CEEPA
The Centre for Environmental Economics and Policy in Africa
University of Pretoria

POLICY BRIEF

No 3, November 2009

Is a Fuel Tax Fair?

A Pollution Control Study from South Africa

Abstract

This CEEPA study from South Africa finds that an environmental tax on gasoline is a viable option for reducing both the amount of fuel that transport in the country uses and the pollution it produces. It also finds that such a tax would not impose an unfair burden on the poor. Indeed, when all forms of fuel use are taken into account, the study concludes that such a tax could actually be progressive (ie. pro-poor). The study also discovers that fuel prices must rise faster than the rate of income growth if gasoline consumption is to be stabilized – again giving justification to a tax measure that would lead to a rise in gasoline costs.

In South Africa road transport is one of the most serious causes of air pollution, fossil fuel consumption and associated environmental degradation. The country already has a heavy dependence on road transport. Its rapid rate of urbanization, economic development and population growth will make traffic-related problems even more severe in the future. This means that finding an answer to the environmental challenge posed by transport in South Africa must be done as quickly as possible; this makes the information provided in this report extremely important and timely.

A summary of CEEPA Discussion Paper No. 44: 'Economic Instruments For Environmental Regulation In Africa: An Analysis Of The Efficacy Of Fuel Taxation For Pollution Control In South Africa', by Emmanuel Ziramba, Wolassa L. Kumo, Oludele A. Akinboade. The Department of Economics, University of South Africa.

Contacts

Emmanuel Ziramba Email: zirame@unisa.ac.za Telephone: +27 12 429 4486
Wolassa L. Kumo Email: wkumo@sars.gov.za Telephone: +27 12 429 4782
Oludele A. Akinboade Email: akinboa@unisa.ac.za Telephone: +27 12 429 4782

Report Summary

In South Africa road transport is one of the most serious causes of air pollution, fossil fuel consumption and associated environmental degradation. The country already has a heavy dependence on road transport. Its rapid rate of urbanization, economic development and population growth will make traffic-related problems even more severe in the future. Now a new CEEPA report has looked at this problem and assessed an environmental tax on gasoline as one potential response. It finds that such a tax is a viable option for reducing both the amount of fuel that transport in the country uses and the pollution it produces. The study is the work of a research team from the Department of Economics at the University of South Africa.

One of the concerns about such an environment tax is the impact it will have on the poor. The study therefore not only looks at the effectiveness of the tax, but also at its potential economic impact on people from different economic levels. It finds that such a fuel tax would not necessarily impose an unfair burden on the poor. Indeed, when all forms of fuel use are taken into account, the study finds that such a tax could actually be progressive (ie. pro-poor). The study also finds that fuel prices must rise faster than the rate of income growth if gasoline consumption is to be stabilized – again giving justification to a tax measure that would lead to a rise in gasoline prices.

Fuel taxes in South Africa

Fuel taxation in South Africa dates back to June 1978 when it was introduced as a General Sales Tax (GST) at 4% or 1 cent per litre (c/l). After a number of changes, GST was replaced in 1987 by a fuel levy of 30.9 c/l. A fuel tax is currently levied on the consumption of gasoline by households and motor vehicle owners. This tax is justified by the need to raise money to pay for the cost of road construction and maintenance and does not have any specific environmental element.

The idea behind a specific environmental tax on the price of gasoline is that it charges drivers for the damage they cause to the environment. It is, of course, hoped that such a tax will have the beneficial effect of reducing the miles people drive and that it will also encourage them to purchase more fuel-efficient vehicles. Most studies suggest that environmental taxes on gasoline tend to be at least mildly regressive; in other words, they place a larger relative burden on the poor than on the rich. This makes such taxes a less attractive option for policy makers; indeed, the regressive nature of gasoline tax is often cited as one of the strongest arguments against any increase in its amount.

Is a Fuel Tax Fair?

Such concerns about the unfairness of environmental taxation were the main reason that this study assessed the impact of a 'green' gasoline tax on the poor. Its aim was to see whether such a tax could be implemented as an equitable and effective policy to do something about the country's transport pollution challenge. The study research team also looked at how demand for gasoline is affected by people's income and by the price that people must pay for it. This was done to get a full picture of the economics of gasoline demand.

An assessment such as this can use either income or expenditure as a gauge of a household's economic status and its ability to pay. Using income has one key drawback: evidence suggests that income data may understates the resources available to some households, particularly at the bottom end of the income scale, where unreported income and private transfers (such as gifts from family members) may constitute a significant share of a household's resources.

Table 3: Fuel expenditure/ Total expenditure, by expenditure decile, 2000

Expenditure deciles	Fuel exp/ Total expenditure (%)
1	0.03
2	0.03
3	0.05
4	0.11
5	0.27
6	0.50
7	0.74
8	1.30
9	2.74
10	3.39

Source: Author's tabulations using 2000 Income and Expenditure Survey

The researchers involved in this study felt that a household's expenditure provides a better measure of its long-term ability to pay tax; they therefore used expenditure in their assessment. This decision was taken because expenditure reflects people's savings and their expectations of future income. Expenditure therefore reflects households' permanent income better than annual income does. In addition, using expenditure data eliminates the problem of understated household resources.

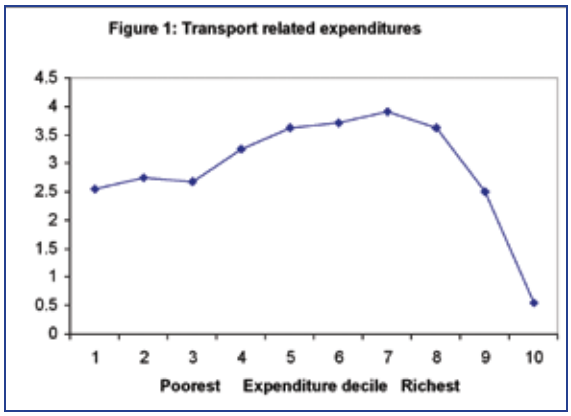
Getting Information on Fuel Use

The basic data source for this study was the Income and Expenditure Survey, (IES) from the year 2000. This survey contains a representative sample of about 26,264 households drawn from all provinces of South Africa. It provides detailed household-level data on consumption patterns and expenditure as well as information on household income and taxes.

To look at the impact of an environmental fuel tax on different economic groups, the researchers divided the households in the IES survey up into ten different expenditure groups. Using the information from the IES, it was then possible to calculate what percentage of their total household budgets people from each economic strata spend on fuel.

Households also make use of fuel indirectly in other transport related activities. For example, through the use of public and hired transport. The study therefore looked at the percentage of each household's budget that is spent on these activities. Total transport- related expenditure was calculated by adding expenditures on bus travel, train, rented vehicles and furniture removal and the transportation of goods.

To assess how the consumption of gasoline is affected by levels of income and by its price, the researchers analysed data from a variety of sources: Information on fuel consumption (based on household expenditure on petroleum products) and real income were obtained from the South African Reserve Bank. Petrol price data was obtained from the South African Energy Statistics and the South African Petroleum Industry Association.



> **"An environmental tax on gasoline is a viable option for reducing both the amount of fuel that transport uses and the pollution it produces."**

A Fuel Tax can be Progressive

It is found that the percentage of a household's income spent on fuel generally increases as total household expenditure rises. The lowest expenditure group in this study devotes 0.03% of their total expenditures to fuel. The highest expenditure group devotes 3.39% of their total expenditures to fuel. Overall, the study finds that the distribution of fuel expenditure is progressive, with higher income households devoting the highest share of their budgets to fuel.

The analysis of indirect fuel use shows that the lowest expenditure group devotes 2.55% of their total expenditures to transport. This percentage share increases with income until the seventh group. This means that middle income groups spend more on indirect fuel use than other income groups. This shows that transport related services are a necessity for middle income households.

When all forms of fuel use (both direct and indirect) are taken into account fuel expenditures are found to be progressive. The share of household budgets devoted to fuel and transport-related expenditures generally increases with overall expenditure levels. The lowest expenditure group devotes 2.58% of total expenditures to fuel and transport. The ninth highest expenditure group devotes 5.24% of their budgets to this expenditure and the highest expenditure group devotes 3.94%.

These results suggest that a fuel tax would not necessarily impose an excess burden on the poorest households, as it would have more impact on those richer groups that spend a greater percentage of their overall expenditure on fuel. Indeed, when all forms of fuel use are taken into account, it is clear that such a tax would be generally progressive.

How to Influence Gasoline Demand

This study's assessment of gasoline demand and how this is affected by gas prices and household incomes has two key conclusions: Firstly, a significant negative relationship exists between gasoline consumption and gasoline price; in other words the more expensive gasoline is, the less demand there is for it. This relationship is more pronounced over the long term. This finding shows that a change in petroleum price will have a larger impact on petrol consumption in the long run than in the short-run. This can be explained by the fact that, over time, consumers will find substitutes for gasoline and so their demand for it will drop away. These findings suggest that using an environmental tax on fuel could be a successful way to reduce consumption.

When the relationship between household income and gasoline demand is examined, it is clear that there is a strong positive relationship between the two. As expected the more income people have, the more gasoline they demand. This finding suggests that petrol consumption will continue to grow as the South African economy grows. As with prices, it is clear that the impact of increased income on gasoline demand is stronger in the long term than in the short term.

Overall, the effect of long-term income growth on gasoline demand is more than twice as strong as the effect of long-term price increases. This indicates that fuel prices must rise faster than the rate of income growth if petrol consumption is to be stabilized.

Overall this study shows that gasoline demand could be controlled using a taxation approach; however, the researchers note that their analysis does not consider the indirect effects of fuel taxation. They also note that reducing pollution (and in particular carbon emissions) requires much more action than just taxing fuel. Other sectors, such as industry and agriculture, are polluting and need to be included in any environmental policy aimed at reducing emissions. However, it is clear that an environmental tax on gasoline would be a good – and socially fair – tool that could be used to help clean up the air in South Africa.

CEEPA

The mission of the Centre for Environmental Economics and Policy in Africa (CEEPA) is to enhance the capacity of African researchers to conduct environmental economics and policy enquiry of relevance to African problems and increase the awareness of the role of environmental economics in sustainable development for economic managers and policy makers. CEEPA's Policy Brief series seek to inform a wide an general audience about research and policy findings from CEEPA studies.

Research Sponsors

CEEPA gratefully acknowledges the support provided by the key sponsors for the research summarised in this policy brief. They are the International Development Research Centre (IDRC) and the Swedish International Development Cooperation Agency (Sida). The findings, interpretations and conclusions expressed herin are those of the author(s) and do not necessarily reflect the views of the Board of Executive Directors of IDRC, Sida or our other sponsors. IDRC and Sida do not guarantee the accuracy of the data included in this work.

Centre for Environmental Economics and Policy in Africa (CEEPA) University of Pretoria, Room 2-7, Agricultural Annex, 0002 PRETORIA, South Africa. Tel: +27 (0) 12 420 4105, Fax: +27 (0) 12 420 4958. www.ceepa.co.za