

Fuel Price Elasticity: Synthesis

prepared for
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Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WSDOT staff. Online and print sources may include newspaper and periodical articles, NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs and related academic and industry research. Internet hyperlinks in the TSRs are active at the time of publication, but host server changes can make them obsolete.

Request for Report

Summary of the issue:

Amy Arnis, WSDOT Chief Financial Officer and Assistant Secretary, Strategic Planning and Finance, requested information on elasticity in fuel prices and the effect on revenue. To review, price elasticity, or price elasticity of demand, is the rate at which demand for a good will change given a change in price. For instance, if the price of a good increases by 10 percent and the demand decreases by 20 percent, then that good's price elasticity is -2. Motor fuel is generally understood to have *inelastic* demand, that is to say when the price of fuel increases its demand decreases less than proportionally. Inelastic goods are those for which exist few substitutes.

Fuel price elasticity is often analyzed over short and long time periods, because over time consumers have more opportunity to respond to a price increase. When fuel price increases, demand decreases primarily due to reduction in driving and improved fuel efficiency. In the short-run, consumers generally reduce their driving and make quick adjustments to improve fuel efficiency, like switching to a more fuel efficient car in a multi-car household. In the long-run, a consumer may purchase a more fuel efficient car or move closer to work (Litman 2007).

WSDOT projects fuel consumption with a model in which fuel price is a key variable. The model estimates fuel price elasticity over its forecast period. Currently the model estimates Washington's fuel price elasticity to be -0.2, a figure consistent with many researchers. Washington's fuel consumption also has a strong positive correlation to the growth of the driving-age population and a strong negative correlation to fleet fuel efficiency. Those two variables change slowly over time, and therefore have a greater long-run impact.

A search of available information on fuel price elasticity reveals many voices, from the realms of both science and opinion, suggesting the public can bear higher fuel taxes due to fuel's inelastic demand. Fuel price elasticity indicates that consumers will not react considerably to substantial price increases. Some articles recommend an additional tax of around 50 cents per gallon.

Much of the research on fuel price elasticity focuses on determining related consumer variables, like income level, place of residence (urban or rural), and type of vehicle owned. For instance, rural households have a lower fuel price elasticity than urban ones (Wadud 2007). Some

research suggests that in the U.S. fuel price is more inelastic than in foreign countries, which is important for considering international sources. Two recent studies show that recently consumers have not reacted to rising fuel prices by switching to more fuel efficient vehicles, in part because auto dealers responded with price incentives on low MPG vehicles such as SUVs.

Some articles focus on a fuel tax's appropriateness for generating revenue for government transportation expenditures. Fuel tax has been found by some to be a progressive tax and a tax that fairly targets vehicle users for costs they incur to the transportation system. Other information suggests that a fuel tax will generate benefits as fuel demand decreases: consumers will move to higher MPG vehicles, reducing CO₂ emissions, and reductions in drivers will ease congestion and road wear and improve traffic safety.

The traditional fuel tax, levied at a set amount per gallon, has been deemed problematic, because it does not increase with inflation, while governments' transportation costs do. For government revenue to keep pace with those costs lawmakers must continue to institute unpopular tax increases. As of 2006, ten states had variable fuel tax rates based on the U.S. Consumer Price Index, updated periodically.

Key terms searched:

Revenue and fuel price elasticity

Overviews of price elasticity:

Price elasticity of demand

From Wikipedia

In economics and business studies, the price elasticity of demand (PED) is an elasticity that measures the nature and degree of the relationship between changes in quantity demanded of a good and changes in its price.

http://en.wikipedia.org/wiki/Price_elasticity_of_demand

Look at These Prices!: Let's Stretch: Elasticity of Demand

Elasticity of demand refers to the change in demand for a good or service that occurs in response to a change in its price. Specifically, it is the degree to which an increase or decrease in price will change the quantity demanded. It is a way economists have of nailing down the relationship between price and demand more precisely.

Unitary elasticity occurs when the quantity of a product demanded changes in response to price changes in a way that leaves total revenue the same. Elasticity occurs when a reduction in price increases the quantity demanded so that the seller's revenue increases. Inelasticity occurs when a reduction in price increases the quantity demanded by more than zero but less than unity. (Unity refers to the proportional change in quantity sold and revenue that occurs under unitary elasticity.) The answers to these questions depend on the buyer's situation and his need or desire for the product, as well as on the seller's situation. That is, the answers depend on the elasticity of demand for the product or service.

<http://www.infoplease.com/cig/economics/let-stretch-elasticity-demand.html>

Fuel price elasticity:

Transportation Elasticities: How Prices and Other Factors Affect Travel Behavior

By Todd Litman

Abstract:

This report investigates the influence that prices and service quality have on travel behavior. It summarizes research on various types of transportation elasticity's and describes how to use this information to predict the travel impacts of specific price reforms and management strategies.

[Fuel price elasticities (p. 21); Sensitivity of vehicle miles traveled to fuel price (p. 7); Overview on price elasticity (p. 2)]

<http://www.vtpi.org/elasticities.pdf>

<http://www.vtpi.org/tdm/tdm11.htm>

Current proposals:

State of Maryland Fiscal Policy Note

P. 1: This bill increases funding to the Transportation Trust Fund (TTF) by: (1) increasing the motor fuel tax rates by 12 cents per gallon, except aviation gasoline and turbine fuel, which remain unchanged; and (2) subject to limitations, imposing an additional tax on gasoline and diesel fuel equal to 4% of the amount by which the average wholesale nonpremium motor fuel exceeds \$1.50.

The bill takes effect July 1, 2007.

P. 3: The price elasticity that is built into the estimate reflects factors such as consumers purchasing fuel in neighboring states with lower rates, shifting to lower-grade gasoline, or ultimately shifting to more fuel efficient vehicles and away from fuel-inefficient vehicles such as sport utility vehicles (SUVs). To the extent that actual elasticity is greater than assumed, then actual revenues could be lower than projected. It should also be noted that the projected revenues from the sales tax on motor fuel are based on economic projections of motor fuel prices. Such prices, however, are extremely volatile.

http://mlis.state.md.us/2007RS/fnotes/bil_0009/sb0949.pdf

U.S. Rep. Proposes Carbon, Gasoline Taxes

Global Refining & Fuels Report 11(2): 27, 10/10/2007

By Peter Haldis

Abstract:

The article reports that U.S. Rep. John Dingell, head of the U.S. House energy committee, released a proposal for a \$50/ton tax on carbon and a 50¢/gal tax on gasoline. The carbon tax would cover petroleum and petroleum products, as well as coal and natural gas. The gasoline tax would also cover jet fuel and petroleum-based kerosene. Biofuels that are not blended with petroleum products are also exempt from the tax and blends of biofuels and the three taxed petroleum products would only be taxed on the petroleum product portion of the fuel.

Recent arguments for taxation:

Do motor-vehicle users in the US pay their way?

Transportation Research Part A: Policy and Practice 41(10): 982-1003, December 2007

By Mark A. Delucchi

Abstract:

Governments in the US spend over a hundred billion dollars per year to build and maintain roads and provide a variety of services for motor-vehicle users. To pay for these infrastructure and services governments collect revenue from a variety of taxes and fees. The basic objective of this paper is to compare these government expenditures with the corresponding user tax and fee payments in the US. At the outset I argue that [such] comparisons tell us something about the equity but not necessarily the economic efficiency of highway financing. I then present four different ways one might tally up government expenditures and user payments, depending on the extent to which one wishes to count "indirect" expenditures (e.g., on prosecuting car thieves) and non-targeted general-tax payments (e.g., severance taxes on oil). I make a comprehensive analysis of all possible expenditures and payments, and then compare them according to three of the four ways of counting expenditures and payments. The analysis indicates that in the US current tax and fee payments to the government by motor-vehicle users fall short of government expenditures related to motor-vehicle use by approximately 20–70 cents per gallon of all motor fuel. (Note that in this accounting we include only government expenditures; we do not include any "external" costs of motor-vehicle use.) The extent to which one counts indirect government expenditures related to motor-vehicle use is a key factor in the comparison.

Hurray For High Gas Prices! [Opinion]

By Steven D. Levitt

For a long time I have felt the price of gasoline in the United States was way too low. Pretty much all economists believe this.

Greg Mankiw blogged back in October about the many reasons why we should raise gas taxes.

The reason we need high gas taxes is that there are all sorts of costs associated with my driving that I don't pay — someone else pays them. This is what economists call a "negative externality." Because I don't pay the full costs of my driving, I drive too much. Ideally, the government could correct this problem through a gas tax that aligns my own private incentive to drive with the social costs of driving.

Three possible externalities associated with driving are the following:

- a) My driving increases congestion for other drivers;
- b) I might crash into other cars or pedestrians;
- c) My driving contributes to global warming . . .

<http://freakonomics.blogs.nytimes.com/2007/06/18/hurray-for-high-gas-prices/>

Cheaper Gas and More Expensive Shoes: California's Transportation Finance Reform Proposal

Transportation Research Record 1960: 1-7, 2006

By Paul A. Sorensen

Abstract:

With mounting concern about current social and environmental challenges, the notion of sustainable development—a paradigm calling for the integration of economic, social, and environmental goals—has gained increasing popularity in recent years. Within the transportation arena, sustainability advocates have argued for reducing reliance on the private automobile and seeking instead to foster alternative modes such as transit, biking, and walking; and many cities are actively pursuing this goal. Yet even the most concerted local efforts can be undermined by contradictory policy frameworks at higher levels of government, and a recent proposal for

transportation finance reform in California serves as a good case in point. Intended to enhance the reliability of highway revenues, the proposal would eliminate a 5% sales tax on gasoline and replace it with a 0.25% increase in the general sales tax specifically earmarked for transportation. Basic economic analysis shows clearly, however, that eliminating the sales tax on gasoline would stimulate additional miles driven within the state, leading in turn to increased highway congestion and vehicle emissions. At the same time, increasing the general sales tax would shift a greater financial burden onto the shoulders of nondrivers from lower-income groups. In short, the recent California proposal, if enacted, would work counter to the three goals of sustainability—economic efficiency, social equity, and environmental responsibility—and surely frustrate local efforts to reduce reliance on the automobile.

[Related PowerPoint presentation available at <http://www.innovativefinance.org/events/pdfs/sorensen.pdf>.]

Recent consumer trends:

As Gasoline Prices Soar, Americans Resist Major Cuts in Consumption

Wall Street Journal, May 1, 2006: A.1

By Jeffrey Ball

With gasoline prices in the U.S. approaching an average \$3 a gallon, Americans are moaning about the rising cost, but so far they are resisting big changes in their gas-guzzling ways.

A 25% jump in prices at the pump since December has set off a firestorm in Washington. Politicians are threatening auto makers with tougher federal fuel-economy standards and oil companies with higher taxes on record profits, while warning against price gouging. Auto and oil executives are predicting that a long-term shift toward greater fuel efficiency is under way. But none of these influences is likely to have much effect on gasoline prices or oil consumption in the near term . . .

The Effects of Higher Gasoline Prices on U.S. Light Vehicle Sales, Prices, and Variable Profit by Segment and Manufacturer Group, 2001 and 2004

May 23, 2005

By Dr. Walter S. McManus

Abstract:

The rising gasoline prices of the past few years were not associated with shifts from vehicles with lower MPG to vehicles with higher MPG. This has been seen as evidence that gasoline prices have little impact on the purchase choices of new-vehicle buyers. However, this paper presents new evidence that the shifts toward vehicles with higher MPG that the rising price of gasoline would have caused were not observed because they were offset by price cuts that were disproportionately applied to vehicles with lower MPG.

<http://www.umtri.umich.edu/content/TheEffectsofHigherGasolinePrices.pdf>

Evidence of a Shift in the Short-run Price Elasticity of Gasoline Demand

National Bureau of Economic Research (NBER) Working Paper No. 12530, September 2006

By Jonathan E. Hughes, Christopher R. Knittel, and Daniel Sperling

Abstract:

Understanding the sensitivity of gasoline demand to changes in prices and income has important implications for policies related to climate change, optimal taxation and national security, to name only a few. While the short-run price and income elasticities of gasoline demand in the United States have been studied extensively, the vast majority of these studies focus on consumer behavior in the 1970s and 1980s. There are a number of reasons to believe that current demand elasticities differ from these previous periods, as transportation analysts have hypothesized that

behavioral and structural factors over the past several decades have changed the responsiveness of U.S. consumers to changes in gasoline prices. In this paper, we compare the price and income elasticities of gasoline demand in two periods of similarly high prices from 1975 to 1980 and 2001 to 2006. The short-run price elasticities differ considerably: and range from -0.034 to -0.077 during 2001 to 2006, versus -0.21 to -0.34 for 1975 to 1980. The estimated short-run income elasticities range from 0.21 to 0.75 and when estimated with the same models are not significantly different between the two periods.

Modelling Strategic Responses to Car and Fuel Taxation

Journal of Transport Economics and Policy 40(2): 203-223(21), May 2006

By Pim Heijnen and Peter Kooreman

This very technical European paper develops a model to analyze how consumers, car producers, fuel producers, and the government interact in relation to car and fuel taxation. It predicts that a rise in diesel tax causes manufacturers to reduce diesel auto cost (p. 215), which is similar to studies that suggest the auto market will reduce the impact of increased fuel prices.

Federal reports:

Monthly Motor Fuel Reported by States: December 2006

Motor Fuel Taxation:

All States levy volume taxes on gasoline and diesel fuel. The rates in effect for 2006 are shown in Table MF-121T. The gasoline rates vary from a low of 7.5 cents per gallon to 34 cents with an average of 20.3 cents. Four States provide for full or partial exemptions for gasohol, a blend of 90 percent gasoline and 10 percent fuel alcohol. Diesel fuel rates vary from 7.5 cents to 38.1 cents per gallon.

Traditionally, State fuel tax rates could only be changed with legislation, but 10 States now have variable rate motor fuel taxes. These taxes are adjusted at specified intervals-annually, semiannually, or quarterly-usually on the basis of an index or formula specified in the enabling legislation. These States are identified in the notes on Table MF-121T. Adjustments to variable rate taxes are announced by State tax agencies shortly before the effective date of the change.

<http://www.fhwa.dot.gov/ohim/mmfr/dec06/index.htm>

RS20521: Transportation Fuel Taxes: Impacts of a Repeal or Moratorium

March 28, 2000

By John W. Fischer and Bernard A. Gelb

Summary:

Steep increases in the prices of gasoline, diesel, and other transportation fuels have prompted some Members of Congress to seek to ease the effects on households and businesses. Interest has focused on possible repeal or suspension of the levying of all or part of the federal excise taxes on those fuels. Current market conditions and the small amount of tax relief incorporated in most proposals, however, raise uncertainty as to whether prices to individuals and businesses would fall and whether any price decline would be meaningful to consumers. A reduction in transportation fuel taxes would result in a decrease in spending for transportation trust-fund-supported federal programs, unless Congress designated alternate sources of funding for these programs. As a result of the structure of the federal programs, the effects of a fuel tax repeal on federal transportation programs would not necessarily be immediate, but depending on the length/scope of the repeal or suspension, they could be substantial.

http://digital.library.unt.edu/govdocs/crs//data/2000/upl-meta-crs-1182/RS20521_2000Mar28.html?PHPSESSID=451118aeedd54dc667e8b8107e1b7023

TI: The Federal Excise Tax on Gasoline and the Highway Trust Fund: A Short History.

AU: Jackson-Pamela-J

CA: Congressional Research Service, the Library of Congress, Washington, DC, 20540, USA

SO: 2006/04/04. 16p (1 Fig., 1 Tab.)

PY: 2006

AB: Excise taxes have long been a part of our country's revenue history . . .

<http://www.ncseonline.org/NLE/CRSreports/Transportation/trans-24.cfm?&CFID=8539261&CFTOKEN=71797464>

Related research:

Optimal taxation and cross-price effects on labor supply: Estimates of the optimal gas tax

Journal of Public Economics 91(3-4): 593-617, April 2007

By Sarah E. Westa and Robertson C. Williams III

Abstract:

This study estimates parameters necessary to calculate the optimal second-best gasoline tax, most notably the cross-price elasticity between gasoline and leisure. Prior theoretical work indicates the importance of this elasticity, but despite this, almost none of the prior studies of commodity taxation (and none of the studies on second-best environmental regulation) actually estimate it. Using household data, we find that gasoline is a relative complement to leisure, and thus that the optimal gasoline tax is significantly higher than marginal damages—the opposite of the result suggested by the bulk of the prior literature. Indeed, even if there were no externalities at all associated with gasoline, the optimal tax rate would still be almost equal to the average gas tax rate in the U.S. Following this approach to estimate cross-price elasticities with leisure could strongly influence estimates of optimal rates for other important commodity or pollution taxes.

Motor fuel taxation, energy conservation, and economic development: A regional approach

Ecological Economics 61(2-3): 409-416, 1 March 2007

By Richard W. England

Abstract:

Combustion of motor fuels has a variety of environmental impacts on local, regional and global scales. Taxing motor fuels more heavily would mitigate those environmental impacts. However, many governments are reluctant to increase motor fuel taxes because they fear that the tax incidence will be regressive and that economic development will be impeded. Using data for the New England region of the United States, this paper argues that an oil-importing region can conserve energy, avoid regressive impacts and encourage economic development by taxing motor fuels more heavily and rebating the incremental revenues to owners of motor vehicles.

Explaining the variation in elasticity estimates of gasoline demand in the United States: A meta-analysis

Energy Journal 17(3), 1996

By Molly Espey

Abstract:

Many econometric studies of gasoline demand have been conducted over the years when fuel prices were high and concerns about energy conservation and security of supply were prominent. Studies were motivated by interest in gasoline consumers' sensitivity to fuel price changes, for the insight this might give in explaining cross country differences in gas consumption and driving and in predicting the impact of fuel tax changes on driving, fuel consumption and government revenue collections. The author used meta-analysis to determine if there are factors

that systematically affect price and income elasticity estimates in studies of gasoline demand in the United States.

Gasoline demand revisited: an international meta-analysis of elasticities

Energy Economics 20: 273-295, 1998

By Molly Espey

Abstract:

Meta-analysis is used to determine if there are factors that systematically affect price and income elasticity estimates in studies of gasoline demand. Four econometric models are estimated, using long-run and short-run price and income elasticity estimates from previous studies as the dependent variables. Explanatory variables include functional form, lag structure, time span, national setting, estimation technique, and other features of the model structure. Elasticity estimates are found to be sensitive to the inclusion or exclusion of some measure of vehicle ownership. Static models appear to overestimate short-run elasticities, underestimate long-run price elasticities, but pick up the full long-run income responsiveness. There is variation in the elasticity of demand across countries, especially in the short-run, and gasoline demand appears to be getting more price-elastic and less income elastic over time.

Gasoline tax as a corrective tax: Estimates for the United States, 1970-1991

Energy Journal 17(2): 103, 1996

By Jonathon Haughton and Soumodip Sarkar

Abstract:

Describes models on the effect of a higher gasoline tax on gasoline consumption, miles driven and road fatalities in the United States. Data considerations; Estimation; Regression results for model of miles drive; Fuel inefficiency; Effect of change in tax on gasoline.

TI: Modeling Fuel Demand for Different Socioeconomic Groups

AU: Wadud-Zia; Graham-Daniel-Joseph; Noland-Robert-B

CA: Transportation Research Board, 500 Fifth Street, NW, Washington, DC, 20001, USA

SO: Conference Title: Transportation Research Board 86th Annual Meeting. Location: Washington. Sponsored by: Transportation Research Board. Held: 20070121-20070125. 2007. 29p (2 Fig., 3 Tab., Refs.)

PY: 2007

RN: Report Number: 07-2263

AB: The fuel demand literature generally focuses on the determination of a single long run or short run price and income elasticity of gasoline for a given country. However, a single elasticity may not dissect the distributional burden faced by different socio-economic groups when faced with a fuel tax or a carbon trading policy (for climate mitigation). Different responses to the same change in price or income are likely to occur, depending on their travel needs, which in turn is contingent upon their income, location of residence and other factors, such as levels of vehicle ownership. This paper investigates the differences in gasoline demand elasticities for different income quintiles. Group-wise aggregated consumer expenditure data for 20 years is used to derive elasticity estimates for the United States. Results show that the elasticities vary for different income quintiles and follow a U-pattern from the lowest to the highest income quintile. The lowest income quintile is found to have the largest price elasticity. The lowest and the highest income quintile appear to be statistically insensitive to any changes in income. The rebound effect also follows the U pattern, with the highest rebound observed among the wealthiest households. Rural households appear to have lower price elasticity than households in urban areas.

Transport Policy and Transport Tax Reform

Public Money and Management 25(3): 171-178, June 2005

By Stephen Potter and Graham Parkhurst

This article focuses especially on the United Kingdom, which levies one of the highest fuel tax rates in the world. The last UK fuel tax policy was abandoned in 2000 due to outcry from the shipping and agricultural sector (p. 173). Current taxation levels and incentives to promote cleaner fuels have resulted in government expenditure outpacing revenue (p. 175). The authors suggest abandoning the current tax policy for a road-use tax.

Distributional and Efficiency Impacts of Gasoline Taxes: An Econometrically Based Multi-market Study

American Economic Review 95(2): 282-287, May 2005

By Antonio M. Bento, Lawrence H. Goulder, Emeric Henry, Mark R. Jacobsen, Roger H. von Haefen

This paper examines recommended federal gas tax policy, employing an econometrically based multi-market simulation model to explore its efficiency and distributional implications. Short-run fuel price elasticity is found to be -0.27 (p. 285), with over 95 percent of decrease in demand coming from reduced vehicle miles traveled rather than increased efficiency (p. 286). The paper investigates how taxes are recycled back to consumers. Under tax-based recycling (where revenues are recycled to households in proportion to gas-tax payment), gasoline tax is proportional when compared to household income, and most costly to not retired families with children that drive a great deal. Under income-based recycling (where revenues are proportional to household income), low consumers of gas yield more revenue, and high consumers less.

TITLE: CONGESTION COST AND CONGESTION PRICING. IN: THE FULL COSTS AND BENEFITS OF TRANSPORTATION: CONTRIBUTIONS TO THEORY, METHOD AND MEASUREMENT.

AUTHOR(S): Anderson-D; Mohring-H

CORPORATE AUTHOR(S): Springer-Verlag, 175 Fifth Avenue, New York, NY, 10010, USA

SOURCE: 1997. pp315-336 (Figs., Tabs., Refs.)

PUBLICATION YEAR: 1997

REPORT NUMBER(S): 3540631232

LANGUAGE OF DOCUMENT: English

ABSTRACT: Pricing congested roads most often produces efficiency gains. However, unless toll revenue is carefully distributed, road pricing could make most drivers worse off, particularly low income people. This paper analyzes the potential income distributional effects for the Twin Cities area by calculating network equilibrium . . . Pricing all congested roads optimally would increase total travel costs by 18-42% depending on the elasticity of demand for travel. With unit-elastic demand, pricing would increase travel costs by 31% and 5% for, respectively, the lowest and highest income groups examined.

TI: MEASURING THE LONG-RUN FUEL DEMAND OF CARS.

AU: JOHANSSON-O; SCHIPPER-L

SO: JOURNAL OF TRANSPORT ECONOMICS AND POLICY. 1997/05. VOL.31(N.3) P277-92 (REF.36)

PY: 1997

AB: Long-run fuel demand for cars is estimated by estimating separately total vehicle stock, mean fuel intensity, and mean annual driving distance, based on a new data set consisting of 12 OECD countries from 1973 to 1992 . . . The effects of changed taxes on car ownership and use are significant, but smaller than from a change in fuel tax.

TI: ASSESSING RISK IN STATE GASOLINE TAX REVENUES.

AU: Jones-CV; Anderson-P

SO: PC Trans. 1992. Spring pp22-23 (1 Fig., 1 Tab.)

PY: 1992

AB: Article describing Colorado Department of Transportation's use of @RISK, a program that statistically simulates the effects of risk factors on target variables. In this case, risk factors include gas prices, price elasticity (a measure of consumer responsiveness to price), the overall inflation rate and vehicle fuel efficiency. CDOT's target variable was revenue generated from the gas tax . . .

The impact of fuel taxes on public transport: an empirical assessment for Germany

Transport Policy 8: 19-28, 2001

By K. H. Storchmann

This German study finds that one factor in determining revenue from higher fuel prices is the resultant increase in transportation expenditures. Higher fuel prices will increase peak-hour public transit use but not leisure or off-peak use, generating above-average marginal costs and below average revenues. Therefore, higher fuel taxes will increase public transport's deficit.

<http://people.whitman.edu/~storckkh/TP.pdf>

The effects of fuel price changes on transport sector and its emissions simulations with REMOVE

European Economy, European Commission, Directorate-General for Economic and Financial Affairs, Economic Papers No. 172, July 2002

By Jacques Delsalle, Directorate General for Economic and Financial Affairs

This 2002 report models two scenarios: (1) the price of oil remains relatively low (\$10/barrel) and (2) the price remains relatively high (\$30/barrel). When the price remains permanently low, it was predicted that public transportation demand would drop, freight transportation would move from light trucks to heavy trucks, and demand for fuel-efficient vehicles would decrease. When the price remains permanently high, there will be a reduction in the car fleet (-1.9 percent), mostly of gasoline cars and heavy trucks, with fuel consumption decreasing by 2.4 percent. This indicates an increase in fuel efficiency, due to such factors as increased use of more fuel-efficient vehicles, reduction in private urban transport demand, and a decrease in congestion level.

http://europa.eu.int/comm/economy_finance

http://ec.europa.eu/economy_finance/publications/economic_papers/2002/ecp172en.pdf

TI: COMPARING REGULATORY AND FISCAL INCENTIVES FOR CLEANER AIR

AU: DODGSON-J (LIVERPOOL UNIV, UK)

SO: IMPROVED AIR QUALITY & CONTINUING TRAFFIC GROWTH. CONFERENCE PROCEEDINGS, 7 DECEMBER 1994, LONDON. 1994. RB1-6 (10 Refs.)

PY: 1994

AB: This paper discusses the relative effectiveness of fiscal and regulatory measures to handle local air pollution. Fiscal measures are taxes or subsidies to induce changes in behaviour. Taxes on a pollutant aim to give polluters an incentive to reduce the amount emitted. An example of a regulatory measure is a legal requirement for all new vehicles to meet mandatory emission levels. Many studies have investigated the effectiveness of taxes in changing behaviour, by studying the elasticity of motorists' demand for petrol. The different ways, in which petrol demand falls if prices rise, makes the long-term demand for petrol more responsive than the short-term demand. The author's work has modelled the effects of fuel prices and other variables on the composition of car stock, distances travelled by different types of car, and total emission levels. These models also include the inter-dependence between public transport fares and the demand for car travel, and between petrol prices and the demand for different forms of public transport. Its results are used to show the relative effectiveness of fiscal and regulatory measures. Estimates are given of the emissions per passenger-km from cars, buses and trains for 1993 and cars for 2000. For the covering abstract see IRRD 869702.

TI: GASOLINE DEMAND - A COMPARISON OF MODELS.

AU: FRANZEN-M (GOETEBORGS UNIV.)

CA: GOETEBORGS UNIVERSITET, GOETEBORG

SO: EKONOMISKA STUDIER. 1994. (N.49) 136P (REF., DIAGR., TABLES)

PY: 1994

RN: ISBN 91-88514-08-0

AB: This thesis analyses the short and long run gasoline demand elasticities in the OECD and for one country, it incorporates a more detailed analysis of the development of the vehicle stock. Information about gasoline demand can, for policy makers, be important for three major reasons, the effect on energy tax revenues, the external balance effect and the importance for environmental issues (such as emissions). It estimates and compares all the major [traditional] models using cross-section, time-series, and pooled methods on the same data set to analyze aggregate yearly gasoline consumption in the OECD countries. The focus of the study is then [shifted] towards the analysis and incorporation of the car stock in an attempt to build a vintage model to further our understanding of the adaptation process. Finally gasoline demand elasticities are used to explore the environmental effect (carbon emissions) of different gasoline taxation strategies for the OECD.

Modelling Tax Revenue Growth

2006, Edward Elgar Publishing, 225 p., ISBN 1845427033

By John Creedy and Norman Gemmell

Demonstrates how the measurement of growth in tax revenues is important for the design of tax policy. This book highlights how an understanding of the principal determinants of a tax system's responsiveness, and a knowledge of the relevant magnitudes, are important for the design and reform of tax policy.

TI: Petrol expenditure and redistributive effects of its taxation in Spain.

AU: ASENSIO-J (Univ Autonoma de Barcelona, Spain); MATAS-A (Univ Autonoma de Barcelona, Spain); RAYMOND-J-L (Univ Autonoma de Barcelona, Spain)

SO: *TRANSPORTATION RESEARCH PART A*. 2003/01. 37A(1) pp49-69 (22 Refs.)

PY: 2003

AB: The objective of this paper is to estimate a petrol expenditure function for Spain and to evaluate the redistributive effects of petrol taxation . . . The results show the importance that household structure, place of residence and income have on petrol expenditure patterns. The authors are able to compute income elasticities of petrol expenditure, both conditional and unconditional on-the level of car ownership . . .

TI: Revenue choice on a serial network.

AU: LEVINSON-DM (Minnesota Univ, USA)

SO: *JOURNAL OF TRANSPORT ECONOMICS AND POLICY*. 2000/01. 34(1) pp69-98 (7 Refs.)

AB: A model to examine the choice by jurisdiction whether to finance roads with taxes or tolls is developed . . . Decentralisation of control and lower toll collection costs are identified as conditions under which tolls would be more likely to become the preferred revenue instrument for highways.