

Essays on the Economics of the Nutrition Transition in Indonesia

Abstract

Indonesia has experienced remarkable economic growth over the past few decades. Fueled by economic development, poverty reduction, and modernization the country is rapidly urbanizing. In addition to advances in infrastructure, healthcare, education and overall increase in living standards, urbanization has led to significant changes in dietary patterns and activity behavior, resulting in a nutrition transition. The expansion of manufacturing and services industries, the prevalence of motorized transportation, and the growth of global and regional food retailers may have played a role in driving the shift towards energy-dense and low-nutrient processed and prepared foods, as well as promoting a more sedentary lifestyle. The nutrition transition has also been associated with anthropometric changes towards overweight and obesity, the prevalence of which has doubled over the past two decades. Indonesia is currently undergoing an epidemiological transition towards non-communicable diseases, which have emerged as the primary cause of death and disability in the country in 2019.

The empirical research in this thesis focuses on children. Despite ongoing issues of undernutrition and high rates of stunting in Indonesia, the prevalence of childhood obesity is rapidly increasing. Overweight children are at greater risk of developing obesity in adulthood, which can lead to adverse health conditions such as diabetes and cardiovascular diseases. Furthermore, obesity can have negative psychological effects, potentially hindering a child's socio-emotional development and academic performance. Ultimately, childhood overweight can have long-term consequences for economic development.

Previous research has identified various risk factors that can contribute to the onset of childhood overweight and obesity. These include dietary preferences, physical activity levels, as well as environmental factors related to food, socio-cultural influences (including peers and parents), and media exposure. Developing an understanding of these factors and finding effective strategies to reduce their impact could potentially help lower the prevalence of childhood obesity.

Set against this background, this thesis (i) explores the current trends and underlying drivers of the nutrition transition in Indonesia, (ii) assesses the available evidence on behavioral, psychosocial, and environmental risk factors associated with childhood overweight in low- and middle-income countries, (iii) illustrates the potential association between the risk factors and overweight or obesity among primary school children in urban Indonesia using original data collected from 1,674 parents, and (iv) evaluates the influence of policy nudges and peer behavior on children's choices of a healthy or unhealthy snack in 18 primary schools in Central Jakarta.

The first essay examines the geospatial trends of the nutrition transition and its drivers that contribute to the rising prevalence of overweight and obesity. The study is based on two rounds of district level panel data (n=438) comprising anthropometrics, household consumption, socioeconomic and infrastructural indicators. The analysis shows that despite the modest increase in daily calorie intake and even slight increase in physical activity the prevalence of adult overweight and obesity has doubled over the last decade. The results suggest a strong positive conditional association between changes in household income and the changing prevalence of adult overweight and obesity, mediated by increased consumption of prepared foods. The study shows evidence of a nutrition transition at the sub-national level in terms of increase in adult overweight and obesity, and changes in dietary patterns towards consumption of processed and prepared foods and beverages. There is no evidence of associations between being overweight and obese with changes in employment and infrastructure. The study points to the rapid increase of the overweight and obesity prevalence and the presence of important heterogeneities at sub-national level.

The second essay systematically maps the existing experimental and observational evidence of associations between behavioral, psychosocial, and environmental risk factors and overweight and obesity among children and adolescents in low- and middle-income countries. Based on 157 primary research publications and 21 systematic reviews the study highlights a need for improvement of geographical coverage and rigor of future research and calls for the inclusion of multiple behavioral and environmental risk factors and their potential interaction to provide context-sensitive evidence for public health policies, and interventions in countries with increasing prevalence of overweight and obesity in children.

Following the first two studies, the third essay¹ focuses on the potential association between demographic, behavioral, and environmental risk factors and overweight or obesity among primary school children in urban Indonesia. The study is based on a self-administered parental survey that measured socioeconomic background, children's dietary and physical activity patterns, and parental practices. In a sample of 1,674 children, 30 percent were overweight or obese and the prevalence of obesity was higher in younger children and boys. The analysis shows that maternal education is positively associated with children's BMI at the median of the Z-score distribution, while the obesogenic home food environment correlates with the BMI-for-age Z-score at the 75th and 90th percentiles. The essay discusses potential opportunities for future policies and interventions such as improving the food environment in homes and schools and continuing to promote healthy nutrition and adequate physical activity.

¹ The essay titled "Behavioral and Environmental Risk Factors Associated with Primary School Children's Overweight and Obesity in Urban Indonesia" has been revised and resubmitted to *Public Health Nutrition*.

The fourth essay² contributes novel experimental evidence on the effects of policy nudges and peer behavior on children's choices of a healthy or unhealthy snack. The essay presents the results of a field experiment with 1,674 children from 18 public primary schools in Central Jakarta. While evaluative policy nudges such as emoji labels moderately promote the choice of a healthy snack, the adverse effect of observing a peer eating an unhealthy snack is large. But there is no evidence for an effect associated with observing a healthy peer or that this can be strengthened by information provision. The essay compares the findings to studies conducted in developed countries and argues that more restrictive measures, such as taxes and subsidies or bans of unhealthy foods at primary schools are needed in the context of a rapidly urbanizing country undergoing a nutrition transition.

Overall, this thesis identifies the current trends of the nutrition transition in Indonesia, investigates its contributing factors and provides a background for the context-specific policy response and future interventions. The study design and methodology may inform other swiftly urbanizing developing settings that are experiencing similar nutritional and anthropometric shifts.

² de Vries Mecheva, M., Rieger, M., Sparrow, R., Prafiantini, E. and Agustina, R., 2021. Snacks, nudges and asymmetric peer influence: Evidence from food choice experiments with children in Indonesia. *Journal of Health Economics*, 79, p.102508.