pool lanes.

Table 4-15: Variables Included in the Model: Support for HOV Lane to HOT Lane Conversion

| Categorical Variable | Wald Chi-Square | p-value |
|---|---|---|
| Experience with So. Cal. Toll Roads | 23.246 | <.0001 |
| Auto Availability | 22.532 | <.0001 |
| Miles Driven Per Day | 21.628 | 0.0006 |
| Hours Driven Per Day | 21.082 | 0.0003 |
| Age Group | 17.931 | 0.003 |
| Income Group | 16.571 | 0.0023 |
| General View of Congestion | 14.513 | 0.0023 |

Note: Variables included in the model in order of significance based on type 3 error analysis

Compared to the oldest respondent age cohort (65+) the younger age cohort of 25-34 is more likely to support conversion to HOT lanes. This group was also more likely to support new toll roads/lanes (as discussed in the last section). The youngest age cohort on the other hand (18-24) is significantly less likely to support the conversion. It may be associated with this demographic group's commitment to the environment and perceived tendency of the HOT lanes to 'tolerate' single occupancy driving. It appears that respondents from the remaining cohorts are not significantly different from the base case (65+ age group), with all p-values higher than 0.10.

In terms of income groups the respondents with income more than $100,000 (the base case) are not significantly different from the lowest income group (income less than $25,000). The two income groups in the middle ($25,000-49,999 and $50,000-74,999) are significantly less likely to support the conversion. The income group most likely to support the conversion is again between incomes $75,000-99,999. Respondents in the same income cohort also favored the idea of tolls for new roads/lanes. It is interesting to note that the income group less than $25,000 are least likely to support tolls on new roads/lanes but are not as opposed to HOV lane to HOT lane conversion. A possible reason for that might be that the respondents in this cohort realize that the conversion does not affect the existing normal lanes.

A variable that was not significant in the model for new toll roads/lanes in the previous section was auto availability. Compared to the base case (respondents who always have car available) the respondents who have car available only occasionally are less likely to support the conversion. It indicates that these respondents prefer that single occupancy vehicles do not occupy the car pool lanes.

Table 4-16: Maximum Likelihood Estimates for Model Coefficients: Support for HOV Lane to HOT Lane Conversion

| Variable | Level Comparison (Base Category) | Estimate | Standard Error | Wald Chi-Square | P-value |
|---|---|---|---|---|---|
| Age Group | **18-24 (65+)** | -3.948 | 1.229 | 10.319 | 0.0013 |
| | **25-34 (65+)** | 3.9304 | 1.1787 | 11.119 | 0.0009 |
| | **35-44 (65+)** | -0.383 | 0.8153 | 0.2203 | 0.6388 |
| | **45-54 (65+)** | -0.598 | 0.8042 | 0.5521 | 0.4575 |
| | **55-64 (65+)** | 1.0035 | 1.2961 | 0.5994 | 0.4388 |
| Income Group | **$25,000-49,999 ($100,000+)** | -2.989 | 0.9567 | 9.7573 | 0.0018 |
| | **$50,000-74,999 ($100,000+)** | -2.232 | 0.957 | 5.4396 | 0.0197 |
| | **$75,000-99,999 ($100,000+)** | 5.6203 | 1.9291 | 8.4883 | 0.0036 |
| | **Less than $25,000 ($100,000+)** | -0.364 | 1.5515 | 0.055 | 0.8146 |
| Auto Availability | **Most of the time (Always)** | -2.835 | 1.3747 | 4.2538 | 0.0392 |
| | **Occasionally (Always)** | 6.4789 | 1.7285 | 14.049 | 0.0002 |
| Miles Driven Per Day | **≤ 10 miles (>50 miles)** | 2.4814 | 0.9694 | 6.5516 | 0.0105 |
| | **10 miles < Distance ≤ 20 miles (>50 miles)** | 3.8511 | 0.9494 | 16.455 | <.0001 |
| | **20 miles < Distance ≤ 30 miles (>50 miles)** | -1.247 | 0.8846 | 1.9853 | 0.1588 |
| | **30 miles < Distance ≤ 40 miles (>50 miles)** | -0.932 | 2.1388 | 0.1898 | 0.6631 |
| | **40 miles < Distance ≤** | -0.545 | 1.0342 | 0.2779 | 0.5981 |

| Variable | Level Comparison (Base Category) | Estimate | Standard Error | Wald Chi-Square | P-value |
|---|---|---|---|---|---|
| | 50 miles (>50 miles) | | | | |
| Hours Driven Per Day | < 30 minutes (>2 hours) | -3.812 | 1.1431 | 11.118 | 0.0009 |
| | 30 minutes ≤Duration < 1 hour (>2 hours) | -0.366 | 0.7205 | 0.2575 | 0.6118 |
| | 1 hour ≤Duration < 90 minutes (>2 hours) | 5.7158 | 1.9382 | 8.6973 | 0.0032 |
| | 90 minutes ≤Duration < 2 hours (>2 hours) | 3.4243 | 1.3901 | 6.0678 | 0.0138 |
| General View of Congestion | **Mild Congestion (Severe Congestion)** | 3.5427 | 1.0765 | 10.829 | 0.001 |
| | **Moderate Congestion (Severe Congestion)** | 1.5051 | 0.7598 | 3.9246 | 0.0476 |
| | **No Congestion (Severe Congestion)** | -4.804 | 2.0762 | 5.3535 | 0.0207 |
| Experience with So. Cal. Toll Roads | **Mixed (None)** | 0.686 | 0.9294 | 0.5448 | 0.4605 |
| | **Negative (None)** | -3.196 | 0.882 | 13.132 | 0.0003 |
| | **Positive (None)** | 3.1079 | 0.864 | 12.938 | 0.0003 |

Again, the relationship between duration/miles driven per day and inclination to support the HOV lane to HOT lane conversion is not monotonous in nature. Respondents who drive less than 30 minutes per day are significantly less likely to support the conversion to HOT lanes (compared to the base case respondents who drive more than 2 hours). However, respondents in the two cohorts who drive between 60-90 minutes and 90-120 minutes per day are significantly more likely to support the conversion. It is interesting to recall that the latter of these two groups was less likely to support the tolls for new roads/lanes in the previous section.

Respondents with the view, "no Congestion", were significantly less likely to support the conversion compared to the respondents who believe there is severe congestion in the inland empire. On the other hand the respondents who view the congestion to be mild and moderate are more likely to support the conversion.

It can be clearly seen that the respondents with positive toll experience on southern California toll roads are significantly more likely to support HOV lane to HOT lane conversion; while respondents with negative experience are almost equally less likely to do so. Note that the base case for this variable is the respondents with no experience with southern California toll roads. The respondents with mixed experience are not significantly different from respondents with no experience. From the two models we have seen so far respondents' experience with southern California toll roads is a very significant factor and a positive previous experience makes them

more likely to support new toll roads/lanes and a negative experience makes them less likely to do so.

### 4.7.4 Support for Private Operation of Toll Roads

The question on which the binary logistic regression model is based (E7 of the original survey instrument) gave respondents four different choices. These choices were narrowed down to two options which indicated whether or not the respondent accepted the idea of private operation of toll roads. The mapping of the original responses and the dependent variable for the model is shown in Table 4-17.

Table 4-17: The Mapping of Binary Dependent Variable on the Original Responses to E7

| Response to E7: Preference for ownership and operation of toll roads | Binary Variable: pvt_toll_op |
|---|---|
| **Publicly owned and publicly operated** | 0 |
| **No preference** | 1 |
| **Privately owned and privately operated** | 1 |
| **Publicly owned and privately operated** | 1 |

This model was estimated to assess the characteristics of the respondents who are accepting of at least private operation of toll roads. It is interesting that for this classification model the most important variable was general view of congestion followed by auto availability (see Table 4-18). Past experience with southern California toll roads is still significant but not as much as it was in the previous two models. The insight into different categories of variables on the likelihood of being accepting of the private operation of toll roads is obtained by examining the individual model coefficients listed in Table 4-19. Compared to the base case of respondents with college degree or higher the respondents with some college education are less likely to be open to privately operated toll roads. There is no significant difference between the base case and the respondents with less than high school diploma. On the other hand respondents with high school diploma/GED are more likely to be open to the idea of private operation of toll roads. In terms of the income level; respondents with less than $25,000 income are significantly less likely to be open to private operation of toll roads (Compared to the base case of "Income > $100,000").

In terms of the daily miles driven respondents who drive 10-20 miles per day are more likely to be of accepting of private toll road operations. At the 90% confidence interval there is no significant difference between the opinions of respondents who drive less than 10 miles and those who drive more than 50 miles (the base case). Respondents who drive more than 75% or 51-75% in congestion are more likely to be accepting of private toll operation. However, compared to the base case (less than 30% congested driving) respondents who did 31-50% of their driving in congestion are less likely to be accepting of private operation.
Respondents who reported their personal trips to be "slightly satisfactory" or "slightly unsatisfactory" were less accepting of the private operation of toll roads compared to the base

case respondents who reported their trips to be very unsatisfactory. All the other categories were not significantly different from the base case.

Table 4-18: Variables Included in the Model: Support for at least Private Operation of Toll Roads

| Categorical Variable | Wald Chi-Square | p-value |
|---|---|---|
| General View of Congestion | 65.704 | <.0001 |
| Auto Availability | 52.625 | <.0001 |
| Hours Driven Per Day | 33.283 | <.0001 |
| Income Group | 29.627 | <.0001 |
| Proportion of Congested Driving | 25.377 | <.0001 |
| Miles Driven Per Day | 24.764 | 0.0002 |
| Education Level | 20.3 | 0.0001 |
| Quality of Personal Trips | 19.964 | 0.0013 |
| Truck Traffic a Problem? | 17.131 | <.0001 |
| Transportation Spending | 14.669 | 0.0007 |
| Paid Toll Electronically | 13.925 | 0.0002 |
| Experience with So. Cal. Toll Roads | 7.2712 | 0.0637 |

Note: Variables included in the model in order of significance based on type 3 error analysis

Compared to the base case of respondents with college degree or higher the respondents with some college education are less likely to be open to privately operated toll roads. There is no significant difference between the base case and the respondents with less than high school diploma. On the other hand respondents with high school diploma/GED are more likely to be open to the idea of private operation of toll roads. In terms of the income level; respondents with less than $25,000 income are significantly less likely to be open to private operation of toll roads (Compared to the base case of "Income > $100,000").

In terms of the daily miles driven respondents who drive 10-20 miles per day are more likely to be of accepting of private toll road operations. At the 90% confidence interval there is no significant difference between the opinions of respondents who drive less than 10 miles and those who drive more than 50 miles (the base case). Respondents who drive more than 75% or 51-75% in congestion are more likely to be accepting of private toll operation. However, compared to the base case (less than 30% congested driving) respondents who did 31-50% of their driving in congestion are less likely to be accepting of private operation.

Respondents who reported their personal trips to be "slightly satisfactory" or "slightly unsatisfactory" were less accepting of the private operation of toll roads compared to the base case respondents who reported their trips to be very unsatisfactory. All the other categories were not significantly different from the base case.

Table 4-19: Maximum Likelihood Estimates for Model Coefficients: Support for at least Private Operation of Toll Roads

| Variable | Level Comparison (Base Category) | Estimate | Standard Error | Wald Chi-Square | p-value |
|---|---|---|---|---|---|
| Education Level | **High School Diploma/GED (College Grad. or Higher)** | 7.1953 | 2.074 | 12.036 | 0.0005 |
| | **Less than High School Diploma (College Grad. or Higher)** | -0.13 | 1.9212 | 0.0046 | 0.946 |
| | **Some College (College Grad. or Higher)** | -4.342 | 1.1477 | 14.311 | 0.0002 |
| Income Group | **$25,000-49,999 ($100,000+)** | 0.7846 | 0.7398 | 1.1248 | 0.2889 |
| | **$50,000-74,999 ($100,000+)** | 4.3333 | 1.415 | 9.3782 | 0.0022 |
| | **$75,000-99,999 ($100,000+)** | 3.4421 | 1.3943 | 6.0946 | 0.0136 |
| | **Less than $25,000 ($100,000+)** | -13.52 | 2.6484 | 26.055 | <.0001 |
| Auto Availability | **Most of the time** | -8.872 | 1.6702 | 28.212 | <.0001 |
| | **Occasionally** | 16.262 | 2.2789 | 50.921 | <.0001 |
| Miles Driven Per Day | **≤ 10 miles (>50 miles)** | -1.84 | 1.1666 | 2.4871 | 0.1148 |
| | **10 miles < Distance ≤ 20 miles (>50 miles)** | 6.0443 | 1.4329 | 17.794 | <.0001 |
| | **20 miles < Distance ≤ 30 miles (>50 miles)** | -2.624 | 0.8852 | 8.7881 | 0.003 |
| | **30 miles < Distance ≤ 40 miles (>50 miles)** | -0.73 | 1.2396 | 0.3465 | 0.5561 |
| | **40 miles < Distance ≤ 50 miles (>50 miles)** | 1.8392 | 2.1447 | 0.7354 | 0.3911 |
| Hours Driven Per Day | **< 30 minutes (>2 hours)** | -3.118 | 1.4582 | 4.5728 | 0.0325 |
| | **30 minutes ≤Duration < 1 hour (>2 hours)** | -1.573 | 1.2295 | 1.6372 | 0.2007 |
| | **1 hour ≤Duration < 90 minutes (>2 hours)** | 7.3302 | 1.6072 | 20.802 | <.0001 |
| | **90 minutes ≤Duration < 2 hours (>2 hours)** | 6.4333 | 1.5547 | 17.124 | <.0001 |
| Proportion of Congested Driving | **30-50% (Less than 30%)** | -13.21 | 2.8123 | 22.079 | <.0001 |
| | **51-75% (Less than 30%)** | 8.9225 | 3.5812 | 6.2076 | 0.0127 |
| | **More than 75% (Less than 30%)** | 10.059 | 2.6585 | 14.316 | 0.0002 |
| Quality of Personal Trips | **Satisfactory (very unsatisfactory)** | 1.0561 | 1.2257 | 0.7424 | 0.3889 |
| | **Slightly satisfactory (very unsatisfactory)** | -4.528 | 1.3815 | 10.744 | 0.001 |
| | **Slightly unsatisfactory (very unsatisfactory)** | -3.1 | 1.3031 | 5.6586 | 0.0174 |
| | **Unsatisfactory (very unsatisfactory)** | -0.811 | 1.8195 | 0.1984 | 0.656 |
| | **Very satisfactory (very** | 0.8464 | 2.4836 | 0.1161 | 0.7333 |

| Variable | Level Comparison (Base Category) | Estimate | Standard Error | Wald Chi-Square | p-value |
|---|---|---|---|---|---|
| | **unsatisfactory)** | | | | |
| General View of Congestion | **Mild Congestion (Severe Congestion)** | 9.3091 | 1.5495 | 36.093 | <.0001 |
| | **Moderate Congestion (Severe Congestion)** | 8.6025 | 1.5585 | 30.469 | <.0001 |
| | **No Congestion (Severe Congestion)** | -20.84 | 2.8051 | 55.202 | <.0001 |
| Truck Traffic a Problem? | **Yes (No)** | -2.293 | 0.5539 | 17.131 | <.0001 |
| Transportation Spending | **Too little (Just Right)** | -3.566 | 0.9628 | 13.714 | 0.0002 |
| | **Too much (Just Right)** | 0.7437 | 0.7929 | 0.8796 | 0.3483 |
| Paid Toll Electronically | **Yes (No)** | 2.1106 | 0.5656 | 13.925 | 0.0002 |
| Experience with So. Cal. Toll Roads | **Mixed (None)** | 4.1908 | 1.67 | 6.2974 | 0.0121 |
| | **Negative (None)** | -2.5 | 0.9808 | 6.4949 | 0.0108 |
| | **Positive (None)** | -0.711 | 0.6673 | 1.136 | 0.2865 |

Respondents with the view that there is "no Congestion" were significantly less likely to support private operation compared to the respondents who believe there is severe congestion in the inland empire. On the other hand respondents who view the congestion to be mild or moderate are more open to the idea. Similarly, respondents who view truck traffic to be a problem are less likely to be supportive of privately operated toll roads.

There is no significant difference between respondents who believe transportation spending is just right and those who believe it is too much. However, respondents who think transportation spending is too little are less likely to be open to the idea of privately operated toll roads. This result is not surprising since this group of respondents want a larger role for the public sector in funding transportation.

Respondents who have paid toll electronically are also more likely to be open to the idea of private operation of toll roads. Similarly, respondents with mixed toll experience on southern California toll roads are significantly more likely to be accepting of private operation of toll roads while respondents with negative experience are less likely. It is noteworthy that the base case for this variable comprises respondents with no experience with southern California toll roads and that there is no significant difference between these respondents and the ones who have had positive experiences.

### 4.7.5 Wider Distribution of Toll Revenues

Education level is the most significant variable affecting support for wider distribution of toll revenues for the general improvement of transportation infrastructure. Toll experience is also significant followed by income and age group. All significant variables are shown in Table 4-20.

Table 4-20: Variables Included in the Model: Support for Wider Distribution of Toll Revenues

| Categorical Variable | Wald Chi-Square | p-value |
|---|---|---|
| Education Level | 129.13 | <.0001 |
| Experience with So. Cal. Toll Roads | 23.147 | <.0001 |
| Income Group | 19.002 | 0.0008 |
| Age Group | 15.686 | 0.0078 |
| Miles Driven Per Day | 15.236 | 0.0094 |
| Transportation Spending | 13.459 | 0.0012 |
| Proportion of Congested Driving | 10.346 | 0.0158 |
| Paid Toll Electronically | 8.0102 | 0.0047 |
| Camera Enforcement | 5.7976 | 0.016 |
| Own/Rent | 5.3685 | 0.0205 |

Note: Variables included in the model in order of significance based on type 3 error analysis

Table 4-21: Maximum Likelihood Estimates for Model Coefficients: Support for Wider Distribution of Toll Revenues

| Variable | Level Comparison (Base Category) | Estimate | Standard Error | Wald Chi-Square | p-value |
|---|---|---|---|---|---|
| Age Group | **18-24 (65+)** | -0.467 | 1.1115 | 0.1761 | 0.6747 |
| | **25-34 (65+)** | 3.9151 | 1.2352 | 10.047 | 0.0015 |
| | **35-44 (65+)** | 1.6325 | 1.186 | 1.8948 | 0.1687 |
| | **45-54 (65+)** | 0.951 | 0.8264 | 1.3243 | 0.2498 |
| | **55-64 (65+)** | 0.7452 | 1.1711 | 0.4049 | 0.5245 |
| Education Level | **High School Diploma/GED (College Grad. or Higher)** | -11.89 | 1.8896 | 39.612 | <.0001 |
| | **Less than High School Diploma (College Grad. or Higher)** | 18.715 | 1.6627 | 126.69 | <.0001 |
| | **Some College (College Grad. or Higher)** | -3.311 | 1.173 | 7.9657 | 0.0048 |
| Income Group | **$25,000-49,999 ($100,000+)** | 3.2399 | 1.2003 | 7.2862 | 0.0069 |
| | **$50,000-74,999 ($100,000+)** | -3.967 | 1.0309 | 14.811 | 0.0001 |
| | **$75,000-99,999 ($100,000+)** | -3.756 | 1.1954 | 9.8728 | 0.0017 |
| | **Less than $25,000 ($100,000+)** | 6.2484 | 1.6928 | 13.625 | 0.0002 |
| Own/Rent | **Own (Rent)** | 1.6952 | 0.7316 | 5.3685 | 0.0205 |
| Miles Driven Per Day | **≤ 10 miles (>50 miles)** | 0.2132 | 1.2348 | 0.0298 | 0.8629 |
| | **10 miles < Distance ≤ 20 miles (>50 miles)** | 3.8987 | 1.2503 | 9.7237 | 0.0018 |
| | **20 miles < Distance ≤ 30 miles (>50 miles)** | -0.139 | 0.9206 | 0.0228 | 0.88 |
| | **30 miles < Distance ≤ 40 miles** | 1.0156 | 1.4958 | 0.461 | 0.4971 |

| Variable | Level Comparison (Base Category) | Estimate | Standard Error | Wald Chi-Square | p-value |
|---|---|---|---|---|---|
| | **(>50 miles)** | | | | |
| | **40 miles < Distance ≤ 50 miles (>50 miles)** | -3.492 | 1.1925 | 8.5735 | 0.0034 |
| Proportion of Congested Driving | **30-50% (Less than 30%)** | 2.2055 | 0.9996 | 4.8686 | 0.0274 |
| | **51-75% (Less than 30%)** | -1.364 | 1.0062 | 1.8384 | 0.1751 |
| | **More than 75% (Less than 30%)** | 1.111 | 1.2586 | 0.7792 | 0.3774 |
| Transportation Spending | **Too little (Just Right)** | 3.2043 | 0.8849 | 13.113 | 0.0003 |
| | **Too much (Just Right)** | -4.544 | 1.3404 | 11.494 | 0.0007 |
| Paid Toll Electronically | **Yes (No)** | -1.539 | 0.5437 | 8.0102 | 0.0047 |
| Experience with So. Cal. Toll Roads | **Mixed (None)** | -1.909 | 0.8473 | 5.0761 | 0.0243 |
| | **Negative (None)** | -5.613 | 1.3164 | 18.181 | <.0001 |
| | **Positive (None)** | 2.651 | 0.9043 | 8.5946 | 0.0034 |
| Camera Enforcement | **Yes (No)** | -1.205 | 0.5003 | 5.7976 | 0.016 |

Model results indicate that the youngest and the oldest cohorts are similar in their opinions about a wider distribution of toll revenues on infrastructure projects other than the highway on which the tolls are collected. In fact, none of the age cohorts is significantly different from the base case (age 65+) except for the 25-34 age group. Respondents in age group 25-34 are more likely to support spending of the revenue on the infrastructure system.

In terms of the education level, respondents with less than high school diploma are more likely to support a wider distribution of toll revenues compared to the base case (college grad. or higher). The other two cohorts are significantly less likely to support wider toll revenue distribution.

The two income groups that are more likely to support a wider distribution of tolls are the cohorts with income less than $25,000 and those between $25,000 and $50,000. The two middle income groups are less likely to support wider distribution.

Home owners are more likely to support a wider distribution of toll revenues compared to renters. This is the only one of the four logistic regression models in which the variable indicating home ownership is significant.

It is also interesting that the respondents who believe that transportation spending is too little are more likely to support a wider distribution of toll revenues while those who believe there is too much transportation spending are less likely to support a wider distribution of toll revenues.

Respondents who have paid toll electronically are less likely to support the wider distribution. These respondents are likely to be more regular users of toll roads and therefore would like to see the toll revenues used for improving the same roads. It is also noteworthy that while previous toll experience is statistically significant, respondents with positive and negative experiences are

in disagreement. Respondents with a positive experience with toll roads are likely to support a wider distribution of toll revenues while those with a negative experience are highly likely to oppose a wider distribution of revenues.

## 4.8 Comparison of Logistic Regression Models

Table 4-22 is a summary of the p-values corresponding to various categories of the independent variables for the four models. Only the p-values that are lower than 0.10 (indicating significance relative to the base case) are shown in the table with the values corresponding to positive coefficients highlighted in yellow. The term "NA" in the table indicates that the variable itself was excluded from the logistic regression model while "-" represents statistical insignificance between that category and the base category of the variable. Only three variables, income level, miles driven per day, and past experience with southern California toll roads were consistently significant and thus appeared in all four models.

It can be seen in Table 4-22 that the preferences of those in age group 55-64 are not significantly different from the base case (65+) in any of the three models in which the age variable appeared. It is also interesting to note that the youngest age cohort, 18-24, has the same opinion as the base case except for HOV lane to HOT lane conversion where the younger group is less likely to support the conversion. It appears that those aged 25 to 34 are the group that would, in general, consistently support the propositions.

Education level is not a significant variable in the HOV lane to HOT lane conversion model but respondents with "Some College" education are less likely to support tolls for new roads/lanes, wider distribution of toll revenues, or be open to at least private operation of toll roads. This education level might be reflecting opinions of the college students since the Inland empire region is home to two major universities, UC Riverside and CSU, San Bernardino.

Income level is one of the three variables that are significant in all the models. However, the relationship is not monotonous in nature with differences between consecutive income groups. It may be generalized that those in the middle income groups show a tendency to support the establishment of toll facilities, but have the tendency to oppose a wide distribution of toll revenues.

Home ownership is not a significant factor in any of the models except for the last one where the home owners are more likely to support wider distribution of toll revenues. Quality of personal trips is a significant factor only for the model explaining openness to private operation of toll roads.

The comparative results appear to suggest generally that those who drive less than 20 miles a day are inclined to support toll facilities. On the contrary, it is those who drive for more than 30 minutes a day who may be inclined to support toll facilities. Similarly, those who hold the view that there is at least some level of congestion are generally inclined to support toll facilities. Not surprisingly those who have a positive experience with toll facilities are inclined to support their establishment. Note that experience with southern California toll roads is one of the three independent variables that are significant in all four models. This finding is consistent with other studies which have reported that past experience with toll roads is a significant determinant of people's perceptions.

Table 4-22: Relative Significance of Variables in Four Models

| Variable | Level Comparison (Base Category) | Support for new toll roads/lanes | Support HOV to HOT Conversion | Open to Private Operation of Toll Roads | Support Wider Distribution of Toll Revenues |
|---|---|---|---|---|---|
| **Age Group** | 18-24 (65+) | - | 0.0013 | NA | - |
| | 25-34 (65+) | 0.0018 | 0.0009 | NA | 0.0015 |
| | 35-44 (65+) | 0.0571 | - | NA | - |
| | 45-54 (65+) | 0.0004 | - | NA | - |
| | 55-64 (65+) | - | - | NA | - |
| **Education Level** | High School Diploma/GED (College Grad. or Higher) | 0.0072 | NA | 0.0005 | <.0001 |
| | Less than High School Diploma (College Grad. or Higher) | - | NA | - | <.0001 |
| | Some College (College Grad. or Higher) | 0.0032 | NA | 0.0002 | 0.0048 |
| **Income Group** | $25,000-49,999 ($100,000+) | - | 0.0018 | - | 0.0069 |
| | $50,000-74,999 ($100,000+) | - | 0.0197 | 0.0022 | 0.0001 |
| | $75,000-99,999 ($100,000+) | 0.0041 | 0.0036 | 0.0136 | 0.0017 |
| | Less than $25,000 ($100,000+) | 0.0012 | - | <.0001 | 0.0002 |
| **Auto Availability** | Most of the time (Always) | NA | 0.0392 | <.0001 | NA |
| | Occasionally (Always) | NA | 0.0002 | <.0001 | NA |
| | Own (Rent) | NA | NA | NA | 0.0205 |
| **Miles Driven Per Day** | ≤ 10 miles (>50 miles) | 0.0002 | 0.0105 | - | - |
| | 10 miles < Distance ≤ 20 miles (>50 miles) | - | <.0001 | <.0001 | 0.0018 |
| | 20 miles < Distance ≤ 30 miles (>50 miles) | 0.036 | - | 0.003 | - |
| | 30 miles < Distance ≤ 40 miles (>50 miles) | - | - | - | |
| | 40 miles < Distance ≤ 50 miles (>50 miles) | - | - | - | 0.0034 |
| **Hours Driven Per Day** | < 30 minutes (>2 hours) | - | 0.0009 | 0.0325 | NA |
| | 30 minutes ≤Duration < 1 hour (>2 hours) | 0.0513 | - | - | NA |
| | 1 hour ≤Duration < 90 minutes (>2 hours) | 0.0001 | 0.0032 | <.0001 | NA |
| | 90 minutes ≤Duration < 2 hours (>2 hours) | 0.0549 | 0.0138 | <.0001 | NA |
| **Proportion of Congested Driving** | 30-50% (Less than 30%) | 0.0585 | NA | <.0001 | 0.0274 |

| Variable | Level Comparison (Base Category) | Support for new toll roads/lanes | Support HOV to HOT Conversion | Open to Private Operation of Toll Roads | Support Wider Distribution of Toll Revenues |
|---|---|---|---|---|---|
| | 51-75% (Less than 30%) | 0.0138 | NA | 0.0127 | - |
| | More than 75% (Less than 30%) | 0.0025 | NA | 0.0002 | - |
| | Satisfactory (very unsatisfactory) | NA | NA | - | NA |
| | Slightly satisfactory (very unsatisfactory) | NA | NA | 0.001 | NA |
| | Slightly unsatisfactory (very unsatisfactory) | NA | NA | 0.0174 | NA |
| | Unsatisfactory (very unsatisfactory) | NA | NA | - | NA |
| | Very satisfactory (very unsatisfactory) | NA | NA | - | NA |
| **General View of Congestion** | Mild Congestion (Severe Congestion) | - | 0.001 | <.0001 | |
| | Moderate Congestion (Severe Congestion) | 0.0046 | 0.0476 | <.0001 | |
| | No Congestion (Severe Congestion) | 0.0057 | 0.0207 | <.0001 | |
| **Truck Traffic a Problem?** | Yes (No) | 0.0458 | NA | <.0001 | |
| **Transportation Spending** | Too little (Just Right) | NA | NA | 0.0002 | 0.0003 |
| | Too much (Just Right) | NA | NA | - | 0.0007 |
| **Government Role in the Economy** | Less than I prefer (Just Right) | 0.0405 | NA | NA | NA |
| | More than I prefer (Just Right) | - | NA | NA | NA |
| **Paid Toll Electronically** | Yes (No) | 0.0099 | | 0.0002 | 0.0047 |
| **Experience with So. Cal. Toll Roads** | Mixed (None) | - | - | 0.0121 | 0.0243 |
| | Negative (None) | 0.0738 | 0.0003 | 0.0108 | <.0001 |
| | Positive (None) | 0.0001 | 0.0003 | - | 0.0034 |
| **Camera Enforcement** | Yes (No) | 0.0042 | NA | NA | 0.016 |

Notes: "NA" indicates that the variable was excluded from the logistic regression model
"-" indicates statistical insignificance between that category and the base category of the variable

It is interesting that those who find the camera enforcement of tolls to be reasonable are more likely to support toll roads while they are less likely to support a wider distribution of revenues. These respondents are likely regular users of the toll roads who want the tolls to be enforced and

would like to see the toll revenues go for improvement of the same toll roads. Respondents' attitudes about government role in the economy are significant only in the first model and the variable is not significant in any of the other models.

# 5 Findings and Conclusions

## 5.1 Demographics and Travel Behavior in the Region

Following interviews with stakeholder groups (including experts), this study conducted a general survey of the population using various media including phone, internet and paper questionnaire that captured a wide cross-section of the population in the Inland Empire region. To correct for the self-selection bias common in this genre of study the investigators weighted the data using a multi-stage weighing procedure. In the survey we found, as expected, that the respondents in the region relied mostly on cars for most of their trips with no other mode having any significant share of trips. While in the overall sample about 83% of the respondents always had an automobile available the availability varied by age group. Fewer of the youngest and oldest age cohorts' always had an auto available compared to middle aged cohorts who almost always had an auto available. The responses from the survey about the most congested corridor matched the opinions of experts interviewed and identified SR91 near Corona as the most congested corridor in the region. Since toll roads are a public policy issue, respondents' view of government role in the economy was also sought in the survey. Survey responses were consistent with the known voting patterns of the Inland empire region. A 45% plurality reported that the government's role was more than what is needed. At the same time, a large share of respondents would also like to see increased spending on transportation. The use of weights to match the demographic information in the survey with known information from census data and other sources improved the reliability of the conclusions from this research.

## 5.2 Support for Toll Roads

The objective of this research was to assess the public's perception of tolls and toll roads. It was found that two attributes of toll roads which the majority of respondents agreed upon were i) toll roads are less congested than freeways and ii) toll roads are expensive. It did appear that a solid majority of respondents will not agree to per trip toll of $5.00 or more even for a travel time savings of 40 minutes and higher. It would be interesting to observe the response to this question in a few years with a better growing economy. Toll roads also did not rank high as the measure for dealing with congestion with less than 10% reported toll roads to be one of the top two ways to deal with congestion. A slight majority (52-54%) oppose tolls for new roads/lanes and HOV lane to HOT lane conversion. Since the need for infrastructure financing might lead to public private partnerships in the future the survey instrument included a question on attitudes about public/private ownership/operation of the facilities. A near majority 47% showed no preference on ownership and operation of toll roads while 43% preferred public ownership and operation. In all, more than 57% of the respondents were accepting of at least private operation of toll roads. This finding indicates that public private partnerships may be an acceptable idea. On the other hand, a similarly significant majority of respondents would like the toll revenues to be used for general transportation infrastructure improvements. This finding points to some conflict in the public's attitude about utilization of private resources for operating toll roads.

## 5.3 Factors Affecting Toll Road Perceptions

One of the factors investigated was respondents' perception of privacy issues. We did not find these concerns to be high among respondents. This conclusion was inferred from the high proportion of respondents who consider video enforcement of tolls reasonable as well as from the higher than expected support for mileage based fees. In terms of the factors that strongly

effect the public's perception about toll roads, respondents' experience with southern California toll roads was the most significant. A positive experience with the existing toll roads in southern California made respondents more likely to support tolls for new roads/lanes as well as for HOV lane to HOT lane conversion. In addition, income levels and miles driven per day were significant in all four logistic regression models developed in this research. However, examining the model coefficients closely revealed that the relationship is not monotonous in nature.

## 5.4 What's a Decision Maker to Do?

The findings of this study provide insights into the challenges decision makers need to be aware of. At the same time respondents' opinions reveal new opportunities as well. For example, the understanding that in the Inland Empire region past experience is a key to support for future toll road projects is critical. This is a factor that is somewhat under the control of the decision makers. Hence, if and when the first toll road project is implemented in the region, it should be done with extreme care since the first project's success or failure will have an impact on people's opinions about toll roads well into the future. For example, for the first project drivers should be provided with all possible options for paying tolls including attendants. In this survey a majority of respondents did prefer to have the option of toll attendants while paying tolls.

Responses from decision makers to some other opinions are not as straight forward. For example, while respondents were not averse to private operation of toll roads a clear majority wanted to have a wider distribution of toll revenues. If wider distribution is desirable then it may be difficult to privatize ownership/operation of the toll roads and the decision makers need to move carefully in that regard.

Another issue examined in our survey was privacy concerns. While the respondents did not seem as concerned about privacy at this stage, investigators suspect that if a specific proposal on mileage based fee comes up these issues may become front and center thereby raising the concerns. Hence, decision makers may need to assess opinions about privacy issues with a specific proposal at hand. Similarly, at this stage there is majority support for higher tolls on commercial vehicles. However, a specific proposal may lead to vocal campaign from the interest groups which may alter public opinion. Nevertheless, the research conducted during this effort provides a basis to clearly identify the changes in opinion that such campaigns might instigate.

## 5.5 Future Research

This study has created a base for a longitudinal study in the region to assess how the public's perception about toll roads might evolve in the future. It should be noted that the study took place when the economic growth is still relatively slow which may be responsible for respondents not being willing to pay tolls to save on travel time. How the willingness to pay changes with changes in the economic outlook is an interesting subject to track. In addition, as the state and local government budget crises get more attention from the public, attitudes about toll roads may evolve further. It will be interesting to be able to observe these evolutions over time. The results of these studies should provide further insights to state agencies and toll road operators alike.

# References


Abdel-Aty, M., & Abdelwahab, H. (2001). Toll Road Origin-Destination Travel Survey: Internet and Mail-Back Response Analysis and Implications for Future Surveys. *Transportation Research Record: Journal of the Transportation Research Board*, *1768*, 61-70.

Buckeye, K., DeCorla-Souza, P., Lari, A., & Aultman, S. (2009). User Perceptions of Fee Lane Concepts in Minnesota. *Transportation Research Board Paper, No. 10-3443.*

Burris, M.W., & Goel, R. (2009). Mode Choice Due to HOV and HOT Conversions. *Transportation Research Board Paper, No. 10-2593.*

Burris, M., Sadabadi, K., Mattingly, S., Mahlawat, M., Li, J., Rasmidatta, I., & Saroosh, A. (2007). Reaction to the Managed Lane Concept by Various Groups of Travelers. *Transportation Research Record: Journal of the Transportation Research Board*, *1996*, 74-82.

Burris, M., Ungemah, D., Mahlawat, M., & Pannu, M. (2008). Investigating the Impact of Tolls on HOVs Using MLs. *Transportation Research Board Paper, No. 09-1596.*

Collier, T., & Womack, K. (2005). "Public Perception Data Collection Regarding Tolling in a Small Urban/Rural Area: Some Surprising Findings," *Presented at the 84th Annual Meeting of the Transportation Research Board, Washington, D.C., Jan. 9–13, 2005.*

Davis, R. W., & Sinha, K.C. (2008). Factors Affecting Willingness to Pay for High-Occupancy Toll (HOT) Lanes. *Transportation Research Board Paper, No. 09-0589.*

Dill, J., & Weinstein, A. (2006). How to pay for transportation? A survey of public preferences in California. *Transport Policy, 14*(4), 346-356.

Higgins, T. (1997). Congestion Pricing: Public Polling Perspective. *Transportation Quarterly, 51*(2), 97-104.

Iseki, H., Taylor, B., & Demisch, A. (2009). Examining the Linkages between Electronic Roadway
Tolling Technologies and Road Pricing Policy Objectives. *Transportation Research Board Paper, No. 10-4033.*

Kockelman, K. M., Podgorski, K.V., Bina, M., & Gadda, S. (2006). Public Perceptions of Pricing Existing Roads and Other Transportation Policies: the Texas Perspective. *85th Annual Meeting of the Transportation Research Board.* Retrieved May 10, 2006, from http://www.ce.utexas.edu/prof/kockelman/ public_html/TRB06public perceptionsfollowup.pdf

Lari, A. Z., & Buckeye, K.R. (1996). Measuring Perceptions of Road Pricing Alternatives: Minnesota Public Outreach Effort. *Transportation Research Record, No. 1558*: 90-98.

Li, J. (2007). Potential Users' Perspectives on Managed Lanes. *Public Works Management and Policy, 12*(2), 416-430.

Macias, R., Poe, C., MacGregor, M. & Ungemah, D. (2008). Developing a Value Pricing Project: The I-30W Experience, Dallas, Texas. *Transportation Research Board Paper, No. 09-3555.*

Oswald, C.J., Lee C., Euritt, M.A, Machemehl, R.B., Harrison, R., Walton, C.M. (1995). Texas Public Opinion Regarding Toll Roads. *Research Study 0-1322.* Center for Transportation Research, The University of Texas, Austin, TX.

Podgorski, K., & Kockelman, K. (2006). Public perceptions of toll roads: A survey of the Texas perspective. *Transportation Research Part A, 40*(10), 888-902.

Results of San Antonio Focus Groups: Public Acceptability of Express Lane Options for I-35, (2005). Texas Transportation Institute, College Station.

SAS Institute (2004). SAS/STAT 9.1 User's Guide. *SAS Institute Inc.*, Cary, NC.

Ungemah, D., & Collier, T. (2007). I'll Tell You What I Think! A National Review of How the Public Perceives Pricing. *Transportation Research Record: Journal of the Transportation Research Board, No. 1996*, 66-73.

Ungemah, D., Swisher, M., & Tighe, C.D. (2005). "Discussing High-Occupancy Toll Lanes with the Denver, Colorado, Public". *Transportation Research Record: Journal of the Transportation Research Board, No. 1932*, 129-136.

Zhou, L., Burris, M., Baker, R. & Geiselbrecht, T. (2008). The Impact of Incentives on Toll Road Use by Trucks. *Transportation Research Board Paper, No. 09-1612.*

Zmud, J., & Arce, C. (2008). *Compilation of Public Opinion Data on Tolls and Road Pricing: A Synthesis of Highway Practice.* Washington D.C.: Transportation Research Board.

Zmud, J., Bradley, M., Douma, F. & Simek, C. (2007). "Attitudes and Willingness to Pay for Tolled Facilities, A Panel Survey Evaluation." *Transportation Research Record, No. 1996*: 58-65.

Zmud, J., Peterson, S., & Douma, F. (2007). "Preliminary Before and After Results of the I-394 HOT Lane Panel Survey." *86th Annual Meeting of the Transportation Research Board.*

# Appendix to Chapter 2

## Appendix 2-1: Summary of Findings from the Studies reviewed

| Study Area | Author | Date | General Toll/HOT Lane Views | Toll Collection Views |
|---|---|---|---|---|
| **National (USA) & International** | Burris, Goel | 2009 | "The vast majority of LOV paying customers of HOT lanes were formerly SOVs on GPLs… The paying LOVs in the HOT lane were most often well educated, between 35 to 54 years old, and had high incomes. However, based on many surveys of paying HOT lane customers, people of all ages, income levels, and educations can be found using the lanes. | N/A |
| | Higgins | 1997 | Reaction to tolls is dependent on how tolls are defined and presented. When no additional information is given to the public, support is low. HOV buy-in congestion pricing supported. Polls comparing congestion pricing, tolls, and higher gas taxes reveal that congestion pricing is the least popular option, and raising the gas tax is the most preferred option. | N/A |
| | Iseki, Taylor, Demisch | 2009 | N/A | "Six primary policy goals are related to system technology specifications. Two most important of these are: (1) the geographical scale of road network tolled and (2) and the level of complexity of pricing programs. Over time it is likely that well-designed GNSS-based systems are likely to be increasingly commonplace." |
| | Ungemah, Collier | 2007 | "Value pricing and tolling overall tend to be more acceptable on **new facilities than existing ones.** In the case of managed lane and HOT lane projects, pricing is applied to only a portion of the facility, resulting in more choices for the driver, and is therefore more likely to be seen as an improvement on the existing facility if correctly positioned as such." | N/A |
| | Zmud, Arce | 2008 | 57% support tolling or road pricing, 31% oppose, and 13% are neutral. Of those, 62% support express toll lanes, 23%, and 15% are neutral; 71% support traditional toll lanes, 26% oppose, and 3% are neutral; and 73% support HOT lanes, 15% oppose, and 12% are neutral. | In Survey #30, "most respondents (75% to 80%) approved of replacing toll booths with electronic toll and traffic management technology." In Survey #32, "most respondents greatly approved of replacing toll booths with electronic toll and traffic management technology, at 76% to 92% approval." In Survey #41, "none said that requiring SunPass or other electronic tolling would be an obstacle to their use of the facility." |
| **California** | Dill, Weinstein | 2006 | Fairly strong public support for tolling options including HOT and TOT lanes. | N/A |
| **Colorado** | Ungemah, Swisher, Tighe | 2005 | HOT lanes viewed as a temporary solution and should not replace other ongoing mobility plans. | N/A |
| **Florida** | Abdel-Aty, Abdelwahab | 2001 | N/A | N/A |
| **Indiana** | Davis, Sinha | 2008 | Travelers, on average, would be willing to pay $0.60 to save 10 minutes and $0.26 to save 3 minutes for work trips. For non-work trips, travelers would be willing to pay $0.36 to save 10 minutes and $0.14 to save 3 minutes. | N/A |
| **Minnesota** | Buckeye, DeCorla-Souza, Lari, Aultman | 2009 | "Overall a FEE Lane road pricing system will require an extensive education and marketing campaign to win broad support. Particular focus must be placed on why the FEE Lane is necessary, what are the operational and performance benefits, and then to communicate rules such as how to safely use a shoulder lane, when it is open and when it is closed, and how the credit system would work." | "The credit system operation was a particular source of confusion for many focus group participants. Although some participants seemed to like the idea of getting the credits to use in FEE lanes, there were numerous concerns about logistics of credit management and distribution." |
| | Lari, Buckeye | 1996 | Toll facilities embraced by jurors if revenues were dedicated to the facilities on which they were collected… all-day toll seemed to be preferred to peak-hour-only toll. Video survey [participants] preferred "the peak-period-only toll concept as opposed to the combined peak and off-peak toll, although the use of toll revenues only in tolled corridors did not make congestion pricing more attractive. This finding contradicts… the focus groups, which preferred the peak hour and off-peak toll concept." | N/A |
| | Zmud, Bradley, Douma, Simek | 2007 | There's a positive association between experience with road pricing and positive attitudes towards it. Willingness to pay significantly related to income, age, trip purpose, time of day, trip distance, and amount of time saved. | N/A |
| | Zmud, Peterson, Douma | 2007 | "Six-to-seven out of ten believed that allowing single drivers to use carpool lanes by paying a toll was a good idea." | "Paying MnPASS customers were exceptionally satisfied... Virtually all (95%) were satisfied with the all electronic toll collection, ease of opening an account (92%); using a credit card to replenish the account (93%)," and … transponder installation (92%). |

| | | | | |
|---|---|---|---|---|
| **Texas** | Burris, Sadabadi, Mattingly, Mahlawat, Li, Rasmidatta, Saroosh | 2007 | "Interest in the managed lanes (ML) concept was high among Texas residents in metropolitan regions, with 70% of travelers expressing interest in using MLs." | "The main opposition to the concept of MLs does not arise from the fact that a potential user may need to provide a credit card and install a transponder in his or her vehicle to access these MLs." |
| | Burris, Ungemah, Mahlawat, Pannu | 2008 | The mode choice model found that travelers were relatively insensitive to price… Overall percentage of HOV2 and HOV3+ vehicles in the traffic stream decreased by only a small amount when a toll was required for them to use the HOV lane. However, this did represent a significant portion of those modes (over 9 percent in the specific scenarios examined) and did result in increased HOT lane revenue (over 10 percent in the specific scenarios examined)." | N/A |
| | Collier, Womack | 2005 | Begrudging acceptance of tolling if no other financing options available. | Public supportive of electronic toll collection and video enforcement. |
| | Li | 2007 | "Before the concept of managed lanes was explained, those who did not know the concept viewed it as a new tax and reacted negatively." However, most people would be willing to use managed lanes once in a while to save time. | "Privacy issues resulting from the use of toll tags did not seem to be a major issue or concern of the participants in this study, who generally agreed that ETC is necessary for successful implementation of managed lanes." |
| | Macias, Poe, MacGregor, Ungemah | 2008 | "The percentage respondents that believe they save between one to nine minutes when using the I-30W ML is 60%. This is consistent with the travel time results reported in the section above with average travel time savings of approximately one to five minutes. This shows that the users have an accurate perception for the times savings benefits when using the ML." The primary responses for using the managed HOV lane "were to avoid congestion and save time which can be interpreted as similar answers. The combined response for these two answers was 59%." | N/A |
| | Oswald, Lee, Euritt, Machemehl, Harrison, Walton | 1995 | "Texans favor toll roads over increases in… fuel taxes 61.7% of the time. Moreover, increased education about the benefits of ETC systems should increase this number, since 28.4% of… persons favoring tax increases… did so because of anticipated toll collection bottlenecks. If these… can be eliminated, then support for toll roads in lieu of increases in motor fuel taxes could be as high as 72.6%." | The implementation of ETC and AVI systems can have a positive influence on toll road acceptance. However, "ETC systems still have a long way to go in achieving market penetration." |
| | Podgorski, Kockelman | 2006 | Existing roads should be kept toll free, and tolls on new roads should be reduced after construction is paid off in full. Trucks should be charged higher tolls, SOVs should not be charged differently than carpools, and congestion pricing should not be implemented. | There is considerable support (66%) for exclusive use of toll tags for collection (rather than allowing manual payment). |
| | Kockelman, Podgorski, Bina, Gadda | 2006 | Regular toll road users and rush hour drivers more supportive of tolls. Long-distance commuters, males, and long time locals less supportive. Tolls preferred to gas taxes. | N/A |
| | Results of San Antonio Focus Groups | 2005 | "Some felt San Antonio was not ready for value priced lanes yet, while others liked the idea of having an option to avoid congestion. The price of the toll was the deciding factor of whether the participants would use the lanes or not." | "Since San Antonio draws large tourist traffic, many believed that the idea of all-electronic toll collection would not help congestion. Most believe that tourist drivers should have the option of entering the toll lanes without having to acquire the toll tag." |
| | Zhou, Burris, Baker, Geiselbrecht | 2008 | "Smaller companies (owner-operators) clearly preferred the non-toll route, citing the fact the toll came directly out of their pocket and it was difficult for them to pass on the cost to their customers. Larger companies were more likely to carefully weigh the benefits and costs of using the toll route when making their decision rather than avoiding toll roads in general. The incentives that most interested the truckers were off-peak discounts followed by a free trip after a number of paid trips." | N/A |

# Appendix to Chapter 3

## Appendix 3-1: List of Stakeholders contacted for Interview

| Name | Position | Contact | Interview Date | Interview Type | Completed? |
|---|---|---|---|---|---|
| AAA Office (R) (Germaine Miles - Branch Mng) | Auto Owners | (951) 684-4250 | 5/10/2010 | Scott.Craig@aaa-calif.com | Yes |
| AAA Office (San Bernardino) | Auto Owners | (909) 381-2211 | Pending 5/10/10 - Paffairs app | beeman.yvonne@aaa-calif.com | |
| Best Buy Distribution Center | Consumer Corp w/ Distribution Ctr | Go thru HR (612) 291-1000 | LM 4 PA 5/11/10 | | |
| Mary Bono (US House of Reps Cal 45) | Elected Official | (202) 225-5330 | LM 6/24/10, e-mailed 5/10/10 | jennifer.may@mail.house.gov | |
| Byers A C Trucking (Bill Garner) | Trucking Corporation | (909) 884-6064 | 5/10/10 - Will not participate | (Although anonymous, he felt his opinion would be too controversial!) | |
| CSU, San Bernardino parking services (Ron Profeta) | Commuter University | (909) 537-5912 | F/ up 5/26/10 - expect next wk | rprofeta@csusb.edu | |
| Caltrans district 8 Inland Empire. | Caltrans | (909) 383-4557 | 5/12/2010 | dan_kopulsky@dot.ca.gov | Yes |
| Wilmer Carter (CA Assembly member) | Elected Official | (909) 820-5008 | LM 6/24/10 | amber.shattler@asm.ca.gov | |
| C & K Transportation (Kim Cooper) | Trucking Corporation | (909) 880-3399 | Follow up 6/25/10 afternoon | kcooper@cnk-swi.com | |
| Express Connections, Inc. (Sorin Buturoaga) | Trucking Corporation | (909) 605-6134 | LM 6/24/10 | sorin@expressconnections.com | |
| Inland Empire Transport Inc (Steve) | Trucking Corporation | (951) 683-3537 | Pending per 6/24/10 call | srosenbery@inlandempiretrans.com | |
| Jack Jones Trucking (Valerie Lessy) | Independent Truckers | (909) 456-2500 | 6/8/2010 | vliese@jjtinc.com | Yes |
| Jerry Lewis (US House of Reps Cal 41) | Elected Official | (909) 862-6030 | Cannot participate | | |
| Kmart Distribution Ctr | Consumer Corp w/ Distribution Ctr | (909) 390-4515 | 5/11/10 - Declined participation | wfogarty@searshc.com | |
| Kuehne + Nagel (Melody x232) | Consumer Corp w/ Distribution Ctr | (909) 574-2300 | LM 6/24/10 | | |
| Ronald O. Loveridge, Riverside Mayor | Elected Official | (951) 826-5551 | 5/13/2010 | phone (951) 826-5551 | Yes |
| McCollister's Transportation Group Inc | Trucking Corporation | (800) 688-0014 | LM on 5/25/10 (gen mailbox) | | |
| Patrick J. Morris, Mayor San Bernardino | Elected Official (Casey Dailey) | (909) 384-5133 | LM 6/24/10 | CD phone (909) 693-6504 | |
| Nat. Assoc. Ind. Truckers (Sbern. Office) | Independent Truckers | (630) 864-3507 | LM w David King 6/24/10 | | |
| Kent Olsen- Parsons Brinckerhoff | Extending 91 exp lanes to riverside co | OlsenK@pbworld.com | 4/23/2010 | phone | Yes |
| Ralphs Grocery CO Distr Center (Emily Valencia) | Consumer Corp w/ Distribution Ctr | (951) 778-6382 | Cannot participate 5/25/10 | | |
| Staples Distribution Center (Bettina Carter) | Consumer Corp w/ Distribution Ctr | (909) 937-7800 | LM at Ext 7814 6/24/10 | | |
| Target Import Warehouse | Consumer Corp w/ Distribution Ctr | (909) 356-6001 x6063 | LM wKayle Schreiber 6/24/10 | | |
| TCA Toll Authority (Inland Empire) Linda | Toll Authority (949) 754-3400 | www.thetollroads.com | LM 6/24/10 for Suzy Williams | lmorgan@thetollroads.com | |
| Toyota Motor Sales USA Inc | Consumer Corp w/ Distribution Ctr | (909) 975-7600 | LM on 6/24/10 | john_waring@toyota.com | |
| Trader Joe's Company (John Contabile) | Consumer Corp w/ Distribution Ctr | (909) 393-5233 x14 | LM on 6/24/10 | jcontabile@traderjoes.com | |
| UCR Transportation & Parking Services | Commuter University | (951) 827-8277 | 5/27/2010 | irma.henderson@uci.edu | Yes |
| Winterton Trucking | Trucking Corporation | (951) 683-4917 | Not willing to sign consent form | | |

## Appendix 3-2: Structured Interview Questions for Stakeholders

Stakeholder Interviews

Assessment of Public Perception of User-Based Fees and Tolls to Finance Transportation Infrastructure Improvements

| | |
|---|---|
| Name: | Date Interview Scheduled: |
| Title: | Interview Location: |
| Affiliation(s): | Contact Information: |
| Interview Date: | Interview Time: |
| Interviewer Name: | Transcribed: |

Introduction:

This interview is being done as part of a research sponsored by the Leonard Transportation Center at CSU San Bernardino. We are investigating the public's perception of specifically directed user based fees collected as tolls as a financing mechanism for infrastructure improvements. The research is focused specifically on the Inland Empire region of Southern California.

The Questions are divided into five sections and will start with (a) congestion in general, then ask for b) opinions, and (c) any arguments that your group may have for or against the idea, and then wrap up with (d) some conclusions.

Your participation will be used in part to help document some of the lessons learned and contribute information that can be of use by state planning officials trying to improve the transportation infrastructure in the region. Are you willing to participate in this interview and allow us to use your comments and responses in the final report?

Interview Questions:

Stakeholder Interview Question Set:

What is your role in the community? (e.g. elected official, city staff, businessperson, educator, etc.)

2. Do you operate your own trucks?

3. Are you a full-load truck or a partial-load truck operator?

CONGESTION

4. How do you view the amount of traffic congestion in the Inland Empire?

5. Are certain areas worse than others?

6. Is commercial truck traffic a problem? If so, why?

OPINION

7. How do you (and members of your group) feel about toll roads or road pricing? On what do you base that?

8. Have you noticed any shifts in your interest group's opinion about road pricing or toll roads in the Inland Empire? On what do you base that?

9. Are you (and members of your group) familiar with any existing examples of road pricing or toll roads? Is your perception of the existing example positive or negative?

10. Do you think your group's opinion varies according to type of project? e.g., toll road, HOT (High-Occupancy Toll) lane, truck only toll lanes, managed lanes, cordon pricing, congestion pricing? What evidence do you have?

11. Do you think your group's opinion varies depending on whether a toll road is publicly or privately owned and operated? Why?

12. Would your interest group prefer electronic or attended toll booths? Why?

13. How does media attention fit into your observations about public opinion on toll roads or road pricing?

ARGUMENTS

14. What arguments supporting road pricing and tolling are prevalent among the customers/public you serve? Please detail.

15. What arguments rejecting road pricing and tolling are prevalent among the customers/public you serve? Please detail.

16. How could support for toll roads or HOT lanes be generated in the Inland Empire?

COMMENTS

17. Any last comments about toll roads or road pricing?

# Appendix to Chapter 4

## Appendix 4-1: The Resident Survey Instrument

### Survey of the Public Perception of Tolls in the Inland Empire

Dear Sir/Madam:

As infrastructure ages and revenue streams become inadequate, new finance mechanisms are imperative. Therefore, the purpose of this survey is to obtain opinions on and receptiveness to user-based fees and tolls as a financing mechanism for infrastructure improvements in the Inland Empire region of Southern California. If you agree to participate, we would first like to ask some questions about you and your travel activities, and then about your opinion on congestion levels and user-fee based transportation choices such as tollroads.

Note: An application to conduct this survey has been reviewed and approved by the Cal Poly Human Subjects Committee and the California State University, San Bernardino Institutional Review Board.

If you have any concerns or would like additional information, please contact one of the following:

RESEARCH PROFESSOR - CORNELIUS NUWORSOO | 805.756.2573 | CNUWORSO@CALPOLY.EDU
RESEARCH PROFESSOR - ANURAG PANDE | 805.756.2104| APANDE@CALPOLY.EDU
CHAIR OF CAL POLY HUMAN SUBJECTS COMMITTEE - STEVE DAVIS | 805.756.2754
DEAN OF RESEARCH AND GRADUATE PROGRAMS - SUSAN OPAVA | 805.756.1508

### A. Demographics

A1. Gender:
- ☐ Male
- ☐ Female

A2. Age:
- ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54
- ☐ 55-64 ☐ 65-74 ☐ 75+

A3. Race or Ethnicity:
- ☐ White, Caucasian, or European
- ☐ Hispanic, Latino, or Mexican-American
- ☐ Asian, Pacific-Islander, East Indian
- ☐ Black, African-American
- ☐ Other:_____

A4. Education Level:
- ☐ Less than High School Diploma
- ☐ High School Diploma/GED
- ☐ Some College
- ☐ College Graduate
- ☐ Some Graduate School
- ☐ Graduate Degree

A5. Household Income:
- ☐ Less than $25,000
- ☐ $25,000 - $49,999
- ☐ $50,000 - $74,999
- ☐ $75,000 - $99,999
- ☐ $100,000 - $124,999
- ☐ $125,000+

A6. Do you have a driver's license?
- ☐ Yes
- ☐ No

A7. Does your household rent or own your residence?
- ☐ Rent
- ☐ Own

### B. Travel Behavior

B1. In the last month, how often did you take the following transportation modes to work or school? (in round trips)

| | 0 | 1-2 | 3-10 | 10-15 | 15+ |
|---|---|---|---|---|---|
| Automobile | ☐ | ☐ | ☐ | ☐ | ☐ |
| Motocycle | ☐ | ☐ | ☐ | ☐ | ☐ |
| Walk/Bicycle | ☐ | ☐ | ☐ | ☐ | ☐ |
| Public Transit | ☐ | ☐ | ☐ | ☐ | ☐ |
| Carpool/Vanpool | ☐ | ☐ | ☐ | ☐ | ☐ |

B2. When you want to go somewhere, how often do you have a car available to drive yourself?
- ☐ Always
- ☐ Occasionally
- ☐ Most of the time
- ☐ Never

B3. In a typical day, how many miles do you drive?

_____ miles

B4. In a typical day, how many hours do you spend driving?

_____ hours

B5. What percentage of your driving is done in congested traffic?

- ☐ Less than 30%
- ☐ 51% - 75%
- ☐ 30% - 50%
- ☐ More than 75%

## C. Congestion

C1. When you travel, how would you rate the quality of your trips in the Inland Empire region?

- ☐ Very unsatisfactory
- ☐ Unsatisfactory
- ☐ Slightly unsatisfactory
- ☐ Slightly satisfactory
- ☐ Satisfactory
- ☐ Very satisfactory

C2. What is your general view of traffic congestion in the Inland Empire?

- ☐ Severe
- ☐ Moderate
- ☐ Mild
- ☐ No congestion

C3. What is your knowledge of congestion levels in the following highway corridors? (place a check mark under the appropriate level of congestion)

| Highway Corridor | | No Congestion | Mildly Congested | Moderately Congested | Severely Congested | Don't Know |
|---|---|---|---|---|---|---|
| I-10 | Near Pomona | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near San Bernardino | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Palm Springs | ☐ | ☐ | ☐ | ☐ | ☐ |
| I-15 | Near Fontana | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Corona/Riverside | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Murrieta | ☐ | ☐ | ☐ | ☐ | ☐ |
| I-210 | Near Fontana | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Rancho Cuchamonga | ☐ | ☐ | ☐ | ☐ | ☐ |
| I-215 | Near San Bernardino | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Riverside | ☐ | ☐ | ☐ | ☐ | ☐ |
| SR-60 | Near Pomona | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Riverside | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Moreno Valley | ☐ | ☐ | ☐ | ☐ | ☐ |
| SR-71 | Near Pomona | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Corona | ☐ | ☐ | ☐ | ☐ | ☐ |
| SR-91 | Near Corona | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Near Riverside | ☐ | ☐ | ☐ | ☐ | ☐ |

C4. If a toll road were to save you a given amount of time in congested traffic conditions, what is the most that you would be willing to pay to use it? (answer for each row)

| | Value of Time Saved | | | | | |
|---|---|---|---|---|---|---|
| | $0 | $2.50 per trip | $5 per trip | $10 per trip | $15 per trip | $20 per trip |
| 10-19 minutes saved | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20-29 minutes saved | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 30-39 minutes saved | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 40+ minutes saved | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

C5. What is your preference for dealing with traffic congestion? (rank the following from first to last preferences)

_____Public transportation _____Additional freeway lanes _____New freeways
_____Carpool lanes (HOV lanes) _____Toll roads/lanes

C6. Do you consider commercial truck traffic to be a problem?

☐ Yes ☐ No

## D. Transportation Financing

D1. What do you think about the government's role in California's economy?

☐ Too much ☐ More than I prefer
☐ Just right ☐ Less than I prefer
☐ Too little

D3. Given that state and local governments in California have to divide their budgets among many competing needs, would you say that government spends too much, too little or about the right amount on transportation?

☐ Too much
☐ Too little
☐ About the right amount

D5. What are your main reasons for your preference in Question D4? (check all that apply)

☐ Tolls charge users directly for road use
☐ I don't want taxes/fees raised
☐ Tolls will lead to faster highway improvements
☐ My past experience with toll roads
☐ Other_____
☐ I don't favor tolls above all other types of transportation financing

D2. Would you say the level of **state** and **local** taxes that you pay is too high, too low, or just about right?

☐ Too high ☐ Too low ☐ About right

D4. What is your most preferred method for funding shortfalls in transportation infrastructure needs? (choose one)

☐ Charge tolls for solo drivers
☐ Increase Gas Tax
☐ Increase Vehicle Registration Fee (annual fee)
☐ Increase Vehicle License Fee (one-time fee)
☐ Institute fee based on the number of miles driven
☐ Increase Sales Tax
☐ Borrow from bond market

D6. Would you prefer tolls on a particular highway to be used to only fund improvements on that toll road itself, or to fund other types of transportation projects?

☐ Use tolls only to fund improvements on the road where the toll is collected.
☐ Use toll roads to also fund various transportation infrastructure projects in the Inland Empire.

## E. Toll Roads and HOT Lanes

E1. How do you feel in general about toll roads or road pricing? (check all that apply)

☐ They are less convenient than freeways due to limited access
☐ They are less congested than freeways
☐ They create economic opportunities
☐ They are expensive
☐ I shouldn't have to pay to use the road
☐ I've had bad past experiences with them

E2. Are you willing to pay variable tolls by time of day?

☐ Yes ☐ No ☐ Not sure

E3. Should toll road rates be higher for commercial trucks and vehicles with trailers than for passenger vehicles?

☐ Yes ☐ No ☐ Not sure

E4. In which of the following scenarios would you support converting existing non-tolled roads into toll roads? (Check all that apply)

- ☐ Revenue could be used to add lanes
- ☐ Better pavement maintenance could be provided
- ☐ Better lighting and signage could be provided
- ☐ Revenue could be used to improve other area roads
- ☐ Congestion could be reduced
- ☐ Travel times would be more reliable
- ☐ Other:_____

E5. Would you support charging a toll to use new highway lanes and/or new highways?

☐ Yes ☐ No

E6. Would you support the conversion of High-Occupancy Vehicle (HOV) lanes to High-Occupancy Toll (HOT) lanes? (HOT lanes allow solo drivers to pay a fee to use carpool lanes.)

☐ Yes ☐ No

E7. Would you prefer using toll roads that are publicly or privately owned and operated?

- ☐ Publicly owned and publicly operated
- ☐ Publicly owned and privately operated
- ☐ Privately owned and privately operated
- ☐ No preference

E8. Are you familiar with any existing examples of road pricing or toll roads in Southern California? Is your perception of these examples positive or negative? (check all that apply)

| Example | Positive | Negative | Don't Know |
|---|---|---|---|
| SR-73 toll road | ☐ | ☐ | ☐ |
| SR 91 express toll lanes | ☐ | ☐ | ☐ |
| SR 133 toll road | ☐ | ☐ | ☐ |
| SR 241 toll road | ☐ | ☐ | ☐ |
| SR 261 toll road | ☐ | ☐ | ☐ |
| San Diego South Bay Expressway | ☐ | ☐ | ☐ |
| I-15 HOT lane in San Diego County | ☐ | ☐ | ☐ |

## F. Toll Collection

F1. Have you ever paid a toll electronically?

☐ Yes ☐ No ☐ Not sure

F3. If electronic toll collection is available, what kind of payment system would you prefer?

- ☐ Pay as you go (similar to a pre-paid calling card system)
- ☐ Monthly flat fee (only feasible if tolls do not vary based on time of day)
- ☐ Debit from bank or credit card account on file

F2. Would you prefer electronic or attended toll booths?

- ☐ Electronic toll collection
- ☐ Attended toll booths
- ☐ Combination of both electronic collection and attended toll booths

F4. Do you think it is reasonable to enforce toll collection by using cameras to photograph license plates?

☐ Yes ☐ No

Thank you for participating in this important survey. Your answers will be kept strictly confidential.

Please feel free to add any additional comments below.

_____

_____

_____

# Appendix 4-2: Distributions and Weighting of Survey Data

Age and Gender Distribution of 2010 Population vs. Sample Survey

| Inland Empire | Dept of Finance (2010) | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Age** | **All** | **Male:** | **Female:** | | **All** | **Male:** | **Female:** |
| under 18 | 1,319,806 | 675,668 | 644,138 | | | | |
| 18-24 | 462,403 | 237,637 | 224,766 | | 12 | 2 | 10 |
| 25-34 | 634,254 | 329,010 | 305,244 | | 36 | 17 | 19 |
| 35-44 | 576,400 | 286,281 | 290,119 | | 29 | 14 | 15 |
| 45-54 | 592,721 | 291,993 | 300,728 | | 46 | 21 | 25 |
| 55-64 | 406,617 | 198,206 | 208,411 | | 38 | 20 | 18 |
| 65-74 | 225,507 | 104,687 | 120,820 | | 22 | 11 | 11 |
| 75+ | 198,941 | 80,233 | 118,708 | | 5 | 1 | 4 |
| **Total** | **4,416,649** | **2,203,715** | **2,212,934** | | **188** | **86** | **102** |

| Inland Empire | Dept of Finance (2010) | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Age** | **All** | **Male:** | **Female:** | | **All** | **Male:** | **Female:** |
| under 18 | | | | | | | |
| 18-24 | 462,403 | 237,637 | 224,766 | | 12 | 2 | 10 |
| 25-34 | 634,254 | 329,010 | 305,244 | | 36 | 17 | 19 |
| 35-44 | 576,400 | 286,281 | 290,119 | | 29 | 14 | 15 |
| 45-54 | 592,721 | 291,993 | 300,728 | | 46 | 21 | 25 |
| 55-64 | 406,617 | 198,206 | 208,411 | | 38 | 20 | 18 |
| 65-74 | 225,507 | 104,687 | 120,820 | | 22 | 11 | 11 |
| 75+ | 198,941 | 80,233 | 118,708 | | 5 | 1 | 4 |
| **Total** | **3,096,843** | **1,528,047** | **1,568,796** | | **188** | **86** | **102** |

| Inland Empire | Dept of Finance (2010) | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Age** | **All** | **Male:** | **Female:** | | **All** | **Male:** | **Female:** |
| under 18 | | | | | | | |
| 18-24 | 15% | 16% | 14% | | 6% | 2% | 10% |
| 25-34 | 20% | 22% | 19% | | 19% | 20% | 19% |
| 35-44 | 19% | 19% | 18% | | 15% | 16% | 15% |
| 45-54 | 19% | 19% | 19% | | 24% | 24% | 25% |
| 55-64 | 13% | 13% | 13% | | 20% | 23% | 18% |
| 65-74 | 7% | 7% | 8% | | 12% | 13% | 11% |
| 75+ | 6% | 5% | 8% | | 3% | 1% | 4% |
| **Total** | **100%** | **100%** | **100%** | | **100%** | **100%** | **100%** |
| | 100% | 49% | 51% | | 100% | 46% | 54% |

Income and Tenure Distribution of 2000 Population vs. Sample Survey

| Inland Empire | US Census (2000) | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Income** | **All** | **Owners:** | **Renters:** | | **All** | **Owners:** | **Renters:** |
| <$25,000 | 295,846 | 135,698 | 160,148 | | 15 | 7 | 8 |
| $25,000-49,999 | 300,178 | 188,600 | 111,578 | | 40 | 23 | 17 |
| $50,000-74,999 | 207,222 | 160,665 | 46,557 | | 33 | 28 | 5 |
| $75,000-99,999 | 112,551 | 97,113 | 15,438 | | 27 | 26 | 1 |
| $100,000 + | 119,015 | 107,417 | 11,598 | | 62 | 60 | 2 |
| | | | | | 10 | 7 | 3 |
| Total | 1,034,812 | 689,493 | 345,319 | | 187 | 151 | 36 |
| | | | | | | | |
| | | | | | | | |

| Inland Empire | US Census (2000) | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Income** | **All** | **Owners:** | **Renters:** | | **All** | **Owners:** | **Renters:** |
| <$25,000 | 295,846 | 135,698 | 160,148 | | 15 | 7 | 8 |
| $25,000-49,999 | 300,178 | 188,600 | 111,578 | | 40 | 23 | 17 |
| $50,000-74,999 | 207,222 | 160,665 | 46,557 | | 33 | 28 | 5 |
| $75,000-99,999 | 112,551 | 97,113 | 15,438 | | 27 | 26 | 1 |
| $100,000 + | 119,015 | 107,417 | 11,598 | | 62 | 60 | 2 |
| | - | - | - | | | | |
| Total | 1,034,812 | 689,493 | 345,319 | | 177 | 144 | 33 |
| | | | | | | | |
| | | | | | | | |

| Inland Empire | US Census (2000) | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Income** | **All** | **Owners:** | **Renters:** | | **All** | **Owners:** | **Renters:** |
| <$25,000 | 29% | 20% | 46% | | 8% | 5% | 24% |
| $25,000-49,999 | 29% | 27% | 32% | | 23% | 16% | 52% |
| $50,000-74,999 | 20% | 23% | 13% | | 19% | 19% | 15% |
| $75,000-99,999 | 11% | 14% | 4% | | 15% | 18% | 3% |
| $100,000 + | 12% | 16% | 3% | | 35% | 42% | 6% |
| | | | | | 0% | 0% | 0% |
| Total | 100% | 100% | 100% | 0% | 100% | 100% | 100% |
| | 100% | 67% | 33% | | 100% | 81% | 19% |
| | | | | | | | |
| | | | | | | | |

Distribution of 2000 Educational Attainment vs. Gender

| US Census (2000) | | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Inland Empire** | All | Male | Female | | **All** | Male | Female |
| Less than High School | 488067 | 240855 | 247212 | | 5 | 2 | 3 |
| High Sch/GED | 477022 | 220773 | 256249 | | 8 | 3 | 5 |
| Some College | 641951 | 302862 | 339089 | | 55 | 18 | 37 |
| College Grad | 202560 | 103329 | 99231 | | 33 | 13 | 20 |
| Some Grad School/Grad | 109697 | 62072 | 47625 | | 87 | 49 | 38 |
| | | | | | | | |
| Total | 1919297 | 929891 | 989406 | | 188 | 85 | 103 |

| US Census (2000) | | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Inland Empire** | All | Male | Female | | **All** | Male | Female |
| Less than High School | 488067 | 240855 | 247212 | | 5 | 2 | 3 |
| High Sch/GED | 477022 | 220773 | 256249 | | 8 | 3 | 5 |
| Some College | 641951 | 302862 | 339089 | | 55 | 18 | 37 |
| College Grad | 202560 | 103329 | 99231 | | 33 | 13 | 20 |
| Some Grad School/Grad | 109697 | 62072 | 47625 | | 87 | 49 | 38 |
| | | | | | | | |
| Total | 1919297 | 929891 | 989406 | | 188 | 85 | 103 |

| US Census (2000) | | | | | User Fee Survey (2010) | | |
|---|---|---|---|---|---|---|---|
| **Inland Empire** | All | Male | Female | | **All** | Male | Female |
| Less than High School | 25% | 26% | 25% | | 3% | 2% | 3% |
| High Sch/GED | 25% | 24% | 26% | | 4% | 4% | 5% |
| Some College | 33% | 33% | 34% | | 29% | 21% | 36% |
| College Grad | 11% | 11% | 10% | | 18% | 15% | 19% |
| Some Grad School/Grad | 6% | 7% | 5% | | 46% | 58% | 37% |
| | | | | | | | |
| Total | 100% | 100% | 100% | | 100% | 100% | 100% |
| | 100% | 48% | 52% | | 100% | 45% | 55% |

# Multi-Stage Weighting

**Two-Stage Weighting: Age and Gender**

| Age | All | Male | Female |
|---|---|---|---|
| *Weights to correct for age distribution bias* | | | |
| under 18 | | | |
| 18-24 | 2.34 | 6.69 | 1.46 |
| 25-34 | 1.07 | 1.09 | 1.04 |
| 35-44 | 1.21 | 1.15 | 1.26 |
| 45-54 | 0.78 | 0.78 | 0.78 |
| 55-64 | 0.65 | 0.56 | 0.75 |
| 65-74 | 0.62 | 0.54 | 0.71 |
| 75+ | 2.42 | 4.52 | 1.93 |
| Total | 1.00 | 1.00 | 1.00 |
| *Weights to correct for gender distribution bias* | | | |
| | 1.00 | 1.08 | 0.93 |
| | | | |
| ***Weight Products*** *(age and gender) = 'Weight1"* | | | |
| | **Age/Gender Unknown** | **Male** | **Female** |
| under 18 | | | |
| 18-24 | 2.34 | 7.21 | 1.36 |
| 25-34 | 1.07 | 1.17 | 0.98 |
| 35-44 | 1.21 | 1.24 | 1.17 |
| 45-54 | 0.78 | 0.84 | 0.73 |
| 55-64 | 0.65 | 0.60 | 0.70 |
| 65-74 | 0.62 | 0.58 | 0.67 |
| 75+ | 2.42 | 4.87 | 1.80 |
| Total | 1.00 | 1.08 | 0.93 |

**Two-Stage Weighting: Household Income and Tenure**

| Income | All | Owners: | Renters: |
|---|---|---|---|
| *Weights to correct for income distribution bias* | | | |
| <$25,000 | 3.37 | 4.05 | 1.91 |
| $25,000-49,999 | 1.28 | 1.71 | 0.63 |
| $50,000-74,999 | 1.07 | 1.20 | 0.89 |
| $75,000-99,999 | 0.71 | 0.78 | 1.48 |
| $100,000 + | 0.33 | 0.37 | 0.55 |
| | | | |
| Total | 1.00 | 1.00 | 1.00 |
| | | | |
| | | | |
| *Weights to correct for tenure distribution bias* | | | |
| Total | 1.00 | 0.82 | 1.79 |
| | | | |
| ***Weight Products*** *(income and tenure)* | | | |
| | **Income / Tenure Unknown** | **Owners:** | **Renters:** |
| <$25,000 | 3.37 | 3.32 | 3.42 |
| $25,000-49,999 | 1.28 | 1.40 | 1.12 |
| $50,000-74,999 | 1.07 | 0.98 | 1.59 |
| $75,000-99,999 | 0.71 | 0.64 | 2.64 |
| $100,000 + | 0.33 | 0.31 | 0.99 |
| | | | |
| Total | 1.00 | 0.82 | 1.79 |
| ***Weight Products*** *(income and tenure) = "Weight2" (plus correction for non-responses)* | | | |
| | **Income / Tenure Unknown** | **Owners:** | **Renters:** |
| <$25,000 | 3.32 | 3.26 | 3.37 |
| $25,000-49,999 | 1.26 | 1.38 | 1.10 |
| $50,000-74,999 | 1.06 | 0.97 | 1.57 |
| $75,000-99,999 | 0.70 | 0.63 | 2.60 |
| $100,000 + | 0.32 | 0.30 | 0.98 |
| | | | |
| Total | 0.98 | 0.81 | 1.76 |
| | | | |
| ***Weight Products*** *(weight1 and Weight2) => weight1*weight2 = "Weight3"* | | | |

## Weighting: Educational Attainment and Tenure

| **Income** | All | Male | Female |
|---|---|---|---|
| *Weights to correct for educational attainment distribution bias* | | | |
| Less than High School Dip | 9.56 | 11.01 | 8.58 |
| High Sch/GED | 5.84 | 6.73 | 5.34 |
| Some College | 1.14 | 1.54 | 0.95 |
| College Grad | 0.60 | 0.73 | 0.52 |
| Some Grad School/Grad | 0.12 | 0.12 | 0.13 |
| | | | |
| Total | 1.00 | 1.00 | 1.00 |
| | | | |
| | | | |
| *Weights to correct for tenure distribution bias* | | | |
| Total | 1.00 | 0.82 | 1.79 |
| | | | |
| ***Weight Products*** *(education and tenure)* | | | |
| | All | **Owners:** | **Renters:** |
| Less than High School | 9.56 | 7.83 | 17.11 |
| High Sch/GED | 5.84 | 4.78 | 10.45 |
| Some College | 1.14 | 0.94 | 2.05 |
| College Grad | 0.60 | 0.49 | 1.08 |
| Some Grad School/Grad | 0.12 | 0.10 | 0.22 |
| | | | |
| Total | 1.00 | 0.82 | 1.79 |
| | | | |
| ***Weight Products*** *(income and tenure) = "Weight2" (plus correction for non-responses)* | | | |
| | All | Male | Female |
| Less than High School | 7.39 | 6.05 | 13.23 |
| High Sch/GED | 4.52 | 3.70 | 8.08 |
| Some College | 0.88 | 0.72 | 1.58 |
| College Grad | 0.46 | 0.38 | 0.83 |
| Some Grad School/Grad | 0.10 | 0.08 | 0.17 |
| | | | |
| Total | 0.77 | 0.63 | 1.38 |
| | | | |
| ***Weight Products*** *=> Age, gender, education, tenure . . . . (balanced) = "Weight_fin"* | | | |