Price Control, Imperfect Capital and Labor Market and Disinvestment Effect in Electricity Industry -A Computable General Equilibrium Approach

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Abstract:

Low level of electricity price in Iran causes overconsumption and also high electricity intensity. In 2007, Iran electricity intensity was estimated nearly twice as large as average global electricity intensity[1]. By considering high losses in generation and transmission, it seems that the efficiency improvement in electricity sector is unavoidable in Iran.

Generally, there are two opposite view about the impacts of energy efficiency improvements on underlying sector's investment. On the one side, some authors like Brookes (1978, 2000) believe that energy efficiency improvement may increase marginal productivity of inputs, and leads to capital stock increase in all sectors. Expanding production possibility frontier and increase in domestic energy supply, it would lead to decrease in its price. This decline creates new derived demand and hence increases investment in energy sector. On the other side, Turner (2009) states that decrease in energy price due to decline in demand would lead to reduction in supplier revenue and profit. The investment decreases In this case. The direct result of this process is called "disinvestment effect".

Disinvestment effect indicates that decline in energy demand may reduce the capital return and therefore the labor and capital outflow may occur. Vikstrom (2004), Washida (2004) and Grepperud & Rasmussen (2004) found that economic impacts of energy efficiency improvement depend on some economic features including elasticity of substitution between energy and capital and labor as well as other factors.

[1] About 0.92 WH/$ US compare with 0.46 WH/$ US.

But both views assume a competitive electricity market with flexible prices. As both of them start their analysis with a price decline, In the case of electricity price control it is expected that different results would appear.

The purpose of this paper is to study the “disinvestment effect” of a counterfactual electricity efficiency improvement in an economy with energy price control and imperfect markets. We are going to study the effects of those imperfections on the “disinvestment effect”. We apply a computable general equilibrium model with special assumptions about given and controlled electricity price, heterogeneous labor market, wage rigidity and imperfect capital mobility between sectors. We found that after a 10% electricity efficiency improvement, the capital stock declined by 9.53% and employment reduces by 9.48% in electricity sector. Services, industries and agriculture sectors had more capital and labor inflow respectively.

Keywords: Computable general equilibrium, electricity conservation, capital return, Investment, labor, Energy

JEL: C68, D12, D22, E22, D58, Q41

References:

Brookes, L. G., (1978). 'Energy Policy, the Energy Price Fallacy and the Role of Nuclear Energy in the UK', Energy Policy, 6(2), 94-106.

Brookes, L. G., (2000). 'Energy Efficiency Fallacies Revisited', Energy Policy, 28(6-7), 355-66.

Grepperud, S. & Rasmussen, I. (2004). 'A General Equilibrium Assessment of Rebound Effects', Energy Economics, 26(2), 261–282.

Turner, K., (2009). 'Negative Rebound and Disinvestment Effects in Response to An Improvement in Energy Efficiency in the UK Economy'. Energy Economics. 31, (5), 648-666.

Vikström, P., (2004). 'Energy Efficiency and Energy Demand: A Historical CGE Investigation on the Rebound Effect in the Swedish Economy 1957'. Umeå University. Umea, Sweden.

Washida, T., (2004). 'Economy-Wide Model of Rebound Effect for Environmental Efficiency', International Workshop on Sustainable Consumption, University of Leeds.