Mechanism for internalizing road transport externalities caused by imported used vehicles in Ethiopia

ABSTRACT

This dissertation discuss how imported used cars cause negative externalities on urban environmental quality of developing countries by taking a case of Ethiopia. The study examines the main negative externalities usually known as "social common tragedies" and employs impact assessment method to examine and identify the main physical characteristics of imported used vehicles and the factors that are responsible for the negative externalities.

Global discussions and consensus have held every year, every month and every day through out the world, but only few of them are meaningfully interpreted into action. Of these that lack practical interpretation from government and attentions from researchers is the international used car trading. Economically, used cars account for the large share of road transportation mode in African countries, however, how to decouple its economic importance without affecting the "common goods" by reducing the associated negative externalities is the main question that this study finds out. The author examines different internalizing mechanism to reduce externalities mainly road traffic accident, urban air pollution, congestion and fuel consumption. These externalities, in particular road traffic accidents and out-door air pollution are the major causes for pedestrian's public health in Ethiopian cities. Besides, it also discusses different policy instruments that help the reduction of transaction cost related to information asymmetries on the quality of imported used vehicles. This is particularly important for imported used vehicles that illegally changed their internal parts before arrival such as shifting the steering from right handto-left hand that raises the probability of road accidents.

The study analyses the existing policies that bought bad results in controlling externalities and finally proposes necessary policies to solve the current problems such as Command - And-Control (CAC) and market-based policy instruments. It also suggests that a combination of different local and international policy instruments are necessary and should be tried in the policy making process.

The dissertation uses fully parametric hazard-based duration models to determine the

survival rate of vehicles and the total Vehicle Kilometer Travel (VKT) that are necessary to estimate/calculate the amount of emission and accident caused in the after-import life time of a vehicle. Given to data shortage on scrapped vehicles, total imported used vehicle age, mileage accumulation, and the overall physical condition, the study used Weibul distribution model to estimate the survival rate. The parameters which are used in the model are the scrappage intensity and average life time of vehicle imported at different age, which are found from regression of total vehicle population data and total annual new vehicle registration data. The model is necessary to calculate the survival rate, scrappage rate, and the total stock of vehicles at different years, which is necessary to estimate the total CO2 emission from imported used vehicles. This will help policy makers to balanced decision that supports low-carbon transportation.

The study estimate a rate that is related to distance traveled and age and it is relevant to calculate ownership tax, usage tax, mileage- based insurance that help purchaser's decision when they want to buy cars. This could be done with support of other internalizing mechanisims such as voluntary vehicle quality and environmentally friendly Eco-labeling measures to reduce the asymmetric information. The tax rate can be calculated based ^ survival rate and total expected VKT that will change the current cylindrical capacity based ? tax rate with consistent mileage-based rate that incorporate? due consideration for long term impacts of externalities.

The study use avoid-shift-improve (Cute-matrix) policy matrix to regulate importation of vehicles based on carbon emission rate & fuel efficiency. These instruments helps to create a balanced business platform for healthy competition between domestic assembled vehicles and imported used vehicles with out abusing the environmental issue to favor the domestic assembled vehicles for only being new.

The study also suggests for big auto makers, international dealers and custom offices to cooperate together for coordinated inspection system. The author strongly believes that these international coordination and policy consensus will assist the global fighting against global warming and help developing countries to regulate their air pollution and other externalities.

Key words: internalizing mechanisms, externalities, used cars, eco-labeling