ENERGY EFFICIENCY AND INFLATION

Amulya K.N. Reddy
(7/12 Palace Cross Road, Bangalore -- 560 020, India)

To develop a simple relation between inflation and energy efficiency, let us start with the equation of exchange[1] involving the price level, P, the quantity of goods and services, Q, the money supply, M, and the velocity of money, V,:

$$P.Q = M.V$$

Differentiating, we have

$$P.dQ + Q.dP = M.dV + V.dM.$$

To sidestep all the discussions regarding the role of money in determining inflation, let us set dM = dV = 0 which means that both the money supply and the velocity of money are assumed constant. In that case,

$$Q\ dP = -\ P\ dQ$$

$$dP = -\ (P/Q)\ dQ = -\ (P/Q)\ dE\ (dQ/dE)$$

$$= -\ P\ (dE/E)\ [(dQ/Q)/(dE/E)]$$

where E is the energy input into the economy. We can also write

$$(100.\ dP/P) = -\ (100.\ dE/E)\ e_{EQ}$$

where e_{EQ} = [(dQ/Q)/(dE/E)] = the energy elasticity of the quantity of goods and services, i.e., the productivity of energy.

This result shows that, if both the money supply and the velocity of money are constant, the percentage price change, i.e., the inflation, decreases with either a percentage increase in the input of energy or an increase in the energy elasticity of the quantity of goods and services, i.e., the productivity of energy. That is, the more efficiently energy is utilized in the economy, the greater will be the decrease of inflation.

This approach to tackling inflation does not seem to have been explored.

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[1] Gwartney, J.D., Stroup, R, **MACROECONOMICS: Private and Public Choice**, Chapter 14: Inflation, Instability and the Challenge of the Monetarists, page 280, Third Edition, Academic Press, New York, 1983.