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# Dual burden households and intra-household nutritional inequality in Indonesia

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## ARTICLE INFO

## ABSTRACT

Overweight is an increasing problem in many developing countries, coexisting with underweight and contributing to a dual burden of malnutrition, sometimes in the same households. We analyze the phenomenon of dual burden households in Indonesia, using 15-year panel data. Currently, 16 percent of Indonesian households are classified as dual burden. In these households, children are often underweight, whereas adults are overweight. The nutrition transition seems to have differential impacts on the body mass index of different age cohorts. Dual burden households are a transitory phenomenon. This phenomenon started in the richer segments, but now the prevalence of dual burden households is highest in the poorest population groups. Most households that move out of the dual burden category end up as overweight. We also develop a continuous Theil index of intra-household nutritional inequality. While the overall prevalence of dual burden households has hardly changed over the last 10 years, the Theil index increased steadily. This underlines that the dual burden classification has limitations in terms of capturing nutritional dynamics. Socioeconomic determinants of dual burden and nutritional inequality are analyzed with regression models.

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## 1. Introduction

Many developing countries face increasing rates of overweight and obesity. In Latin America and North Africa, this problem has been recognized for a while; in many countries of Asia and Sub-Saharan Africa it has entered the research and policy agenda more recently (Jones-Smith et al., 2012a,b; Martorell et al., 2000; Ziraba et al., 2009). Overweight and obesity are the results of changing food consumption and physical activity patterns caused by rising incomes, urbanization, and globalization. These trends have been termed the nutrition transition (Popkin, 2003; Popkin and Gordon-Larsen, 2004). Obesity is associated with many chronic diseases, so that policy

attention is required. Designing appropriate policy responses is difficult. The task is challenging especially in situations where overnutrition coexists with undernutrition, which is often referred to as the dual burden of malnutrition (Khor, 2008).

This dual burden phenomenon occurs at the country level, but sometimes it is also observed at the household level, implying that there are overweight and underweight individuals living in the same household (Doak et al., 2005). There are factors within households that contribute to nutritional inequality, which is in line with research on intra-household resource allocation (Alderman et al., 1995; Thomas, 1990). The existing literature on intra-household dual burden tends to categorize households in a discrete way: based on the body mass index (BMI) or similar indicators of nutritional status of individual members, households are classified as underweight, normal, overweight, or dual burden. Doak et al. (2000,

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2005) found dual burden households in Brazil, China, Indonesia, Kyrgyz Republic, Russia, Vietnam, and the USA. One aspect that has received particular attention in the literature is the relationship between dual burden and income. For example, in Indonesia and China, dual burden and overweight households were found to be richer than the rest; in other countries like Brazil and Russia, dual burden households tend to have lower than average incomes (Doak et al., 2002, 2005).

Other studies focus more specifically on mother and child pairs, because underweight children and overweight mothers are paradoxically the most common combination observed in dual burden households. Jehn and Brewis (2009) found that these pairs exist mainly in higher income and urban locations. Khor and Sharif (2003) and Saibul et al. (2009) analyzed relationships between dual burden mother–child pairs in Malaysia, pointing at the importance of dietary diversity and individual health conditions. There is also research that looks at mother–child pairs but uses stunting instead of underweight as the nutritional indicator for children (Garrett and Ruel, 2005). In their studies in Guatemala, Lee et al. (2010, 2012) found that the combination of child stunting and maternal overweight is characteristic of the most disadvantaged population groups, especially poor rural and indigenous households.

The main objective of this article is to analyze the phenomenon of dual burden households and intra-household nutritional inequality in Indonesia. We contribute to the literature with two particular innovations. First, while existing studies on dual burden households have mostly used single round data, we employ panel data, which allow us to examine nutritional dynamics more explicitly. For instance, knowing whether a dual burden household in one period was also classified as dual burden in previous or subsequent periods can help to better understand possible nutritional shifts. The same holds true for households in other nutritional categories. Tracking the same households over time can lead to new insights about the role of socioeconomic factors, which is of high policy relevance. Indonesia is an interesting study country because of its rapid economic development over the last 15 years. Indonesia is also one of the few developing countries, for which suitable panel data are available.

Second, in addition to working with the common household classification in dual burden analysis, we introduce the Theil index as a continuous measure of intra-household nutritional inequality. The discrete classification of households into underweight, normal, overweight, or dual burden depends on BMI thresholds of individual household members, resulting in fairly heterogeneous categories. For instance, an overweight household can be a household where all members are overweight (or obese), but it can also be a household where only one member is overweight and all other members are normal. Such inequality within household categories can be captured with a continuous measure, which is important to better understand nutritional dynamics. We build on work by Sahn and Younger (2009), who developed and used a Theil index for BMI to analyze the relationship between inequality at country and household levels. To our knowledge, no previous study has used a continuous measure of intra-household inequality in connection with dual burden households and nutritional shifts over time.

## 2. Data and methods

### 2.1. Data

This study uses the Indonesian Family and Life Survey (IFLS) of the RAND Corporation, an international public policy research institute headquartered in the USA. IFLS encompasses four survey waves that were carried out in 1993 (IFLS1), 1997 (IFLS2), 2000 (IFLS3), and 2007 (IFLS4). We use all four waves for the analysis in this article. The data are representative for 83 percent of the Indonesian population (13 out of 27 provinces). The selection of the provinces was done taking account of the high heterogeneity of the population. The following provinces are included: North Sumatra, West Sumatra, South Sumatra, and Lampung (in Sumatra), DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java (in Java), as well as Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi. Villages and households were sampled using the National Socioeconomic Survey (SUSENAS) sampling frame of the Indonesian Bureau of Statistics. Further information about the sampling scheme and survey design is given in Frankenberg and Karoly (1995), Frankenberg and Thomas (2000), and Strauss et al. (2004, 2009).

In the first wave of the survey in 1993, only selected members of the sampled households were interviewed and measured. From 1997 onward, all household members were included. Thus, in the first wave, results may differ. In particular, the 15–25 year age group has a relatively low population share in IFLS1. But when we compare this age group over the years, results seem plausible, and we could not identify any obvious bias. Hence, our approach of using data from all four waves seems justified; observations over a period of 15 years are of great advantage for the analysis of possible nutritional shifts over time.

### 2.2. Measures of nutrition and nutritional inequality

#### 2.2.1. The BMI

We use two measures to analyze intra-household dual burden and nutritional inequality, namely a discrete classification of households and the continuous Theil index. These measures themselves are described below. Both build on the BMI of individual household members. The BMI is calculated by dividing the weight of a person in kilograms by the squared height in meters. It is widely recognized as a relatively accurate measure of nutritional outcomes for adults (WHO, 1995, 2000). For children and adolescents, the simple BMI is less commonly used, because body composition changes rapidly during growth. However, standardized BMI-for-age measures can be calculated to allow comparison across different age and gender groups (see further details below) (Mei et al., 2002; WHO, 1995). For this purpose, optimal growth curves, which represent international BMI standards for every month of life until the age of 19 years, are available. These optimal growth curves for BMI in children and adolescents were updated recently (de Onis et al., 2007; WHO, 2009).