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# Impact of Petroleum Products Subsidization to Energy Demand in Thailand

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## Abstract

The sensitivity of energy demand which is changed from price and income provides an impact on national security and climate change understanding. This study uses quarterly time-series data to investigate the patterns of price and income elasticity of petroleum products demand for Thailand and focuses on the impact of gasoline and diesel subsidization through the energy price crisis since 2004. By applying the log-linear energy demand model considering short-run and long-run elasticities, covering 1990 to 2006, focusing on the primary energy supply and final consumption reflected from the price and income, it is found that the price elasticity is inelastic while the income is very sensitive to energy consumption due to the greatly dependent on energy import and subsidization ratio among period. The price elasticities differ considerably by -1.53 to 1.30 during 1990 to 2003, -0.52 to 27.47 during 2004 to 2010, and -17.33 to -1.01 for 2011 to 2016. Fuel subsidies have been playing role in the price elasticity sensitivity while results also indicate that short-term gains from subsidy reform are much smaller than the long-term. However, the income elasticity has moved from inelastic to very sensitive or very elastic in Thailand. The policy recommendations in subsidization arrangement are also raised.

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*Keywords:* Price elasticity, Energy demand, Energy subsidization, Thailand.

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## 1. Introduction

The change of petroleum price has an effect on consumer's response. The change of petroleum price in a short-run affect less on petroleum consumption of consumers but if the price have been change for a long-run, it will have

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a big effect on consumer’s behavior. While consumer’s response for the change of petroleum price is one of evaluation tools in setting petroleum tax [1] or energy policy. As The Energy Policy and Planning Office (EPPO) annual report, petroleum consumption has increasing continuously in every year. In 2015, it is found that first, overall petroleum consumption is 142.7 million liters per day which is increased by 1.9%., second, petroleum import is 9.9 million liters per day which is decreased by 34.3%, lastly, internal petroleum production is 171.5 million liters per day which is increased by 8.9%. [2] Fig.1 shows petroleum consumption in Thailand during 1990-2016, it is found that the amount of petroleum consumption tend to be increased in each year particularly diesel and it tend to be higher and higher in the future. Therefore, in order to decrease the amount of petroleum consumption, petroleum tax and policy have to be apply.

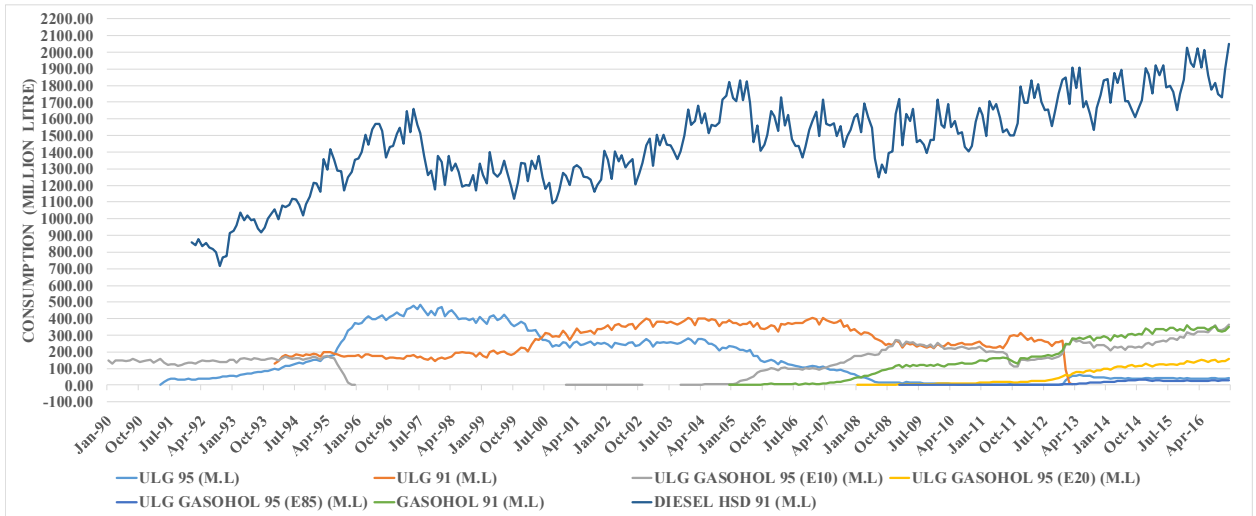


Fig.1. Petroleum products consumption in Thailand since 1990 to 2016

Petroleum price structures consist of ex-refinery price, tax, fund, and marketing margins which is shown as fig.2. Tax is determined by government. In Thailand, tax and fund were implemented to reduce petroleum consumption in some products. As fig.2, it shows that Thailand collect partially budget from retail petroleum to Oil Fund and ENCON Fund. Oil Fund was establish to reduce the volatility of oil retail price by charging some money from oil retail price when the price is low and subsidizing when the price is high. For ENCON Fund, was establish to promote energy conservation and renewable energy.

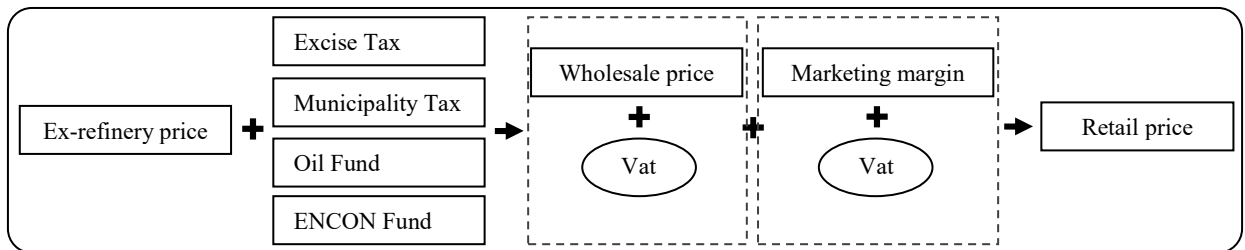


Fig.2. Thailand petroleum products price structure.

The concept of petroleum price subsidy was implemented by many countries to assist people in form of social welfare. In Thailand, some petroleum price was subsidized form Oil Fund. And to reduce petroleum consumption, taxing some type of petroleum to subsidize others was applied.

This study focuses on the impact of petroleum subsidization on petroleum consumption during 1990-2016 through the price elasticity of gasoline--unleaded gasoline 95, unleaded gasoline 91, gasohol 95 (E10), gasohol 95 (E20), gasohol 95 (E85), gasohol 91 and diesel.

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