This study examines the short- and long-run effects of various determinants on the demand for U.S. air passenger-services using the Johansen cointegration analysis and a vector error-correction (VEC) model. Results show that, in the long-run, airfare, disposable income and NASDAQ have significant effects on U.S. air travel demand. The combined short-run dynamic effects of disposable income, NASDAQ, population and airfare jointly explain changes in air passenger-miles. Finally, we find that the 9/11 terrorist attacks drop air passenger demand by 5% during 2001:Q3-2002:Q2, which in turn pushes down the seat capacity by 4%. However, it has little impact on airfare.
Airports of the Future: Air transportation by the year 2050
Rosa Maria Arnaldo, Universidad Politécnica de Madrid (UPM)
Ricardo Román, Universidad Politécnica de Madrid (UPM)
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Jose Félix Alonso, Polytechnic University of Madrid (UPM)

The air transport sector has an important role in the global economy, mainly because of its influence in the Gross Domestic Product, generation of jobs and improvement of people’s mobility. Within the Air Transport System, the airport plays a vital role. Due to the increasing number of passenger traffic in airports worldwide, the system is reaching a saturation situation in the near future.

As a consequence, several proposals have emerged in order to search for new and innovative ideas for the airports of the future. In particular, the “Airport 2050+” project studies and analyzes the concepts which propose radical and novel solutions to prepare airports for 2050 and beyond. The objective of these airport concepts, which have been proposed through the Advisory Council for Aeronautics Research in Europe (ACARE), is to maximize value through efficient and effective air transport operations. The project has a total duration of 30 months, and the results are meant to be applied in any airport of the world.

The airports of the future will have to meet different objectives amongst other in the areas of environment, costs and performance. Each airport is likely to have a focus on one of these areas that can vary between different airports. Therefore, the “2050+ Airport” project develops three different airport concepts (passenger time efficient, climate neutral and low cost) which explore what the future airport will look like when taking one of the areas as the main objective. The project shows the benefits and challenges of the different concepts and the trade-offs between the different areas to be made. The airport concepts describe the interface between the aircraft and the ground as well as the new principles for the airport layout including intermodal connections.

The first concept considered has the objective of achieving a seamless travel of passengers and baggage through the airport. This means that the passenger, their baggage, cargo, and the aircraft, need to physically come together and flow seamlessly through the air transport system of which this airport is a pivotal part. Thus, the passenger must be able to depart from his point of origin, be transported to the airport, and board the aircraft without any disruption. The aircraft
subsequently takes off and when it lands, the passenger can exit straightaway and continue on to be transported to his final destination. This way, the total journey time of a passenger (from door to door) is significantly shortened. For this purpose, the airport should have efficient internal processes and should be fully integrated with other means of transportation, specifically with the railroad network. The new information technologies and information sharing platforms would facilitate data sharing and decision making processes.

The second concept objective is to describe the airport of the future to be climate neutral; this is, to be self supporting to its energy needs and to operate in a way that minimizes its impact to the environment and the noise produced to the surrounding area, as well as being operative independently of the meteorological conditions.

Finally, the third concept objective is to create an airport with extremely low operating cost. In the future, low cost airlines and their passengers are the users and they will require minimal airport charges, although safety and security are not compromised. For the low cost airport it is especially important to consider the non-performance cost, which are the costs incurred by the airline and airport due to non-performance of the aircraft like missed transfers by passengers and cancelled flights.

The approach is to develop concrete concepts taking into account input from existing studies. The project provides a scientific methodology to develop and evaluate innovative airport concepts. With this methodology, the output will show which step change innovation is proposed to prepare the different types of airports for the second half of this century.
An Investigation of Factors Influencing Travelers’ Choice of Mode and Transit Ridership in a Metropolitan Area
Hsing Chung Chu, National Chiayi University
Li-Yen Chang, National Chiayi University

This research investigates the relationship between influential factors of competitive transport modes and traveler’s preference for mode choice behavior as well as transit ridership. Survey techniques of revealed preference and stated preference were applied to collect mode choice data including transit, bus, taxi, and automobile in the Kaohsiung metropolitan area, Taiwan. Estimation results of the nested logit model indicate that trip purposes (e.g., work, school, leisure, shopping), travel time, on-time performance, access time, access cost to the transit station, route network, and frequency of feeder bus services significantly affect the mode choice decisions and transit ridership.
Are Land-use Planning and Congestion Pricing Mutually Supportive?  
Evidence from a Pilot Mileage Fee Program in Portland, OR  
Zhan Guo, NYU  
Asha Agrawal, San José State University  
Jennifer Dill, Portland State University

Congestion pricing and land-use planning have been proposed as two promising strategies to reduce the externalities associated with driving, including traffic congestion, air pollution, and greenhouse gas emissions. However, they are often viewed by their proponents as substitutive instead of complementary to each other. Using data collected over 10 months from 130 households from a pilot mileage fee program run in Portland, OR, we explore whether congestion pricing and land-use planning are mutually supportive in terms of VMT reduction. We found that with congestion pricing, the VMT reduction is greater in traditional (dense and mixed use) neighborhoods than in suburban (single-use, low density) ones, probably due to the availability of travel alternatives in the former. Under the same land-use pattern, land use attributes explain more variance of household VMT when congestion pricing is implemented, suggesting that this form of a mileage fee could make land-use planning a more effective mechanism to reduce VMT. In summary, land-use planning and congestion pricing appear to be mutually supportive. For policy-makers considering mileage pricing, land-use planning affects not only the economic viability but also the political feasibility of a pricing scheme. For urban planners, congestion pricing provides both opportunities and challenges to crafting land use policies that will reduce VMT. For example, if a pricing zone overlaps with dense, mixed-use and transit-accessible development, it can reinforce the benefits of these development patterns and encourage greater behavioral changes.
Assessing the Strategic Evolution of U.S. Low Cost Airlines in the Post-9/11 Environment

Carl Scheraga, Fairfield University
Paul Caster, Fairfield University

Alamdari and Fagan (2005) have suggested that low-cost airlines have, in varying degrees, departed from the original low-cost model introduced by Southwest Airlines. They examine the single year of 2001 utilizing a qualitative checklist of product and operational features to measure differences in strategic positioning in a combined sample of U. S. and European low-cost airlines. This study provides a multi-year analysis in the post-9/11 time period, for the years 2004-2009, of the demonstrated strategic positioning choices of U. S. low-cost airlines. The sample utilized is restricted to U. S. low-cost carriers so as not to conflate operating environments. Furthermore, a quantitative methodology is employed to effectively measure these choices and to facilitate inter-firm comparisons.

Airlines, as part of their strategic planning process, articulate positions with regard to cost leadership, product differentiation, and growth. Decisions implemented are dynamic and inter-temporal in nature. Therefore, it is often difficult to assess the effectiveness of changes in strategies, particularly since such effectiveness is often a function of the confounding forces of organizational strategy and market conditions. Managers thus need a multi-period methodology to evaluate the implementation of strategic positions. One such approach is the strategic analysis of operating income.

Horngren, et al (2006) demonstrate a methodological template for decomposing operating income into three components: (1) growth, (2) price recovery, and (3) productivity. The growth component measures the change in operating income (whether due to a change in market share or market size) caused by a change in sales units while keeping sales prices, input costs, and input-output relationships constant. The price recovery component measures the change in operating income caused by changes in sales prices and unit input costs holding sales and input-output relationships constant. As Mudde and Sopariwala (2008) note, this component has two effects embedded in it. The revenue effect, holding sales units constant, measures the impact of changing prices. The cost effect measures the impact of changing input costs, again holding unit sales input-output relationships constant, and the price recovery component is affected by changes in revenues and by changes in costs. As Horngren, et al (2006) suggest, this component evaluates a company's product differentiation strategy. That is, a favorable price recover
component suggests that because of an airline's pricing power, it was able to elicit prices from passengers that more than compensated the firm for cost increases that were experienced. The productivity component measures the change in operating income caused by variations in input-output relationships. In other words, it captures an airline's operational efficiencies. Again, Horngren et al (2006) suggest that this component captures whether an airline's low cost strategy was successful because of efficiency gains.

The Horngren model is an outgrowth of research by Banker, et al (1989) on productivity measurement. Thus, this concept of strategically analyzing profitability is about 20 years old, but to date, has not been applied on an inter-company basis in the U.S. low-cost airline industry in the manner of a formal analysis. Thus, this study examines low-cost U.S. airlines in the post-9/11 environment, identifying comparative strategic positions across airlines and then assessing the implementation efficacy of these positions.
Choosing a Port: An Analysis of Containerized Imports into the U.S.
Adams B. Steven, University of Maryland
Tom Corsi, University of Maryland

Using a unique data set of individual shipments, port characteristics, and actual freight charges, we examined potential factors within management controls that affect the attractiveness of a port for containerized shipments. Specifically, we hypothesized that crane productivity and port congestion by impacting the speed of operations at ports can influence individual port choice. We further hypothesized that, the importance placed on each of these factors vary by the size of the shipper. We find support for our hypotheses that management control factors can add to the attractiveness of a port and that large shippers emphasize the factors affecting speed of delivery more than the freight charges they pay compared to small shippers. These findings have managerial implications because investments in port development would pay off depending on the fit between the type of investment and the customers' needs.

Our analysis provides the opportunity to inform port managers about opportunities to influence the attractiveness of their respective ports.
Commuters Attitudes to Frequency of Delays Days on Their Routes
Nikhil Sikka, University of Iowa
Paul Hanley, University of Iowa

Behavioral responses to travel time reliability has become an important dimension of understanding travelers’ route choice attitudes. Several sources of disruption, both random and predictable, constitute variations in the traffic conditions leading to increased travel time unreliability. The result of these incidents is limited or a total loss of capacity on particular and results in poor transportation network performance. Therefore, in the last two decades the measurement of transportation system reliability has become one of the central topics of travel demand studies. A more recent addition to this growing literature is the measurement of value of travel time reliability which provides a monetary cost of avoiding unpredictable travel time.

The goal of this study is to measure travelers’ behavioral responses to travel time reliability and their willingness to pay (WTP) to avoid unreliable routes. The route choice behavior is studied in the context of commuting trips. The preferences are elicited through a pivoted stated preference (SP) survey technique where commuters were to choose between different routes with different travel time reliability. Most previous studies link the concept of travel time reliability with the concept of travel time variability in which travel time is assumed to have a statistical distribution. The travel time reliability is then quantified in terms of the measure of spread of the assumed distribution. Although it provides an efficient way of measuring travel time reliability from an analyst’s point of view, it is not easy to communicate statistical distributions to general public in order to get realistic behavioral responses to travel time reliability. To circumvent the issue of presenting statistical distributions to day-to-day commuters, we use the frequency of delay days as a means of measuring people’s attitude to travel time reliability. Federal Highway Administration (FHWA) also recommends measuring travel time reliability in terms of frequency of delay days because of their technical merit and their simplicity to communicate to travelers. The advantage of using these measures in eliciting traveler preferences for travel time reliability lies in the fact that these methods simply compare days with high delay to days with usual travel time.

The data is analyzed using a panel mixed logit model. We found that travelers are not only averse to frequency of delay days but also the amount of delay they experience on those days. The WTP measures for travel time and travel time
reliability show significant heterogeneity and the mean WTP estimates are much higher for respondents who already pay tolls for their commute trips as compared to respondents who don’t. The mean of WTP corresponding to highly unreliable routes (i.e. frequency of delay days is 9 days out of 10 days) ranges from $17.14 to $23.56 per hour as compared to the estimate of $10.56 to $14.73 per hour for the reliable routes (i.e. frequency of delay days is 1 day out of 10 days). Therefore, this study provides valuable insight on calculating value of travel time reliability which is an important input to cost-benefit analysis of transportation investment projects (like tolls). We used a more realistic approach in eliciting travelers’ behavioral responses to travel time reliability by presenting reliability in a simpler way.
The construction of energy facilities such as wind farms and biofuel plants in local communities can be of great benefit to the latter. They can generate jobs and provide considerable revenue to the local land owners, while at the same time they contribute in the sustainability of the community’s (and the nation’s) resources, energy, and effectiveness. In the US, communities are beginning to develop both types of sustainable energy sources in an attempt to realize these benefits. However, wind farms and biofuel plants may also have adverse impacts on the existing infrastructure, the aesthetics of the local communities, the environment, and the safety of the neighboring residents. While a few communities have completed the process of constructing wind farms and biofuel plants, many more are expected to be presented with the opportunity. However, there is currently limited comprehensive information on sustainable energy policy considerations for local agencies. To that end, the objective of this paper is to provide local agencies with specific financial, community, site, environmental, safety, and infrastructure considerations and concerns, in order to make informed community decisions about the construction and location of sustainable energy facilities.
As freight movement continues to grow, the urban environment experiences great challenges providing adequate space, facilities and mobility for the trucks that are necessary for local pick-up and delivery activities. Many communities cannot afford to conduct extensive studies and are fiscally constrained with respect to implementing solutions. Street Smarts (now Stantec) was hired by FHWA to identify and document best practices that could be replicated by other cities and counties.

In order to develop the most useful case studies, an extensive review of freight-related projects and strategies that provide practical information and transferable solutions to the challenges that confront urban goods movement was conducted. The project team also conducted site visits and interviews with organizations involved in project implementation, including state departments of transportation (DOTs), metropolitan planning organizations (MPOs), city governments, and private-sector. These case studies provide information on freight-related initiatives that mitigate congestion and improve the safety and efficiency of commercial vehicle travel in urban areas. Los Angeles is one of four urban areas selected for study. The other areas are Orlando, New York City, and Washington, DC.
Sustainable energy source facilities such as ethanol plants, wind farms, and biomass power plants are constructed in many parts of the United States. To successfully construct and operate such facilities, proper roadway infrastructure is needed. The majority of the local roads are not designed to carry heavy loads typically associated with wind farm construction, or daily truck traffic generated by ethanol and biomass power plants during their construction and operation. This paper aims to identify specific critical loads and truck traffic volumes associated with the construction and operation of such sustainable energy source facilities. To that end, a simple procedure is presented, which provides a pavement structure design capable of withstanding heavy traffic loads, while at the same time quantifies the effects that new sustainable energy source facilities may have on local road networks. The procedure is accompanied by two MS Excel-based software tools that can be used in the design of local roads adjacent to ethanol plants, biomass plants, and wind farm facilities. The tools’ input is the capacity of the ethanol/biomass plant or the number of wind turbines to be constructed, as well as an approximate value of soil strength, and the output is pavement design specifications generated in a timely fashion. The design output of the developed tools has been compared to existing pavement designs used near similar energy source facilities with heavy load carrying abilities, and it was found to provide reliable and robust specification results. From a practical viewpoint, the developed tool is expected to prove useful to county highway administrators, as it provides timely and accurate estimates.
Politics is at the heart of the aviation economy in the United States. Any significant change in Federal aviation infrastructures involves the participation of very diverse and highly parochial economic enterprises, labor organizations, and general consumers of aviation services. The key political question for aviation environmental policies is how to garner support of politically influential members of the community, for service cost increases sufficient to reduce the social costs of emissions. The answer is to be found in transportation's historical dependence on Government and a tradition of public policies supporting long-term social goals and broad-based cost recovery, with highly particular, short-term distributive benefits, that motivate supporters and neutralize opponents.
A Game Theoretic Approach to Understanding Port Privatization Decisions: The Case of Panama Transshipment Ports
Anthony M. Pagano, University of Illinois at Chicago
Onésimo Sánchez, Panama Canal Authority
Ricardo Ungo, Panama Canal Authority

Panama has five main ports: Balboa and PSA on the Pacific side, and Cristóbal, Manzanillo and Colon Container Terminal on the Caribbean side. These ports mainly handle transshipment cargo. The ports of Balboa, Cristóbal and Manzanillo were originally operated by the government of Panama. These ports were privatized in the late 1990s. Balboa and Cristobal are now run by Hutchison Port Holdings. Manzanillo is run by MIT (Manzanillo International Terminal- Carrix/SSA). This paper will analyze the dynamics of port concessions considering that container terminal operators compete in a regional transshipment market. The nature of the transshipment cargo makes it possible for the operator to consider other locations for the terminal in the region. These outside options favor the bargaining power of operators during the negotiations. Using a game theoretic approach, this paper will analyze the decisions made to privatize the ports. The possible payoffs to the government of Panama, possible efficiency savings and the benefits to the private operators will be examined. The paper can have implications not only for port privatization, but PPP efforts in other modes as well.
Sustainable energy source facilities such as ethanol plants, wind farms, and biomass power plants are constructed in many parts of the United States. To successfully construct and operate such facilities, proper roadway infrastructure is needed. The majority of the local roads are not designed to carry heavy loads typically associated with wind farm construction, or daily truck traffic generated by ethanol and biomass power plants during their construction and operation. This paper aims to identify specific critical loads and truck traffic volumes associated with the construction and operation of such sustainable energy source facilities. To that end, a simple procedure is presented, which provides a pavement structure design capable of withstanding heavy traffic loads, while at the same time quantifies the effects that new sustainable energy source facilities may have on local road networks. The procedure is accompanied by two MS Excel-based software tools that can be used in the design of local roads adjacent to ethanol plants, biomass plants, and wind farm facilities. The tools’ input is the capacity of the ethanol/biomass plant or the number of wind turbines to be constructed, as well as an approximate value of soil strength, and the output is pavement design specifications generated in a timely fashion. The design output of the developed tools has been compared to existing pavement designs used near similar energy source facilities with heavy load carrying abilities, and it was found to provide reliable and robust specification results. From a practical viewpoint, the developed tool is expected to prove useful to county highway administrators, as it provides timely and accurate estimates.
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Determinants of Vessel-Accident Bunkers Spillage
T L Yip, Hong Kong Polytechnic University
Wayne Talley, Old Dominion University
Di Jin, Woods Hole Oceanographic Institution

A vessel may spill oil accidentally or intentionally. Accidental spillage may occur from a vessel accident or during the transfer of oil to and from a vessel. Typically, intentional spillage is operational dumping – e.g., a vessel during the discharge of its oil cargo will take on ballast water to provide stability to the vessel, but then dumps the dirty ballast water (a water-in-oil mixture) prior to or on arrival at a cargo-oil loading port. The largest vessel oil spillages are attributed to vessel accidents. With respect to determinants of vessel-accident oil spillage, the literature has focused on investigating determinants of the oil spillage of oil-cargo vessel accidents. This paper is the first to appear in the literature that investigates determinants of the oil spillage of non-oil-cargo vessel accidents, i.e., determinants of the bunkers spillage of non-oil cargo vessel accidents. The amount of bunkers spillage of a non-oil cargo vessel involved in an accident is posited to be a function of vessel type, hull type, bunkers fuel type, visibility at time of accident, type of vessel accident, and vessel operation phase. This function will be estimated utilizing detailed data of individual non-oil cargo vessel accidents that were investigated by the U.S. Coast Guard during the 8-year time period 2001-2008 and extracted from the Coast Guard’s Marine Information for Safety and Law Enforcement (MISLE) database. The U.S. Coast Guard compiles vessel casualty and pollution statistics and maintains a computer database of detailed records on vessel accident and pollution events in U.S. waters.

Specifically, the function will be estimated using Tobit regression analysis. Preliminary estimated results suggest that the amount of bunkers spillage from a non-oil-cargo vessel accident will be greater if the accident occurs at night, the vessel has a steel hull, the accident type is an allision, capsize, fire, grounding and material failure accident and larger the size of the vessel.
Effect of Transportation Infrastructure on Food Manufacturing Industries in the United States
Tingting Tong, University of Tennessee
T. Edward Yu, University of Tennessee

This paper evaluates the effect of transportation infrastructure investment on 34 food manufacturing industries in the United States from 1985 to 2005. By using heterogeneous dynamic panel methods including pooled mean group, mean group, and dynamic fixed effects, evidence suggests that highway and street infrastructure has a homogeneous long-run positive effect on the output of food manufacturing industry. Specifically, one percent increase in government fixed assets in highway and streets infrastructure will increase U.S. food manufacturing industry output by 0.21 percent. Transportation infrastructure also creates heterogeneous effect on the output across food manufacturing industries in the short run. The long-run positive food output impact of road infrastructure implies that increasing the formation of transportation infrastructure can enhance the output of food manufacturing industry, hence potentially mitigating the issue of the food shortage and high food price.
Traffic congestion is a significant problem for many transportation modes and a variety of operational actions, infrastructure improvements and policies can be employed to help mitigate congestion. Effectively assessing the impact of a congestion mitigation measure relies on the ability to accurately model the responses of users to varying levels of congestion. In freight transportation systems, shippers may respond to congestion by switching modes, destinations and/or time frames for shipments. In this research we show how modeling shippers’ responses to congested barge transportation on an important segment of the Upper Mississippi River (UMR) system strongly influences the expected economic benefits attributed to different congestion mitigation measures on the UMR.

The UMR is a key waterway in regional, national and global supply chains, especially for agricultural commodities. The majority of UMR traffic is grain sent downstream to Gulf ports for export and many shippers that use the UMR may have practical, but currently less preferred, alternatives available, such as shipping via rail to Gulf or west-coast export ports. Our research employs analytical models populated with historical operations data and recent survey results of agricultural shippers preferences calibrated to the UMR to help evaluate three key congestion mitigation measures for handling increasing river traffic and the resulting congestion on the UMR. The key measures are: (1) improved scheduling of barge tows by re-sequencing vessels in lock queues, (2) deployment of helper towboats at congested locks to improve the locking process, and (3) construction of new larger locks. Each congestion mitigation measure is analyzed under several scenarios reflecting differing levels of attractiveness for shipping alternatives to transportation on the UMR, including the scenario considered in prior research, where all traffic is forced to use the waterway regardless of the level of congestion.

We extend earlier work on simulation models of the UMR by developing a new model that embeds a shippers’ discrete choice random utility model within a complex simulation model that captures detailed operations on the most congested 100-mile segment of the UMR system, just north of St. Louis, MO. The random utility model recognizes that potential waterway users may (in their self-interest) opt out of using the system in response to anticipated poor levels of performance.
created by increased congestion and instead utilize alternative transport modes and/or shipment destinations. Incorporating the response of shippers to changed operating conditions improves existing simulation models by explicitly accounting for the behavior of self-interested economic agents in the modeling of system performance and by providing a foundation for deriving an estimate of the direct economic benefits associated with measures designed to improve system performance. Computational results are presented from simulations of operations on the UMR with three congestion mitigation measures under a wide range of forecast traffic demands in light of historical data and recent trends. Results document the sensitivity of the performance of the system under various congestion mitigation measures to the available alternatives to UMR transportation. The major contributions of this research include (i) demonstrating the value of using models that capture shippers’ responses to congestion and other varying economic conditions in transportation systems when users have alternatives, and (ii) illustrating a methodology for quantifying the direct economic benefits to users of different alternatives for improving transportation on the UMR.
Equitable recovery of cost of repairing, rehabilitating and reconstructing damaged highway pavements means that each vehicle class pays its fair share of highway use. In past studies, different approaches used field data and/or hypothetical preservation schedules to estimate the marginal cost of pavement damage. Also, most past studies considered rehabilitation cost only or rehabilitation and maintenance cost only. In overcoming these limitations, this paper describes a study that incorporated costs and schedules involving all three preservation categories associated with pavement damage repair, namely, routine and periodic maintenance, rehabilitation, and reconstruction. This was done for each of the three major highway functional classes: Interstate pavements, non-Interstate pavements on the National Highway System (NHS), and Non-NHS pavements. The study results show that failure to consider any one of the preservation categories can be very detrimental to the estimation of pavement damage cost. Compared to the ideal and recommended scenario where all three major preservation categories are considered, failure to consider reconstruction cost leads to 36% underestimation of pavement damage cost, similarly, failure to consider reconstruction and routine maintenance leads to 45% underestimation of pavement damage cost. Consideration of rehabilitation only (that is, non-consideration of reconstruction and maintenance) at hypothetical fixed intervals or expert opinion, leads to 25% underestimation of marginal pavement damage cost. Also, the study results suggest that pavement damage cost is generally 53% higher for old pavements compared to new pavements. Finally, sensitivity analyses show that the estimates of marginal pavement damage cost are highly sensitive to length of analysis period and interest rate used in the analysis and moderately sensitive to effectiveness and cost of the individual construction, rehabilitation, and maintenance treatments that constitute highway preservation schedules.

Related Links
Evaluation of the Impacts of Land Use Household Vehicle and Trip Characteristics on Automobile-Specific Carbon Dioxide (CO2) Emissions

Saidi Siuhi, President's Office Planning Commission, Tanzania
Judith Mwakalonge, South Carolina State University (will be presented by Mr. Jason Reed)
Judy Perkins, Prairie View A&M University

This paper evaluates the impacts of land use, household, vehicle, and trip characteristics on automobile-specific CO2 emissions using the 2009 National Household Survey (NHTS) conducted by the U.S. Department of Transportation. Overall, the results highlight the importance of contextual and individual factors contributing to CO2 emissions. Residential density measured in terms of housing units per square mile significantly impacts on CO2 emissions. The results indicate that converting the current average residential densities to the optimal value for Metropolitan Statistic Areas (MSA) with population density of three (3) million or more would cut CO2 emissions per trip by approximately 37%. Vehicle ownership decisions and their use are also an important factor in determining the amount of CO2 emissions released per trip. As expected, increasing the proportion of vehicles that are hybrid or use alternative fuel has large impact in reducing CO2 emissions. The results also demonstrate that shifting travel to the use of small cars instead of van/sport utility vehicles and pickup trucks would cut CO2 per trip by about 42% and 51%, respectively. The results also have shown the significance of incorporating the patterns of trips making in estimating the amount of CO2 emission models. Non home-based trips produce comparatively higher amount CO2 emissions per trip compared to other trips. This reflects the impact of temporal distributions of different trip purposes. This suggests that encouraging motorists to make discretionary trips during relatively uncongested traffic than congested conditions could significantly reduce CO2 emissions.
Transportation planners monitor trends in transportation system supply and demand so that they can predict reliably the direction and magnitude of future gaps and take the appropriate palliatives to mitigate any expected extreme gaps. Where there are adequate data on the influential factors of supply and demand, planners can develop an optimal, phased supply schedule for the entire life of a new infrastructure or for the remaining life of an existing infrastructure, such that total cost (underutilized capacity and user cost) over the remaining life, is minimized. In this paper, we present a generalized discussion on how such gaps could be recognized quantitatively and minimized, for different scenarios. Then, we illustrate one scenario using a case study involving the Beijing Capital International Airport (BCIA). Our development of an optimal supply schedule for BCIA included a forecast of long-term passenger demand forecast over a selected analysis period, and estimation of agency costs (of capacity expansion) and user costs (of passenger time delay due to inadequate terminal capacity). A comparison of the optimal schedule and the actual schedules for supply over the first part of the analysis period (1960 and 2010) suggests that the actual capacity-supply schedule appeared not be very responsive to the growing demand in the years 1990-2010 and thus significant user delay was encountered in that period. Recognizing that a user cost dollar is not necessary equal to an agency cost dollar, a sensitivity analysis was carried out for different relative weights, and it was seen that the optimal solution is very sensitive to the relative weight used for the analysis.
Highway Capital Accumulation and Induced Travel
Sisinnio Concas, Center for Urban Transportation Research

This paper develops an intertemporal optimization framework to study the effects of public capital investment on the demand for travel. Using a panel of 50 U.S. states over the period 1980-2008, we find that increasing the stock of productive capital by investing in additional highway infrastructure has positive short run effects on the demand for travel. Results indicate that the elasticity of travel demand with respect to changes in state highway capital stock is equal to 0.12, substantially less than previous study short run estimates of 0.50. We show that capital expenditures, when viewed within this framework, represent a more comprehensive predictor than changes in lane miles added, a common approach found in the empirical literature. We also revisit discuss of endogeneity, sequential exogeneity and simultaneity between travel demand and road supply that have direct implications on the use of simultaneous equation models within this field of research.
A Model for Evaluating Emission Benefits and Economic Effects after Closing Drive-Thrus
Hetal Bhatt, City of Arlington
Stephen P. Mattingly, University of Texas at Arlington
Melanie L. Sattler, University of Texas at Arlington
Antonio Massidda, University of Texas at Arlington

In many areas of the United States, air quality challenges are caused by on-road mobile sources. All non-attainment regions must develop strategies so that the regions’ air quality can attain the National Ambient Air Quality Standards. With implementation of the new, more stringent 75 ppb ozone standard over the next several years, new innovative strategies for meeting air quality goals must be considered. Metropolitan Planning Organizations (MPOs), state and federal environmental regulatory agencies and academic researchers are considering such measures. Policies implementing restricted or controlled drive-thru activities are one such strategy being considered by the authorities. While the exact policy has not been determined, the magnitude of the potential air quality improvement needs to be investigated. After determining the magnitude of the improvement, other policy issues such as social and public acceptance and feasibility can be examined.

This study develops a methodology for estimating emission benefits associated with drive-thru restrictions by characterizing a drive-thru as a steady-state queuing system(s). The researchers formulate emissions factors to represent the emissions associated with different vehicular activities (e.g. moving forward, idling, and moving backward) at the facility. The researchers then formulate the emissions attributable to each queuing system state. After collecting arrival and service rates during morning (7-10 a.m.) and lunch (11 a.m. – 2 p.m.) periods at a fast food restaurant, the team estimates drive-thru emissions during each period. At this site, a drive-thru closure will result in a 61% (16 gm) nitrogen oxide (NOx) reduction over the morning hours and a 67% (16.1 gm) NOx reduction over the lunch period.

Region-wide, the air quality impact of closing drive-thrus could be substantial. As an example, in 2006, the North Central Texas Council of Governments (NCTCOG) modeled 7 Transportation Control Measures (TCM) as part of the State Implementation Plan (SIP) development process for ground-level ozone. These TCMs collectively reduced nitrogen oxide (NOx) emissions by 1.27 tons per day in the North Central Texas region. Our estimates suggest that careful implementation of drive-thru regulations alone could yield at least 5-10% of the 1.27 tons per day.
Closures could be considered for drive-thru lanes at fast food restaurants, as well as banks/credit unions, coffee shops, pharmacies, and other businesses. The research evaluates and estimates the economic and health impacts of proposed drive thru restrictions.
Impact of Stale Rates in Truckload Shipments
Bobby J. Martens, Iowa State University
Yoshinori Suzuki, Iowa State University

Contract truckload rates represent the rates which both shippers and carriers agreed to use, and are specific to each origin-destination lane. The contract rates can be changed in two ways. First, each shipper can perform a "procurement exercise" to adjust the contract rates of all the carriers they use. This procurement exercise basically represents a large bidding (auction) process administered by a shipper or by a third-party logistics company (3PL) for a shipper, in which carriers provide bids for each lane or for a set of lanes and the shipper or 3PL determines the set of carriers to use, along with the new contract rates. Second, the contract rates can also be adjusted from the carrier side on an "as-needed" basis. Carriers increase or decrease their rates for a variety of reasons (e.g., economic conditions and changing network structures of carriers). This second type of change can take place at any time; i.e., can happen any time between two procurement exercise dates. Carriers can also affect the rates of a shipper indirectly by not honoring contract rates (rejecting load tenders). In this case the contract rates do not change, but the shipper must seek for other carriers that can haul the rejected shipments, which generally results in higher rates (accepted rates) for the shipments.

From the shippers’ standpoint, it is important to understand how carriers are adjusting and honoring contract rates between two procurement exercises, as it will help them understand the value of performing rather-costly procurement exercises. Of particular interest is whether or not the lane rates (accepted rates) tend to increase over time. If, for example, carries adjust rates or reject load tenders purely based on economic conditions (i.e., increase rates and/or reject tenders when economy is good and the capacity is tight, but decrease rates and/or accept tenders when economy if soft and the capacity is loose), the rates should not be an increasing function of time after controlling for economic trends. In this case there is little or no value for performing procurement exercises (ever) because it implies that, in theory, the “re-optimization” of contract rates will not lower rates in the long run. If, however, carries adjust rates or reject load tenders conveniently such that they increase their rates at a faster rate than that accounted for by the economic growth or start rejecting loads soon after the procurement exercise date, the rates will be an increasing function of time. In this case performing procurement exercises on a regular basis will be helpful for shippers to control
transportation costs, because it eliminates that portion of the rate which increases over time (time effect).

Based on a collaborative research project conducted with C.H. Robinson Worldwide (CHRW), the largest 3PL in North America, this paper examines the value of performing procurement exercises by empirically investigating whether the accepted rates of truckload carriers tend to increase over time between two procurement exercise dates. Using the U.S. domestic truckload shipment data for years 2008 through 2010 obtained from CHRW, which contain over 700,000 records, we use an econometric model to estimate how actual rates are affected by time, in days, since the last procurement exercise date. Results indicate that there is significant value for performing a procurement exercise and that shippers who perform procurement exercises on a regular basis achieve considerably lower average rates per load than those that perform procurement exercises only occasionally.
Impetus to Short Sea Shipping Lines through Marine Highways: Trade Growth between Latin America and U.S.
EunSu Lee, North Dakota State University

This paper investigates the empirical evidence of the impact of the trade growth between Latin American and U.S. The container shipping lines experience the rebounded business from the economic recession to the stage of 2008 in terms of container throughput. The exported containerized freight to U.S. decreased 206,000 TEUs by 43% in Brazil, 9000 TEUs by 5% in Chile, 10,000 TUEs by 10% in Columbia. However, in 2010, the number of containers slightly increased from Latin America. The growth in the future would affect the U.S. transportation infrastructure of ports and hinterland accessibility. To mitigate the congestion at ports and environmental issues, U.S. DOT’s Maritime Administration (MARAD) initiated the America’s Marine Highway Program. The authors investigates the future impact of the initiatives and Latin America’s trade since the container vessels become larger to handle massive containerized freight from Asia and the shipping lines practice marine hub-and-spoke system to avoid the port capacity issues to the larger vessels. In accordance with the shipping size and routes, the Latin America’s trade routes will plays a major role on the U.S. transportation infrastructure to stay viable in increasing competition in the North America for the U.S. markets. This paper uses geospatial regression model in GIS and optimize the cost efficient routes for the Latin America’s container shipping lines and the U.S. short sea shipping lines by connecting landside intermodal systems.
Minimizing transportation cost is essential in the forest products industry. Wood and chips are relatively low value, yet are dense heavy weight products to transport. As a result transportation cost represents a large portion of the final delivered product price. The Midwest forest products industry competes in a global market, and the region’s value proposition is highly dependent on an affordable and efficient transportation system. Understanding of system efficiencies requires sufficient data, but while most individual forest products companies collect data on truck trip origin and destination, little is known about the actual daily truck activity within the region. One method to collect data on continuous truck movements is with Global Positioning Systems (GPS) data receivers. Since the cell phone coverage in the region is very sparse and unreliable, using satellite based GPS transponders is a logical alternative, but the use of such devices has been limited in the forest products industry, partially due to high cost of devices and partially due to the fact that the financial benefits of these tracking systems haven’t been demonstrated for many owner operators, nor has this data been required for payment.

The primary objective of this research effort was to provide transportation time and movement data for actual shipments of logs and chips to gain insights on how to improve system efficiency. While system improvements reduce costs and provide overall economic benefit to the supply chain, the research team was not provided with commercial rate data or cost information to make economic conclusions.

Truck transportation of logs and chips in the Upper Peninsula of Michigan, Northern Wisconsin and Minnesota is a challenging business due to the fact that the logging sites are widely dispersed in a large and rugged rural area. Many log loads originate off public roads networks, making site identification difficult for trucking companies unfamiliar with the region. Specialized equipment is needed to load trucks at the job site. Unpaved roads often limit harvesting productivity during freeze and thaw cycles. Many trucking companies complain of delays and process inefficiencies yet
lack data to refute claims. And finally, transportation is a significant cost component in the global fiber supply chain business.

The research team undertook the industry challenge and recruited a sample of volunteer operators to allow real-time data collection to document the day to day trucking operation in this region. It is estimated that there are 600-700 truckers in the region, most are owner operators (Green 2005). Despite repeated efforts to have participation by a statistically significant number of truckers, many truckers were hesitant to participate in the study for various personal reasons. GPS monitors were used to map and chart the routes used. This data was supplemented by driver activity log sheets to describe the daily operational events. Two data collection periods were undertaken. Eight trucks participated in the first data collection effort which spanned a four week period between October and November 2010 and five trucks participated in January and February 2011. A mix of log and chip trucks participated in the effort.

This research effort concluded that there are significant similarities between log and chip truck movements. It also validated the fact that the main barrier to truck productivity involves numerous truck stops required either for loading or unloading and short average length of haul. There are differences between log and chip truck productivity. Chip trucks had significantly shorter unloading times when compared to the log trucks and they recorded higher average daily mileage. The research did not identify specific inefficiencies in the actions of truck drivers, but it was recognized that trucks experience extensive idle periods during operation due to other nodes in the supply chain efforts to optimization costs. The sensitivity analysis conducted to identify potential savings from reduced idling, suggested that several hundreds of dollars in fuel savings could be realized by each individual truck if idling could be reduced.

While extensive effort to assemble a statistically valid sample size was made, the truckers in the region have been struggling to survive based on reduced freight volumes, increased operating costs and an environment of increased regulatory scrutiny. Anecdotal comments from the drivers contacted for the study included concern about how the data would be used, downward rate pressure from landowners and the potential for regulatory repercussions.

Findings, while not statistically significant based on the sample size, identified that loading time took twice as long as unloading time. Loading time amounted to 36-
55% of total stop times. Unloading time amounted to 16-28% of the stop times. Technical, mechanical and unknown stops represented 6-35% of the stop time.
Imputing Erroneous Data of Single-Station Loop Detectors: Using a Spatial-temporal State-space Model
Weihao Yin, Virginia Tech

The effective use of loop detector data for traffic management applications requires that errors be efficiently detected, diagnosed and corrected. This paper combines the temporal information and spatial information together to provide corrections to known erroneous loop detector data using spatial-temporal state-space model based on Expectation-Maximization algorithm. The proposed method differs from previous ones due to its integration of both recent temporal and spatial information, which could improve the correction accuracy. The proposed method is compared to existing data imputation methods. The results suggest the proposed method does provide increased robustness and sufficient accuracy.
Individual Freight Effects, Capacity Utilization, and Service Quality

Betty Krier, U.S. Department of Transportation
Chia-Mei Liu, U.S. Department of Transportation
Brian MacNamara, U.S. Department of Transportation
Jerrod Sharpe, U.S. Department of Transportation

This paper presents a new perspective on the post-deregulation rail industry. We hypothesize that a link exists between individual freight effects and Amtrak's service quality. Our sample consists of 891 directional station-pairs between fiscal years 2002 and 2007 on 28 Amtrak non-Northeast Corridor passenger routes. We found that freight effects have a significant impact on the delays of Amtrak trains after controlling for other important delay determinants such as the capacity utilization rate. The impact is higher on long-distance routes. We also observed significant differences among freight railroads. For example, travel on several freights' tracks increased Amtrak trains' delays, while travel on Freight 1's tracks reduced delays below baseline levels.
Influence of Network Structure and Urban Form on Multimodal Public Transit Utilization
Yu Zhang, University of South Florida
Makarand Gawade, University of South Florida

Increasing urban population leads to extensive travel demand, traffic congestions and negative environmental impact. Public transportation is advocated as a low-emission alternative for auto mode. However, the utilization of public transportation is significantly low in the US. This study investigates the transportation network structures and urban forms and explores the relationship between them and the utilization of multimodal public transportation. The level of analysis is at individual, household and also on an aggregate regional level. At individual level, interactions of socio-economic characteristics are also considered in the evaluation study. The study starts from a thorough literature review to synthesize the metrics and spatial models for network structure and urban forms and to assess the benefits of multimodal transportation system (MMTS) from social, economic, environmental and public health perspectives. Several census and travel surveys are used as the sources of data. Some of the urban form and network structure related variables are extracted from GIS maps of study areas. These GIS maps involve land use forms and network structure of the study areas. Advanced econometrics models like regression and discrete choice (nested and joint logit) are applied to explore and quantify the interactions between the determined metrics and the utilization of MMTS using various direct and indirect parameters. Then several cities from 50 largest cities in the US are selected as the case studies. Furthermore, potential policies and innovative technologies are proposed based on the outcomes of the models.
Modern Roundabouts Offer Safety, Sustainability, Efficiency and Green
Ken Sides, City of Clearwater

Modern roundabouts are the new, green configuration of roadway intersection that are replacing conventional intersections in large numbers worldwide. The Federal Highway Administration says modern roundabout reduce fatalities by more than 90%, and injuries by 76%. Modern roundabouts can improve operational efficiency and in many cases, reduce emissions and GHGs by as much as 20-30%, yet require no new technology and maintain normal operation during power outages.
Ride or Relocate? Transportation and Housing Options for Senior Adults
Del Peterson, North Dakota State University
Marc Scott, North Dakota State University

The American population continues to mature with an impending ‘aging tsunami’ just a few years away. Public transportation provides freedom to much of the aging population who would otherwise be forced to give up their lifestyles. Critics of publicly funded transportation argue that many of the aging population would be better off relocating to larger communities where desired services are more readily available (Cox and O’Toole, 2004). Public transportation proponents believe that it is more desirable for aging Americans in rural areas to remain in their homes and utilize public transportation (APTA, 2008).

The objective of this research was to quantify the cost of living at home and riding transit in North Dakota versus relocating to an assisted living facility. Special attention was paid to three different living situations including homeowners with and without mortgages as well as apartment dwellers. Overall, simulation results indicated that the cost of assisted living was almost always higher than the other three alternatives. Homeowners without mortgages had the lowest costs followed by apartment dwellers and homeowners with mortgages. Finally, every senior’s situation is unique and other factors such as amenities and safety may be more important than cost in considering quality of life and peace of mind for them and their families.
Severity Analysis of Single Vehicle Run-Off-Road Crashes using Kansas Data
Sunanda Dissanayake, Kansas State University
Uttara Roy, Kansas State University

Run-off-road crashes in the United States have become a major cause of serious injuries and fatalities. Statistics based on Fatality Analysis Reporting System (FARS) data from 2008 illustrated traffic fatalities. Statistics about fatalities in Kansas due to ROR crashes are even worse than the national statistics. For the same year (2008), percentage of ROR fatal crashes was about 66% of total fatal crashes in Kansas. A significant portion of run-off-road crashes are single vehicle run-off-road crashes that occur due to collision with fixed objects and crashes due to overturning. Accordingly, this study was conducted with the intention of identifying the factors associated with high severity of run-off-road crashes in Kansas.

Single vehicle run-off-road crashes that occurred between 2004 and 2008 were extracted from Kansas Accident Reporting System (KARS) database to identify the important factors that affect their severity. Different driver, vehicle, road, crash, and environment related factors that influence crash severity are identified using binary logit models. Three models were developed taking different levels of crash severity as response variables. The first model taking fatal or incapacitating crashes as the response variable seems to be better than the other two models developed. The variables that were found to increase the probability of all levels of run-off-road crash severity are driver related factors such as driver ejection, being an older driver, alcohol involvement, license state, drivers at fault, medical condition of the driver; road related variables such as speed, asphalt road surface, dry road condition; time related factor such as crashes occurring between 6 pm and midnight; environment related factors such as daylight; vehicle related factors such as SUVs, motorcycles, vehicle destroyed, vehicle disabled, vehicle traveling straight, and vehicle passing; and fixed objects types such as trees and ditches.

The variables that are identified in this study as influential towards crash severity can help in developing appropriate countermeasures to reduce the severity of single vehicle ROR crashes.
Cities of developing countries are engines of growth, but rapid urbanization and uncontrolled land development leads to improper expansion of cities. The result is increased trip distances that impact negatively on transportation, which is a critical service needed for development. There is a general consensus that these trends are not sustainable. The transportation system is complex, consisting of large numbers of elements, which cut across socioeconomic, environmental and cultural concerns. Hence a sustainable solution must seek to integrate all these components into the solution.

The transportation characteristics in most developing countries are completely different from what pertains in the west. Yet most developing countries adopt conventional transportation planning methods that are developed based on the western system. Such planning methods are rigid and weak in public participation. Other planning methods, which seek to explore social interactions, are important for developing countries, because of their community culture. Hence the concept of participatory approach to planning is fast gaining recognition from many development partners, and also from the World Bank, which supports most projects in developing countries. Another concept which is becoming relevant in developing countries is indigenous knowledge, because of the way indigenous communities are able to leave at peace with their natural environments.

In a transport survey carried out in Accra, the researchers seek to show that system users often have their unique understanding of the transportation problem and when given the opportunity, they are able to communicate their needs in simple terms for incorporation into the planning process and complement the input from experts. In many developing countries, the opinion of system users is an important ingredient for project success, because car ownership in Accra for instance is about 20%. This means over 80% of the population are public transit dependent and usually have no other options for travel. Most of these system users are also illiterates and are often ignored in the planning process. In other words, they are ‘captive’ transit users. On the other hand, majority of the experts have their private means of transport and are socially excluded from the everyday needs of the system. This means their proposed solutions may not always meet the needs of the users. Bridging this divide between users and experts could make
transportation policies and projects more acceptable and patronizing, leading to more judicious use of scarce resources.
A Multistage Stochastic Optimization Model for the Optimal Transportation Fleet Management Problem
Wei Fan, The University of Texas at Tyler

The objective of this paper is to addresses the Optimal Transportation Fleet Management Problem (OTFMP) in a carsharing context, in which the service operator must manage fleets of vehicles and determine the optimal vehicle allocation in both time and space in order to maximize profits. A multistage stochastic optimization model which can explicitly take into account demand uncertainties is formulated. A Monte Carlo sampling based stochastic optimization technique is used to solve the OTFMP. Numerical results are described and insights into the OTFMP are also presented.
The Attitudes of Qatari Nationals and White-Collar Resident Workers Towards the New Traffic Law in Qatar
Elawad Elmogiera, Qatar University

In 2007 the government of Qatar enacted a new traffic law with the objectives of improving the traffic flow and reducing the road traffic-related death and accident rates in the country through policy interventions, mass media and national traffic campaigns. Three years have passed since then and Qatar is still among the countries with the highest death accident rates in the world. Using the 2011 Social and Economic Survey Research Institute (SESRI) Omnibus Survey, we ask Qatari nationals and white-collar resident workers about their level of knowledge and awareness of the national campaigns for the prevention of road accidents and their level of commitment to the new traffic law. Respondents were also asked about the main causes of traffic accidents in Qatar and their attitudes towards the new penalties for traffic violation associated with the new law. The purpose of this presentation is to highlight the results of this important study.
Technology to produce fuels from biomass is on the verge of commercialization. However, many feedstock and biofuel logistics issues must be addressed prior to initiation of large-scale production. This is especially true in the northern plains where remote production, deteriorating infrastructure, and weather-related impacts on biomass harvest effect feasibility.

In this study, the economics of sourcing wheat straw and corn stover within a 100 mile radius of 20 mgy cellulosic biorefinery located in central North Dakota are determined. Total delivery costs which consist of on-farm collection, farm-to-storage transport, storage, and storage-to-plant transport costs are identified. Wheat straw storage sites and routes are located using a GIS-based linear program.

The complex economic and environmental relationships among biomass feedstock agronomics, harvest, densification, handling, storage and transportation are explored. Transportation infrastructure impacts resulting from moving straw and stover and the implications of the emergence of a cellulosic-based bioenergy industry on rural transportation finance are also considered.

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In recent years, urban policies have aimed to reduce presumed inefficiencies associated with suburbanization. Since it is assumed that the auto is the main cause of urban sprawl, the policies are intended to reduce auto usage and increase transit usage. The intent is to produce a more compact urban area. These policies attempt to achieve that objective by manipulating urban form. The evidence on such transport strategies, however, is mixed. We think this is so because most empirical research is based on ad hoc empirical specifications, lacking a formal behavioral framework that considers travel as the result of activities planned and executed through space and time. To address this shortcoming, we present empirically implementable models of the interaction between urban form and transit demand drawn from urban economic theory. The theoretical hypotheses are empirically tested using a dataset that integrates travel and land-use. We find that population density does not have a large impact on transit demand and that the effect decreases when residential location is made endogenous. We find that households living farther from work use less transit and that trip-chaining behavior explains this finding. Therefore, reducing the spatial allocation of non-work activities and improving transit accessibility at and around subcenters would increase transit demand. Similar effects can be obtained by increasing the presence of retail locations in proximity to transit-oriented households. Although focused on transit demand, the framework can be easily generalized to study other forms of travel.
The Impact of On-Street Parking Availability on the Car Ownership of Households with Off-street Parking

Zhan Guo, NYU

Local governments’ minimum street-width standards often force developers to over-supply, and residents to pay for, a large quantity of on-street parking in residential neighborhoods. These free parking spaces could potentially encourage car ownership and usage and reduce the affordability of housing. In this paper, I examined the impact of residential on-street parking on the car ownership decisions of households who already have off-street parking. The main dataset is a household travel survey conducted in the New York City metropolitan area in 1998, the most recent one of its kind. I obtained the home addresses from the New York Metropolitan Transportation Council (NYMTC) after signing a confidentiality agreement. A sample of 403 households were randomly selected from the neighborhoods right outside the Manhattan core—Brooklyn, the Bronx, Queens, North Manhattan (110th street), and ten municipalities across the Hudson River in New Jersey. For each household, the car ownership and household information is obtained from the NYMTC survey while the off-street and on-street parking supply is measured through Google Street View and Bing Maps Birds Eye View. Off-street parking supply includes both garage and driveway spaces. On-street parking supply is measured based on the number of empty spaces on both street sides within 150 feet from both directions from the household residence.

I first tested the endogeneity between parking supply and car ownership using instrumental variables. Over-identification tests indicate the instrumental variables are valid, but the Hausman tests are insignificant at the 10 percent level. This suggests no or weak endogeneity between parking supply and car ownership in the sample. The correlation between off-street and on-street parking supply is also low due to the unique set up of the case study. Therefore, I estimated the impact of on-street parking on car ownership levels without correcting the endogeneity, using both multinomial and ordered logit models and controlling for demographic and urban form variables and off-street parking.

Estimation results show that the availability of on-street free could affects a household’s car ownership even when they already have off-street parking. Simulation also indicates that free and readily available on-street parking increases private car ownership by 8.8 percent, or one out of eleven cars purchased in the study region by households with off-street parking. A similar effect is likely to hold in lower-density communities. Because private developers are reluctant to provide
on-street parking and residents are unlikely to pay for such parking if the cost is not bundled with housing, this increased car ownership is largely the result of (ineffective) government intervention in the market. The policy recommendation is that local governments should revise their street standards and make the provision of on-street parking optional. They should let the market decide whether, and how many, on-street parking spaces to provide in new residential developments. Because the U.S population will grow by 110 million by 2050, and between 70 and 90 percent of this growth will occur in greenfield developments, such a policy change could affect the fate of millions of cars and have a tremendous impact on our built environment.
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on-street parking and residents are unlikely to pay for such parking if the cost is not bundled with housing, this increased car ownership is largely the result of (ineffective) government intervention in the market. The policy recommendation is that local governments should revise their street standards and make the provision of on-street parking optional. They should let the market decide whether, and how many, on-street parking spaces to provide in new residential developments. Because the U.S population will grow by 110 million by 2050, and between 70 and 90 percent of this growth will occur in greenfield developments, such a policy change could affect the fate of millions of cars and have a tremendous impact on our built environment.
The Impact of Recent U.S. & European Airline Mergers on Industry and Airport Concentration Levels
Aisling Reynolds-Feighan, University of College Dublin

This paper reviews the merger policies of US and EU regulatory agencies in relation to airline mergers. Using capacity data from the Official Airline Guide (OAG), the impact of mergers in the US and Europe is examined at the industry level and for the largest airports. The concentration levels on the routes and airports of merging carriers are measured before and after the mergers and issues relating to market definitions are highlighted. The implications of network reorganisations by the merging carriers are related to regional accessibility in a selection of cases. It is demonstrated that concentration levels at many of the largest airports have remained very high, or even increased in the last decade. Industry concentration has also increased significantly in the US in last three years and this should be cause for concern. A broader perspective, examining more than just the competitive impacts on overlapping routes of merging carriers, is recommended.
The Relationship between Characteristics Associated with High Reliability and Commercial Aircraft Accident Rates
Patrick D. O'Neil, University of Nebraska at Omaha
Kenneth Kriz, University of Nebraska at Omaha

This study uses time series analysis to determine if a correlation exists between the emergence of characteristics associated with a high reliability regulatory system and the occurrence of Part 121 commercial aviation accidents. High reliability advocates claim that highly reliable organizations (HROs), like the Federal Aviation Administration’s (FAA) air traffic control (ATC), routinely demonstrate the ability to safely and reliably perform large scale and complex operations. High levels of productivity and low levels of error are achieved even though hazardous technology is routinely used to accomplish mission goals. It has been recently asserted that the FAA’s ATC function developed HRO characteristics over an extremely long period of time as part of a larger governmental policy-agency HRS. In that study, identifiable and measurable attributes and characteristics associated with high reliability were constructed and their emergence was tracked over time to evaluate the development of high reliability within the government’s high reliability policy-agency aviation regulatory system. If these attributes and characteristics are associated with high reliability, then a relationship should exist between the emergence of these attributes and characteristics and a reduction in accidents that have historically threatened aviation safety and reliability.
The Relationship Between Vehicle Miles Traveled and Economic Activity
B. Starr McMullen, Oregon State University
Nathan Eckstein, Oregon State University

Vehicle miles traveled (VMT) in the U.S. have exhibited an upward trend over time similar to that observed for gross domestic product (GDP) and personal income (PI). While conventional wisdom suggests that economic growth leads to more driving and thus higher VMT, it is theoretically possible that the causation could also be the other way around. If causation is from VMT to GDP, then legislation such as the Federal Surface Transportation Policy and Planning Act of 2009’s directive to annually reduce national per capita VMT could potentially have an adverse impact on overall economic activity.

This study uses times series techniques to empirically test for Granger causality between VMT and various measures of economic activity over time. In most circumstances the causal relationship is found to be from economic activity to VMT, confirming conventional wisdom and suggesting that exogenous shocks to VMT would not negatively impact national GDP. However, the relationship between VMT and GDP is found to be dependent on the stage of the business cycle, in particular GDP leads VMT in economic upturns or normal times, but VMT tends to lead GDP at the national level in recessions. Evidence is found indicating that the causal relationship between VMT and economic activity may vary across urban areas where VMT reduction policies are most likely to be implemented.
The Reshaping of Land Use and Urban Form in Denver Through Transit-Oriented Development
Keith Ratner, Salem State University
Andrew R Goetz, University of Denver

As large cities seek to expand their transit systems to accommodate increasing travel demand and provide alternatives to growing road traffic congestion, more research attention has been focused on the land use effects of transit, most notably in the form of transit-oriented development (TOD). Many cities in the USA are starting or expanding rail transit systems with objectives that include more focused economic development near transit stations and along transit corridors. Denver, Colorado is one of the cities that is aggressively expanding its rail transit system and encouraging high-density, mixed-use development in the station areas. Early evidence indicates that the scope of transit-oriented development in Denver is considerable, resulting in nearly 18,000 residential dwelling units, 5.3 million square feet of retail space, 5.4 million square feet of office space, and 6.2 million square feet of medical space within one-half mile of existing or planned transit stations from 1997-2010. As one of the critical elements of the regional land use and transportation plan, the rail transit system and the emphasis on transit-oriented development is contributing to an increase in the average density of the Denver urbanized area.
The Role of Street Network Pattern in Daily VMT: A Behavioral Analysis of a National Road User Study Participants
Paul Hanley, University of Iowa
Suyun Ma, University of Iowa

This paper investigates how street network pattern influences daily VMT at an individual level based on the data from a national road user study, which recruited over 2,800 participants over a two-year period. The street network pattern within a 0.5-mi radius of each participant’s residence is measured in three dimensions using ArcGIS: connectivity, compactness and configuration. The relationship between daily VMT, which is grouped into work-related and nonwork-related, and quantified street network pattern is captured with descriptive statistic techniques. In addition, the effect of each street network pattern dimension on daily driving is estimated by using multilevel mixed effect modeling when some demographic and socio-economic factors such as income, age, gender and education level are controlled.
Weihao Yin, Virginia Polytechnic and State University

Shipping, one of the major propellants of world economy, has become the means or target of organized crime and terrorism. The United States, under current circumstances, has established a series of measures such as the Container Security Initiatives (CSIs), the Customs Trade Partnership against Terrorism (C-TPAT) and 24-hours Rule to lower the potential risks involved. Though these measures have been taken, security inspection, which serves as the final defense line for illegal transportation of contrabands and weapons of mass destruction, still plays a significant role in maritime security system. However, it has to be pointed out that security inspection has an adverse influence on port efficiency and liner companies' competitiveness due to the inevitable delay

This paper thus tries to present a new framework for security inspection in ports under U.S. security protocols. Based on ship courses, destinations, and cargo characteristics, it is proposed to quantify the shipment’s levels of risk so as to help decide what kind of inspection should be involved. Combined with the previous work, a simulation model is then built up and used to compare the performance of the current inspection strategy and proposed differentiated one. It is believed that the new inspection measures would enhance efficiency.
Travelers’ responses to changes in the cost of travel provide key data to help predict future travel behavior. Recently (particularly in the year 2008), the price of gas increased dramatically—and therefore the cost of travel increased as well. Travelers’ responses to this have been generally as expected. Initially there was relatively little change in behavior, but as prices continued to rise some travelers shifted to vehicles with higher fuel efficiencies and to alternative modes (transit and bike/pedestrian) (Deakin and Cervero, 2008, Komanoff, 2008, Neuman, 2008). One thing that has not been examined is potential route shifts, to or from toll facilities.

Many toll routes offer an uncongested and more direct route to a traveler’s destination. Therefore, the traveler is willing to pay a toll to use the toll facility rather than a toll-free alternative. A substantial amount of research finds this choice primarily depends on (1) travel time savings, (2) travel time reliability, and (3) toll cost (Avineri and Prashker, 2005, Ozbay et al., 2006, Hensher et al., 1990, Odeck and Brathen, 2008, Lake and Ferreira, 2002, Hess et al., 2005). However, as the price of gas increases, the difference in the cost of gas used on an uncongested, shorter, toll route versus a non-toll route may also influence route choice.

In theory, as gas price increases the use of toll facilities would also increase. However, some toll facilities are experiencing the opposite effect. The cost of gas increased to a point where many travelers refused to pay any more for their trip, including paying a toll, despite the fact the toll route may offer significant savings in gas. Additionally, as more travelers shift modes due to higher gas prices, congestion of non-toll routes decreases, eroding the travel time savings offered by the toll facilities.

This study examined traffic trends on several toll facilities around the country over the last few years and these data were used to estimate the impact of changing gas prices on traveler’s choice of toll facilities—furthering our understanding of travel behavior in response to prices. This study collected monthly toll traffic data and gas price data for the period 2000 to 2010 from toll facilities operated by 13 agencies around the United States. In addition to investigating the impact of the changes in gas price on the use of toll facility, this research also considered other factors that may have influenced the use of the toll facility. These factors included the toll rates,
unemployment rate, population and number of registered vehicles in the metropolitan area where the toll facility was located.
The Use of Econometric Models to Estimate Initial Rest Periods for Purposes of Highway Pavement Preservation Scheduling

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Newly-constructed engineering systems generally do not need rehabilitation or maintenance until after a number of years after the initial construction. This is because after construction, the structure material, under the effect of load and climate, progressively deforms and develops surface defects and distresses up to a point where some preservation intervention is necessary. The length of initial “rest period,” defined as the time interval between the initial construction and the application of the first treatment, is a critical component of any preservation schedule. Also, the initial rest period, which can be considered as a measure of the medium-term effectiveness of the initial construction, is determined as the time taken for the pavement performance to fall below a specified performance threshold. A review of the literature showed significant inconsistencies in the practice; different highway agencies use different lengths of rest period even for the same pavement material type and highway class, and traffic volume range. Further inquiries as part of this study also revealed that highway agencies have historically established these rest periods using expert opinion. Using data from state of Indiana, this paper presents an econometric framework that agencies can easily use to prescribe their rest periods. Demonstrating the framework with a case study, the paper determines the rest period for newly constructed flexible and rigid pavements for each of three different highway functional classes: Interstates, non-Interstate National Highway System (NHS), and Non-NHS, under different levels of climatic severity and traffic. The International roughness index (IRI) was used as performance indicator. The study methodology can be replicated by highway agencies to refine their existing rest periods. The case study suggests that for Indiana, depending upon highway functional class, the prescribed rest period is significantly influenced by the pavement material type, functional class, traffic loading, and climatic severity.
Toxic Air Pollutants and Trucking Productivity
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This paper introduced toxic air pollutants into the measurement of trucking productivity to obtain true productivity growth. Our results showed that omitting or ignoring toxic air pollutants in trucking production yielded statistically significant biased productivity estimates in years 2002-2005. We also found that the difference between traditional and environmental efficiency scores was small, suggesting that environmental constraint did not lead to efficiency loss in the trucking sector.
Transitioning to a New Financing Structure for U.S. Roads in the 21st Century
Marcus Bowman, 3G Mobility, LLC
Gabriel Roth, Civil Engineer and Transport Economist

Federal funding of roads in the U.S. in the twentieth century was successfully accomplished largely, and simply, through a tax on consumption of fuel. Several emerging factors are changing the situation.

First, advances in fuel economy result in less tax revenue per mile of travel. Also, the “user pays” principle itself is in question as new vehicles such as the Nissan LEAF use no gasoline at all. Second, the fuel tax has remained unchanged since 1993 while increases in inflation raise the cost to maintain and improve roads every year. Third, the user pays principle is also undermined by diversions to non-road projects, such as through the Mass Transit Account of the Highway Trust Fund. This is one reason contributing to why road capacity has increased just 8.3% since 1980 while Vehicle Miles Traveled (VMT) have increased 96.2%. Fourth, Congressional earmarks, Federal grant programs, and other bureaucratic reasons have led to increasing Washington, DC control of project selection that is less formula-based and objective oriented.

This paper addresses these issues in development of new approaches to finance the road system in the 21st century. Two themes emerge above. First, that the Federal fuel tax is becoming unsuitable for financing the road system in the long-term. Second, the structure of Federal involvement may need to be addressed. Amid Federal government budget constraints the “user pays” approach to financing roads is being undermined. The question is how to improve the market-based characteristics of this method, both from the first theme perspective of collecting revenue for use in maintaining and improving roads; and from the second perspective of how best to utilize and spend that revenue.

New technology (e.g. electronic tolling and GPS) is one factor making a transition to a market-based road system easier than it has been in the past. Thus, new pricing solutions can be implemented, such as expanded use of tolls, including peak pricing or system-wide, mileage-based user fees. These methods directly correspond to road usage and actual miles driven, thereby overcoming the future problems for the Federal fuel tax.
At the same time, program (and even agency) reform can be utilized to procure non-government sources of funding. Public-private partnerships are a basic form of this approach, while commercialization or privatization of the road system is a more radical solution. Toward these approaches, the paper underscores the role of the 2008-2009 financial crisis in increasing attention within the financial industry toward transportation infrastructure as a safer, income-generating investment. Therefore, more private capital is becoming available for road projects, and the important task is to develop the framework and methods to access these funds.
Transportation and the Climate Change Connection: Causes, Consequences, and Cures
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While inclement weather affects all modes of transportation in a modern society, transportation likewise influences climate. The transportation sector consumes more than two-thirds of oil supplies in the U.S. each year and accounts for approximately one-third of U.S. carbon dioxide emissions contributing to a rise in global temperatures. Research suggests that this temperature has altered precipitation patterns, caused more severe weather outbreaks, and has significantly increased operating expenses for the transportation industry. As abnormally hot days become more frequent and extreme, asphalt roadways are subjected to softening while concrete highways undergo joint buckling creating hazardous conditions for motorists. Railroads tend to warp and buckle during significant heat events sometimes causing train derailments. Airports experiencing extreme temperatures are more likely to undergo high-density altitude conditions, which affect aircraft engine performance causing reduced lift, longer takeoff rolls, and runway closures. Sea levels are projected to continue rising at an accelerated pace accompanied by higher storm surges and flooding. Consequently, seaports along with the connecting roadway and railway facilities will likely be inundated. Likewise, airports located along coasts are at risk of diminished operations due to rising waters and might require expensive protection measures in the near future. This research considers practical solutions to decrease greenhouse gases, create new jobs, cut transportation costs, and reduce dependence on foreign oil which should ultimately contribute to greater national security while mitigating the effects of climate change.
While inclement weather affects all modes of transportation in a modern society, transportation likewise influences climate. The transportation sector consumes more than two-thirds of oil supplies in the U.S. each year and accounts for approximately one-third of U.S. carbon dioxide emissions contributing to a rise in global temperatures. Research suggests that this temperature has altered precipitation patterns, caused more severe weather outbreaks, and has significantly increased operating expenses for the transportation industry. As abnormally hot days become more frequent and extreme, asphalt roadways are subjected to softening while concrete highways undergo joint buckling creating hazardous conditions for motorists. Railroads tend to warp and buckle during significant heat events sometimes causing train derailments. Airports experiencing extreme temperatures are more likely to undergo high-density altitude conditions, which affect aircraft engine performance causing reduced lift, longer takeoff rolls, and runway closures. Sea levels are projected to continue rising at an accelerated pace accompanied by higher storm surges and flooding. Consequently, seaports along with the connecting roadway and railway facilities will likely be inundated. Likewise, airports located along coasts are at risk of diminished operations due to rising waters and might require expensive protection measures in the near future. This research considers practical solutions to decrease greenhouse gases, create new jobs, cut transportation costs, and reduce dependence on foreign oil which should ultimately contribute to greater national security while mitigating the effects of climate change.
The production of oil in the Bakken formation is more difficult than in other oil drilling forms, as it takes a significant amount of water to fracture the sediment into a slurry, and move it to the waiting tanker trucks. The current levels of water sources may not be enough to support the populace and the oil production levels together. As the oil wells are constantly being brought online, this will affect the route in which the water trucks take, as well as capacity issues of the water source due to the limited supply. The current method of transporting the water is by truck, due to the variation in location of wells as well as the amount of water needed at each well. The rural roads that are being used are also becoming deteriorated due to the unexpected amount of truck activity. The water resources have limited capacity per day on volume of water that is accessible. There is also the issue of long term water contracts, on who has priority access to the water sources. The water depots location also plays a vital part of the capacity of water at the oil well. The optimization of the oil wells, water sources, empty-tanker movement and wastewater disposal wells for the transportation network will become more critical as the opportunity cost of the potable water increases.
Understanding Gender Effect on Commuter's Transportation Mode Choice
Ryoichi Sakano, North Carolina A&T State University

Structural equations analysis is applied to examine the role of gender in commuter’s mode choice. Gender effect is modeled not only directly in the choice equation as dichotomous variable, but also through gender differences in perception and attitudes toward transportation mode and commuting. Although gender is found not to have a direct effect on mode choice, differences in perception and attitude toward traffic congestion between women and men are important factors influencing transportation mode choice among commuters. Women are found to be more concerned with traffic congestion during commute and are more likely to take a reliable mode such as train.
Traditionally, static signs are used to convey messages to the road users. The need to quickly communicate up-to-date messages to the road users has given rise to the use of dynamic message signs (DMS). A typical DMS includes only dynamic messages. An alternative to DMS is hybrid signs, which display both static and dynamic messages on a single sign. A hybrid sign consists of a conventional retro-reflective static sign that is embedded with one or more relatively small, dynamic, usually light emitting diode (LED) message panels. Potential advantages of hybrid signs over DMS include better legibility, shorter reading time, smaller size, and lower installation, operations, and maintenance costs. This paper provides the first state-of-the-practice review on the use, design, and performance of hybrid signs. It covers hybrid sign applications in different parts of the world, including the U.S., Europe, Australia, and Asia. The application areas reviewed included variable speed limits, lane control, managed lane operations, dynamic rerouting, travel time display, and graphical route information display. Multiple examples of each application, many of which were considered innovative and can potentially be adopted for use in the U.S., were given. Issues related to the applications were discussed and lessons learned were provided.
**Walking On The Safe Side: A Look At The Safe and Complete Streets Act of 2011**

Henry Salley, South Carolina State University

The purpose of this paper is designed to understand the affects and importance of the proposed Safe and Complete Streets Act of 2011. Specifically this paper will explore the meaning of the bill and related research to conclude if the bill is in fact needed or if it may need to be revised. The Safe and Complete Street Act of 2011 was introduced on May 5th 2011 by Congresswoman Doris O. Matsui of California’s 5th district and co-sponsored on that same day by Congressman Steven C. Latourette of Ohio’s 14th district and has been referred to the Subcommittee on Highway and Transit. The Safe and Complete Streets Act of 2011 has garnered an additional 16 co-sponsors along both party lines and is continuing to gain momentum in the house. The purpose of this bill is to ensure the safety of all users of the transportation system, including pedestrians, bicyclists, transit users, children, older individuals, and individuals with disabilities, as they travel on and across federally funded streets and highways. The research that will be conducted on this bill will show and discuss the positive factors of this bill and the overall outcome if the bill is indeed enacted.
A Simple Guide on Low Volume Road Design
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Low volume roads constitute the vast majority of the US’ road network. From an economic standpoint, low-volume road preservation accounts for several hundred US million dollars per year, or more than half of the annual investment in roads. Although low volume roads carry a small percentage of the overall traffic, their associated crash rates are considerably higher than those for higher volume roads. Clearly, low-volume roads are an important part of the nation’s transportation infrastructure and even small improvements in their design can have significant impacts on the safety of drivers and the nation’s economy. Thus, there is a need to design low volume roads using engineering principles to insure an economic design and avoid premature road failures. Many agencies have proposed low volume design methodologies, yet most of them require input that may not be available to local agencies. The objective of this paper is to develop a low volume road design methodology that is accurate, requires minimal input that is readily available to local agencies, and is simple to use, while at the same time is customizable in order to account for specific weather and sub-grade conditions.
Women and Health: A Study of Female Shift Workers In the Transportation Industry
Patrick Sherry, The University of Denver
Allison Bondanza, The University of Denver

In 2008, the Sleep Research Unit at the Institute for Work and Health in Toronto defined “shift work” as an individual working outside of the hours of 7am to 6pm. As of 2004, 15% of the American workforce, or roughly 8.5 million Americans, were engaged in some sort of shift work (Chung, Wolf, Shapiro, 2009). Areas such as transportation, military, restaurant staff, law enforcement, hospitals, and health and safety are just a few examples of the professions that require shift work of some sort. There has been an extensive amount of research conducted on the ill effects of shift work and at night work when the body would typically be sleeping (Barton, 1994). Research literature has had a tendency to fall into three main areas of study: the disturbances in our sleep/wake or circadian cycles (eg., Akerstedt, 1990; DeKonick, 1997; Reinberg, A & Ashkenazi, I, 2008), the physical ill-health effects on our bodies (eg. Barton, L. 1994; Costa, 2003; Amelsvoort, Shouten, E., & Kok, F, 1999; Lin, Y, Hsiao, T, & Chen, P, 2009), and the social and family disturbances that can be a result of working shift work (eg., Culpepper, 2010).

The negative effects of fatigue especially in the transportation industry, can be seen in many forms. Loss of alertness, impaired judgment, slower reaction time, increased errors, increased risk-taking, and reduced motivation are just few of the most important examples. Fatigue may also lead to mood changes in the form of irritability and negativity (Sherry, 2005). According to Chung et. al. (2009), “sleepiness, fatigue, and sleep deprivation negatively affect functioning, resulting in decreased productivity, increased errors and workplace accidents, traffic collisions, and deterioration of relationships, and may trigger a general decline in health and well-being”. Fatigue within the transportation industry is particularly challenging due to the fact that the industry operates on a twenty-four hour, seven day a week demand. Accidents on the job within the transportation industry can have detrimental and fatal effects. The issue of fatigue in transportation workers has been a top priority of the National Transportation Safety’s Board (NTSB) for the past 2 decades (Sherry, Belenky, Folkard, 2006). In 2002, the Transportation Research Board released a report that found 20 percent of responding transit agencies to a survey conducted by the American Public Transportation Association identified fatigue as a contributing factor to job-related accidents (TCRP, Report 81). Women make up roughly half of the American work force (Chung et. al.,
2009). The female work force deserves particular attention when occupational demands lead women to working at night and shift work schedules. The physiology of the female body is obviously different than that of a male. Female family responsibilities and reproductive ability bring different challenges when we are faced with sleep deprivation. The health consequences of a female are therefore different than those of a male. It is important to understand how shift work can affect women independently of male co-workers. There is some evidence to suggest that women have greater difficulty adjusting to the demands of shift work and fatigue compared to males. It has also been suggested that female shift workers have potential greater risk for gender related ill-health effects. Furthermore, Sherry & Bondanza (2009) found that 22% of female train drivers in the New York City area experience health problems that affect their work compared to 17% of their male counterparts. Disturbances in the female menstrual cycle (eg. Costa, 2003; Clayton, 2008), fertility and reproductive cycles (eg., Barzilai-Pesach, Sheiner, Potashnik, Shoham-Vardi, 2006), and alarmingly, an increased risk for breast cancer (eg., Medgal, Kroenke, Laden, Pukkala, Schernhammer, 2005; Stevens, 2009) have been reported. Although there has been an expansive amount of generalized research on the ill-health effects of shift work and working at night, more specific attention needs to be given to the effects on women.
A Time and Money Constrained Model of Household Vacation Destination and Mode Choice Behavior

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Vijay Sivaraman, University of South Florida
Abdul Pinjari, University of South Florida

This study contributes to the long-distance travel modeling literature by providing an analysis of American households’ annual vacation destination choices and related time allocation patterns. More specifically, an annual vacation destination choice and time allocation model is formulated to simultaneously predict the different vacation destinations that a household visits in a year, and the time (no. of days) it allocates to each of the visited destinations. The model takes the form of a Multiple Discrete-Continuous Extreme Value (MDCEV) structure. Further, the paper proposes a variant of the MDCEV model that reduces the prediction of unrealistically small amounts of vacation time allocation to the chosen destinations. To do so, the continuously non-linear utility functional form in the MDCEV framework is replaced with a combination of a linear and non-linear form. The empirical analysis was performed using the 1995 American Travel Survey Data, with the United States divided into 210 alternative destinations. The model estimation results provide important insights into the determinants of households’ vacation destination choice and time allocation patterns. The proposed variant of the MDCEV model reduces the likelihood of unrealistically small amounts of vacation time allocation for long-distance destinations. The annual vacation destination choice model developed in this study can be incorporated into a larger national travel modeling framework for predicting the national-level, origin-destination flows for vacation travel.
Accessibility and Residential Property Price Resilience to Economic Downturns: Evidence from Limited Access Roadways
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Arjun Chauhan, Center for Urban Transportation Research

This paper investigates the relationship between accessibility improvements to limited-access roadways and residential property prices. We wish to test the hypothesis that houses located in proximity of limited-access roadways exhibit resilience to price decline. We use propensity score matching approach to select treatment and control parcels for two separate limited access roadways in Miami-Dade and Hillsborough County, Florida.

We employ two panel dataset where parcel-level data are collected for a treatment and control group. Parcels within the treatment group are those that are within a 1.5 mile buffer around the access points to the limited-access route. Control groups are parcels within the county selected using a propensity-score matching approach to find neighborhoods sharing similar socio-demographic and housing characteristics with the treatment group. Both panels cover the period 2005-2010 and span two separate limited-access roadways located in Miami-Dade and Hillsborough County, Florida. We look at empirical evidence of price differentials before/after construction and operation of network improvements.

Using a difference-in-difference estimator, we find that residential property values have a price resilience of around 5 and 11 percent for Hillsborough and Miami-Dade County respectively. These findings indicate that prices of parcels located in proximity to a limited-access roadway, although exhibiting a decline in value, have declined less than the rest of the county in the aftermath of the real estate bubble. This paper contributes to the empirical literature by providing a framework to select comparable parcels for hedonic regression using a quasi-experimental approach.

Related Links
Airline Fare and Seat Management Strategies with Demand Dependency
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Ryoichi Sakano, North Carolina A&T State University

From the relevant airline fare and seat management literature this paper conceptualizes four strategies which airlines use. They are the large fare discount-few discount seats, large fare discount-many discount seats, small fare discount-few discount seats and small fare discount-many discount seats. Using a constrained revenue maximization model that assumes interdependent demand, it develops rules to guide decision-making, and shows that the large fare discount-many discount seats and small fare discount-few discount seats strategies are optimal. In the empirical section the paper provides support for the large fare discount-many discount seats strategy but not the others, and identifies three other strategies not found in the literature. They are no fare discount or premium-moderate discount seats, small fare premium-moderate discount seats, and large fare premium-very few to moderate discount seats strategies. The paper argues that these strategies are used in different demand situations and allow airlines to price discriminate.