# *INDUCED TECHNOLOGICAL CHANGE AND THE ENERGY INTENSITY OF THE JAPANESE ECONOMY*

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## Overview

In many countries around world, technological change is one of the main driving forces to decline energy intensity of economies. There are mainly two types of approaches to deal with technological change in explaining the declining energy intensity. Traditionally, technological change is simply assumed as an autonomous process, that is, assumed as a function of time. This type of technological change is called exogenous technological change. On the other hand, technological change can also be considered as the outcome induced by changes in prices and activies. In fact, empirical evidences in literature suggest that prices, R&Ds, and learning through past experinece play some role in the accumulation of energy-saving knowledge stock. It is called endogenous technological change. The accumulation of energy-saving knowledge stock have been investigated mainly in the case of the U.S. economy, but not of other countries. It is important to measure the energy-saving knowledge stock in economies around the world in order to compare the countries' energy-saving efforts in the past. In particular, it is important to investigate whether induced technological change is more influential than exogenous technological change to decline energy intensity of Japanese economy, since the country have experienced oil price shock during 1975-1985 and made much effort to decline energy intensity. In this paper we present the results of econometric ananysis to decompose the effects of induced/autonomous technological changes in declining energy intensity of Japanese economy.

## Methods

Econometric analysis using Japan's KLEM data.

## Results

First, time-series changes of energy intensity of Japanese economy is presented to observe the energy efficinecy improvement of main industrial sectors in the country.

Second, the estimation results of energy-saving knowledge stocks due to induced technological change in Japan are presented.

Third, the energy-saving knowledge stocks are compared with autonomous technological changes and discuss how large was the impact of induced technological change in declining energy intensity of Japanese economy.

## Conclusions

The impact of endogenous technological change in declining energy intensity of Japanese economy is relatively high. It implies that obtaining additional energy-saving knowedge stock in Japan would be more costly than other countries.

## References

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