The Effects of Taxes and Subsidies on Purchases of Healthy and Less Healthy Foods:

A Quantile Regression Approach

By

Geir W. Gustavsen\textsuperscript{1} and Kyrre Rickertsen\textsuperscript{2,1}

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\textsuperscript{1}Norwegian Agricultural Economics Research Institute, Oslo, Norway.
\textsuperscript{2}Department of Economics and Resource Management, Norwegian University of Life Sciences, Aas, Norway.

Correspondence: Kyrre Rickertsen, Department of Economics and Resource Management, Norwegian University of Life Sciences, \, P.O. Box 5003, N-1432 Aas, Norway.
E-mail: kyrre.rickertsen@umb.no
Abstract

Many diseases are linked to dietary behavior. According to the 2002 World Health Report the overconsumption of several agricultural products and underconsumption of dietary fibers, fruits and vegetables are linked to cardiovascular diseases, cancer, diabetes, and obesity. The six leading risk factors for these diseases are smoking, high blood pressure, alcohol, high serum cholesterol, overweight and a low consumption of fruits and vegetables. We focus on consumption of products associated with positive, mixed, or negative health effects. Fruits and vegetables have positive effects (associated with reducing cardiovascular diseases and cancer); milk has mixed health effects (associated with high serum cholesterol and cardiovascular diseases but also a good source of calcium and some micronutrients); and sugar-sweetened carbonated soft drinks (SSCSD), ice cream, and candy have negative health effects (associated with overweight, diabetes, cardiovascular diseases, and mental health problems).

Adverse health effects are most likely among households consuming either low quantities of vegetables, high or low quantities of milk, or high quantities of SSCSD, ice cream, and candy. Therefore, the effects on high- and low-consuming households are estimated using quantile regressions (QRs) and Norwegian household purchase data. Since many households did not purchase these goods, censored as well as ordinary quantile regressions are used.

The costs incurred by health problems associated with excess weight are only partly covered by the overweight and obese individuals. For example, the public Norwegian health insurance system pays most of the medical costs associated with treating obesity. This imposes an externality and may justify policy interventions. The purchases of goods may be altered through taxes and subsidies. We investigate the effects of: (i) removing the value
added tax (VAT) on vegetables and milk and (ii) doubling the VAT on SSCSD, ice cream, and candies.

We find quite different effects in different parts of the purchase distribution for different commodities demonstrating the usefulness of QRs. The investigated VAT reduction will not substantially increase vegetable purchases among low-consuming households but be more effective at increasing milk purchases among such households. The doubling of the VAT to 25% will reduce the per capita purchases among high-consuming households with almost 2 kilograms of ice cream, almost 20 liters of SSCSD, and about 1.5 kilograms of candies.

The effects of these reductions on body weight depend on the substitution among goods. However, given that obesity builds up over time, the effects can be substantial. For example, substituting 5 liters of SSCSD with water per year corresponds to an annual reduction of about 0.3 kilograms of body weight. Over a ten year period, the accumulated effect is about three kilograms.