Multidimensional Child Poverty in South Korea: Developing Measures to Assess Progress Towards the Sustainable Development Goals

Soyoon Weon

Chung-Ang University, South Korea

Marco Pomati

Cardiff University, United Kingdom [Corresponding Author]

Shailen Nandy

Cardiff University, United Kingdom

This paper presents the development of a measure to assess the prevalence and patterning of multidimensional child poverty in South Korea. The first goal of UN's Sustainable Development Goals (SDGs) is to reduce poverty in all its dimensions, and countries are increasingly developing their own measures of multidimensional poverty. This flourishing of different measures presents challenges for international comparisons. The paper applies an internationally-validated method of assessing multidimensional poverty to demonstrate its suitability for use in a high-income Asian economy. Multidimensional child poverty is assessed by combining data on child material deprivation with their household income. Using data from the 2018 Korean National Children Survey, we show that child material deprivation is higher (15%) than income poverty (12%). When measured using a combined measure of material deprivation and income, around one in every three children in Korea were found to be either poor or vulnerable to poverty. These findings show that the official monetary poverty measure on its own may understate child multidimensional poverty condition in Korea, as envisioned by international targets like the SDGs. In terms of policy, analysis of individual deprivations suggests that a combination of in-kind benefits such as vouchers for leisure activities or education and asset-building programs as well as cash transfers are needed for tackling child poverty.

Key words/short phrases: Child Poverty, Multidimensional Poverty, Material Deprivation, South Korea

Introduction

This paper considers the issue of child poverty in Korea. When considering how best to tackle poverty, it is important that attention be placed on how it is defined and measured. One of the main poverty measures used in Korea is the 'child relative income poverty rate' – i.e. the percentage of children (0-17 years old) with an equivalised household income below the poverty threshold. When measured using a threshold of 50% of median disposable income, the relative child income poverty rate in Korea fell from 10.1% in 2005 to 6.9% in 2015 (Yeo et al., 2016), due to general increases in household incomes, including for households with dependent children, and also to policy efforts aimed at mitigating child poverty (Yeo, 2018). Despite the decrease in the monetary poverty among children, many children in Korea continue to experience material deprivation and poor living conditions which affect their broader development and wellbeing. For example, over the last five years, around 350,000 children (4%) received government-provided food benefits, and around 10% of children live in dwellings which do not meet minimum housing standards (Statistics Korea, 2020a). Given these considerable gaps between child income poverty rates and poor living conditions, researchers and stakeholders question whether official poverty measures, based solely on household income, can adequately capture the multidimensional nature of child poverty in Korea (E. Kim & Nandy, 2018; Yeo, 2018).

Poverty is more than just a lack of income, and internationally-agreed definitions recognize that it entails being deprived in vital aspects of life such as health, nutrition, shelter, water and sanitation, and education, all of which are essential to children's development and well-being (UNICEF, 2019) and enshrined in the 1989 UN Convention of the Rights of the Child. In addition, children's perspectives about their living conditions have been too often disregarded in the poverty measurement process, despite research demonstrating the necessity

and importance of including children's perspectives to thoroughly understand their living conditions (Barnes & Wright, 2012). Given issues surrounding the monetary measures of poverty, and the consequences of indicator selection for social policy priorities, the concept of material deprivation is increasingly used as a direct measure of the actual living conditions of children (Guio et al., 2018). In the international Sustainable Development Goals (SDGs), adopted by all United Nations (UN) member states in 2015, Goal 1 aims to eradicate poverty, and Target 1.2 explicitly aims, by 2030, to reduce "*at least by half of the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions*". To gauge progress on SDG implementation, it is highly recommended that each country develops national indicators using children specific statistics based on the concept of multidimensional poverty (UNICEF, 2019). Accordingly, it is increasingly required to define and measure multidimensional poverty among children using child-appropriate indicators, to know how they are impacted by policies and programs intended to tackle child poverty. However, in many countries including Korea, indicators of multidimensional child poverty remain underdeveloped, and national Voluntary National Reviews (VNR) submitted to the UN frequently only report statistics on overall (adults and children combined) monetary (income) poverty, not child poverty per se as shown in Korea's VNR, submitted in 2019. Due to the limitations of (income) poverty measures to reflect child multidimensional poverty (Minujin et al., 2006), it is difficult to assess progress in improving children's living conditions in Korea following the implementation of several national anti-poverty policies, including the universal child allowance for children aged 0-7[1] introduced in 2018, free meals for primary school students, and universal childcare allowance for children aged 0 to 5.

---

[1] Universal child allowance in Korea was introduced in 2018 for children aged 0-5 and expanding its coverage for children aged 0-7 in 2019. It provides USD 100 every month to a child, regardless of parental income.

In this paper, we use nationally representative survey data to assess the prevalence and patterning of multidimensional child poverty in Korea as required by the SDGs. We test the reliability, validity, and additivity of items for a deprivation index for Korea, using both child-derived and household-derived items, and then in combination with data on equivalised monthly household income, examine multidimensional child poverty in Korea. As a final step, to investigate how child poverty varies by household socio-economic characteristics, we conduct a subsample analysis and multinomial logistic regression. Based on our findings, we discuss policy implications for how to address child poverty in Korea. To our knowledge, this is one of the first studies to estimate child poverty in Korea using both child-derived and household-derived perspectives.

Literature Review

Multidimensional Child Poverty Measurement

There are several traditions in multidimensional poverty measurement, and these are mainly classified by two criteria: by the poverty framework behind them - i.e., capabilities (Alkire et al., 2015, p. 2; Sen, 1979), relative deprivation (Townsend, 1979), unsatisfied basic needs (Boltvinik, 1999, 2013) - or by the way in which indicators are aggregated -i.e., intersection and union approaches, weighted or unweighted indicators, and the dimensions covered (Spicker, 2007; Najera et al., forthcoming). Townsend (1979) defined the poor as those people whose resources are so seriously below those commanded by the average individual or family that they are excluded from ordinary living patterns, customs and activities. On the other hand, the capability approach focuses on the distribution of individuals' capabilities to achieve important and worthwhile goals (Kelleher, 2013). Within these theoretical frameworks, decades of research and experience with anti-poverty programs have shown that households with incomes above a set poverty line can experience, and be

vulnerable to, multiple material deprivations (e.g., Lyte et al., 2001; Saunders & Naidoo, 2009). As such, income measurement alone cannot reliably capture the multidimensional nature of poverty including those important elements linked to nutrition, health, education, and financial security (Sen, 1979; Townsend, 1979). Furthermore, traditional monetary approaches treat households as the unit of analysis, and do not consider children as distinct individuals; this is problematic given evidence that household income is rarely allocated equally across household members, or across genders and generations (E. Kim & Nandy, 2018; Tafere, 2012). The needs and living standards of children can be different from those of adults, even within the same household (Gordon & Nandy, 2012; Guio et al., 2018; Main & Bradshaw, 2012). To overcome these limitations, researchers and UN agencies like UNICEF are increasingly assessing child poverty using multiple deprivation non-monetary approaches (Stewart & Okubo, 2017; UNICEF, 2020).

Countries reporting progress on child poverty reduction for the SDGs are generally using two main approaches: the Multidimensional Poverty Index (MPI) modified for use with children and UNICEF's Multiple Overlapping Deprivation Analysis (MODA), both of which build on earlier work (Gordon et al., 2003; UNICEF, 2005). The MPI was developed by the Oxford Poverty and Human Development Initiative in collaboration with the United Nations Development Program (UNDP). The global MPI examines household deprivation using ten (or sometimes more) indicators across three equally weighted dimensions: health, education, and standard of living. It counts households as multidimensional poor if they are deprived in one-third or more of the indicators (Oxford Poverty and Human Development Initiative [OPHI], 2020). The Global MPI includes indicators to estimate child deprivation such as child mortality and school attendance and there are some empirical examples which use the child as the level of analysis and strive to use more child-level indicators (Alkire et al., 2016),

but overall it is an index primarily based on household-level and not a child-level indicators. On the other hand, UNICEF's Multiple Overlapping Dimension Analysis (MODA) was designed from the beginning as a child-centered methodology. For example, cross-country multidimensional child deprivation analysis (CC-MODA) is intended to analyze child deprivation in low- and lower-middle income countries using agreed international standards as guiding principles (de Milliano & Plavgo, 2014). Furthermore, the deprivation dimensions and indicators of CC-MODA distinguish between two age-groups, children under five and children aged 5 to 17, to facilitate the selection of age-specific indicators and reflect the changing needs of children between early childhood, primary school, and adolescence, following a life course approach. CC-MODA consists of six deprivation dimensions with a total of thirteen indicators: nutrition, health, water, sanitation, housing, and protection from violence during infancy and early childhood (below the age of five), education, information, water, sanitation, housing, and protection from violence for school-aged and adolescence (de Milliano & Plavgo, 2014). While the MPI and CC-MODA are more commonly used in low- and middle-income countries, the EU-MODA aims to assess the deprivation in higher income countries having different living standards (Chzhen et al., 2016). In the EU-MODA, there are five deprivation dimensions including nutrition, clothing, early childhood education and care, child development, information, and housing for children below minimum compulsory school-age. For school-aged children (under 16), deprivation dimensions include nutrition, clothing, educational resources, leisure, social, information, and housing. For children aged 17 to 18 and being capable of economic activity, deprivation dimensions include clothing, activity, leisure and social, healthcare access, information, and housing (Chzhen et al., 2014).

Both MPI and MODA methodologies however are generally constrained by information available in large national surveys such as the Demographic and Health Survey

(DHS) and Multiple Indicator Cluster Surveys (MICS). This improves comparability but also limits to a large extent the types and national specificity of child deprivations measured in the final deprivation indices. Moreover, because of the data limitations of these surveys, the relationship between monetary and multidimensional poverty cannot be investigated, leading to separate estimates which fail to use information on both household resources (such as income) and satisfaction of children's needs.

One approach that has attempted to tackle these criticisms is the Consensual Approach (Gordon, 2006; Mack & Lansley, 1985; Pomati & Nandy, 2020). For example, following this approach, the 2012 UK Poverty and Social Exclusion (PSE) Survey collected information on a wide range of child deprivation indicators endorsed by the UK public and having verified the validity and reliability of these items used both material deprivation (a direct measure of poverty) and income data (an indirect measure of poverty) (Dermott & Main, 2017; Ringen, 1988) to define monetary and deprivation cut-offs and categorize households and children. Specifically, it set the poverty line at a point "that maximizes differences between the poor and not poor, and minimizes differences within the two groups" (Gordon, 2006, p. 44). Using these income and deprivation cut-offs, households were classified into four different groups: (i) Non-poor (neither income nor deprivation poor), (ii) Rising (deprivation poor, but not income poor), (iii) Vulnerable (income poor, but not deprivation poor), and (iv) Poor (both income and deprivation poor) (Gordon, 2006). Analysing the rising and vulnerable groups can offer valuable insights on the dynamics of poverty in a cross-sectional survey, such as the PSE survey. According to Gordon (2006), those identified as vulnerable may have experienced a reduction in income due for example to job loss, while their household's standard of living has not yet declined because they have not yet lost some of the items perceived to be necessities of life. This group is likely to fall below the 'poverty' threshold in

the long-run. On the other hand, for the rising group, income may have increased because they may have gained employment and/or resources, but they have not yet been able to buy or afford all the necessities after being on a low income for some time.

In this paper, we apply the PSE method to explore multidimensional child poverty in Korea, combining data on household income and material deprivation.

Previous Research on monetary child poverty and child deprivation

To tackle child poverty, an increasing number of empirical research has paid attention to child deprivation. For example, by applying the EU-MODA, Chzhen et al. (2016) compared the living conditions of children in three diverse countries, Finland, Romania, and the UK. Consistent with previous research (e.g., Bradshaw & Finch, 2003), their finding showed that not all income poor were also materially and socially deprived and vice-versa. In addition, the deprivation incidence in at least one dimension was higher than monetary poverty incidence. For example, in Finland, 12% of preschool-age children were income poor when 37% were deprived in one or more dimensions (8% were both poor and deprived, and 29% were deprived while not being income poor). In Romania, 26% were income poor and also deprived, and 67% were deprived while not being income poor. Using 20 deprivation indicators categorized in five dimensions, Qi & Wu (2019) also showed that there is a mismatch between income measures and deprivation in China. Their results suggest that poor children in China faced multiple vulnerabilities and disadvantages which could not be measured by household income. Similarly, Saunders and Tang (2019) explored the (lack of) overlap between deprivation and income poverty indicators in Hong Kong and concluded that income poverty and deprivation approaches are capturing different aspects of social disadvantage and that composite measures are valuable additions to the poverty analyst's toolkit. This conclusion is also consistent with the concept of "consistent poverty" used by

(Nolan & Whelan, 1996, 2011).

In Korea, child poverty has historically been measured using household income, despite its limitations. Accordingly, only a few Korean studies have attempted to estimate multidimensional child deprivation, yet the resounding message from this limited literature is that traditional income poverty measures overestimate the living conditions of children. For example, using the Korean Welfare Panel Study of 2012, Jung (2014) showed that the child deprivation rate was 10.8 percent - higher than the relative income poverty rate of 8.6 percent. Based on this, Jung concluded that since most anti-poverty strategies in Korea rely on the means-tested income transfer program, some children experiencing considerable material deprivation were being excluded from accessing social welfare programs. Later work by E. Kim & Nandy (2018) estimated children's multidimensional poverty using the 2013 Korean National Children Survey and the PSE method, using a combination of deprivation and income data. They showed that the multidimensional child poverty rate in Korea was 9.8% which was almost twice as high as the estimate based on the official income poverty line.

Using several data resources, Yoo (2019) explored various dimensions of children's well-being including health, financial difficulties, education and development, leisure activity, safety, relationships, and subjective well-being. Findings showed that around 10% of children and youth in Korea were deprived of basic needs like food and clothing, but more than 40% of them experienced deprivation of leisure activities and social engagement. In addition, the average degree of life satisfaction of Korean children was lowest among the OECD countries although it varied by their social background including the standard of living, life stability, and the region where they lived (Yoo, 2019).

Based on observations emerging from previous research, this paper aims to

investigate the overlap between monetary and deprivation indicators and to what extent combining these two approaches could improve poverty monitoring in South Korea. Korea has a comprehensive child welfare system that includes essential components such as universal health care insurance, child allowance, daycare services, and compulsory high school education. This sets Korea apart from other developed or developing Asian countries. Additionally, Korea's unique focus on children and family, influenced by Confucianism, instills specific set of values. Consequently, the unique institutional frameworks, values, and policy initiatives of Korea contribute to the ongoing policy debate observed across Europe, North America, and other Asian nations.

Research Design

Source of Data

This paper uses data from the cross-sectional 2018 Korean National Children Survey which has been conducted every four-years since 2013. The survey was conducted by the Korean Institute for Health and Social Affairs (KIHASA) and funded by the Korean Ministry of Health and Welfare (KMHOW). The survey was administered in 2019 to 4,039 households and their children aged 0 to 17: 2,550 general households and 1,489 low-income ones. The survey asked for information about the prior year, and the collected data reflects conditions in the year prior to the survey year (Ryu et al., 2019)[2]. In households with more than one child, the one whose birth month was earlier was selected. To draw the sample, general households were selected based on population census data in 2017 using a probability proportional to size systematic sampling that considered place of residence and whether the household had at

---

[2] Data are open to the public on the Statistics Korea website (http://mdis.kostat.go.kr). The most recent data open o the public stems from the 2018 survey, while the ongoing survey for 2023 is currently being conducted by KIHASA.

least one child aged 0 to 17. Next, to examine the welfare needs and living conditions of children in low-income groups, low-income households were oversampled based on the list of beneficiaries of the social assistance program based on means-tested called the Basic Livelihood Security Program (BLSP)[3] and subsidy for a single-parent family situated at the near-poverty line.

The 2018 Korean National Children Survey uses two questionnaires: (a) a Household Questionnaire for household socio-demographics, disposable income, age of all household members, material deprivation, and welfare needs, completed by a parent, and (b) a Child Questionnaire (for children aged under 17 years) collecting information about health, education and development, relationships, social activities, deprivation, and subjective well-being. The survey includes 17 child-specific deprivation items based on the child deprivation index by UNICEF. Children aged 9 to 17 provided responses for these items, and parents provided responses for children under 8. There are 31 household-level household conditions items. For our analysis, we dropped four cases where information was missing on key variables such as household income and deprivation; our final sample included data on 4,035 households and their children. The percentage of children below the official monetary poverty line in our sample was between 14% and 17%[4] (according to 95% confidence intervals) which is in line with the official 2018 monetary child poverty estimate of 12%.

Child Deprivation Index

The child-centric questions used in this paper enable identification of children in income-poor (i.e. low income) families who are not deprived, and also deprived children in

---

[3] The income threshold for living benefits of the BLSP is 30% of median household income.

[4] Specifically, in this survey 15% of households with children (95% CI 13% - 16%) and 16% of children (95% CI 14-17%) were below the official poverty line of 1,150 USD (50% of median OECD equivalised monthly disposable income).

non-income-poor families (Main & Bradshaw, 2012). The research literature shows that household poverty status impacts the everyday lives of children, through deprivation of economic and material needs, social relations, and emotional experiences (Ridge, 2011). In some cases, non-deprived children may be found in poor families due to parental sacrifice, rather than adequate family income. However, empirical evidence also indicates a correlation between parents' poverty experiences and their children's tendency to conceal their needs and experience heightened level of stress (Ridge, 2011). Accordingly, to draw a complete picture of an acceptable standard of living for children, it is important to gather information from both adults and children about their lives and how poverty affects them (Barnes & Wright, 2012; Ridge, 2011).

In this paper both child-derived and household-derived items (46 items in total) are used to estimate child deprivation: (a) 15 child-derived items[5] were grouped into four categories (food, clothing, education/development, and leisure activity) and 31 household-derived items were grouped into nine categories (food, clothing, housing and environment, health, leisure activity, social support, saving for a future, education, and financial difficulties). Every item was grouped in each domain following Ryu et al. (2019), the research report on the 2018 Korean National Children Survey. The categorization followed the existing index guidelines including the UNICEF child deprivation index and EU material and social deprivation index.

For child-derived items, respondents were asked if they (or their child) could afford them (e.g., meat, chicken, or fish at least once a week) or not (i.e. there were two possible answers besides don't know); those who could not afford an item were identified as deprived

---

[5] There are 17 child-derived items in the child's questionnaire, but two that were not asked to children aged under 8 were excluded.

of that particular item. Similarly, for household-derived items, household respondents (one per household) were asked whether the household could afford them and children living in households that couldn't afford an item were identified as deprived. Details about each item are provided in Table 1.

[INSERT TABLE 1 ABOUT HERE]

To construct the deprivation index (i.e. the total number of deprivations experienced by the respondents), we first examined the validity, reliability, and additivity of child-derived and household-derived items following Gordon (2017) to produce an 'objective' poverty line. To produce an objective poverty line, it is necessary to differentiate between items lacked because people do not want them or cannot afford them (Gordon, 2017). As the Korean National Child Survey does not ask respondents if they think items are necessary or not, we do not know whether people adapted their expectations in the knowledge that there is little chance of having an item. The survey also did not ask whether respondents lacked an item because of personal taste or reasons other than affordability. However, research in other countries (Abe, 2019; Guio et al., 2017; Pomati et al., 2020; Pomati & Nandy, 2020) has demonstrated high levels of acceptance for such items, suggesting they are considered to be necessities.

To check the validity of each item as an indicator of deprivation, we compared the odds of being able to afford an item between better-off and less well-off households, using indicators known to be highly correlated with poverty. The odds were compared using logistic regression models, where the dependent variable was a given deprivation item and the independent variables were the three validators, leading to three models for each deprivation indicator. Three binary indicators (our independent variables) were used to assess criterion validity following recent work done by UNICEF (Government of Uganda &

UNICEF, 2019): (a) Income poverty using the official measure (50% of equivalised disposable income); (b) Head of household's economic activity ('working in the cash economy' vs 'subsidized/family worker or unemployed'); and (c) Self-perceived social stratification ('lower-stratification' vs 'middle- or higher-stratification'). Considering the difference between urban and rural areas such as living cost and service coverage, we controlled for place of residence (metropolitan city, middle-sized city, and rural area) in the logistic regression.

Next, we assessed the reliability of the deprivation index using Cronbach's Alpha. A Cronbach's Alpha above 0.7 is recommended as acceptable in social science research (Cronbach, 1951). Items may be considered unreliable if the total Alpha score is higher once the individual items are excluded from the index so this was also checked for each item.

Lastly, the components of a 'good' deprivation index should be additive, that is, for example, households with a deprivation score of one should be poorer than households with a deprivation score of zero, irrespective of the deprivation item (Guio et al., 2017). To test this, we first compared the mean equivalised disposable household income of respondents who could not afford an item with those who could afford it for each of the 46 items. Specifically, we checked whether each possible deprivation item had a negative and significant association with income using a linear regression model (with logged equivalised income as dependent variable). Due to the small sample size we only tested this bivariate relationship, and did not test whether the association between a deprivation item and income changed if we controlled for other deprivation items.

Items which did not meet the validity, reliability, and additivity criteria were excluded, and a final deprivation index was constructed using both child-derived and household-derived items. This is to ensure that the deprivation index for each child reflects

both individual (i.e. child-) and household-level conditions. Following the PSE methodology described above (Gordon, 2006), cut-offs for both income and number of deprivations were derived. Using these, respondents were then divided into four groups (Non-Poor, Rising, Vulnerable and Poor).

Analytical Plan

As households can become poor for different reasons (e.g. loss of a job, illness, discrimination, or bad luck), so too can their living conditions vary by different characteristics (Hick, 2016). To investigate how deprivation and child multidimensional poverty varies across groups, we first conducted a subsample analysis based on household structure ('two-parents' vs 'single-parent or grandparent'), the number of breadwinners in a household ('dual-earners' vs 'single-earner/no-earner'), and head of household's (dis)ability condition ('disability' vs 'non-disability').

We estimated the association of household socio-economic characteristics with the multidimensional child poverty outcome using a multinomial logistic regression. We used a multinomial logistic regression model considering that our outcome is a categorical variable. For this model, outcomes were coded as 0 (non-poor), 1 (Rising), 2 (Vulnerable), and 3 (Poor). When using 'Non-poor' as a base category, we estimated the probability of being in the Rising, Vulnerable, or Poor groups relative to the Non-Poor. When labeled with the categories of the outcome variable *pov*, the output corresponds to the three equations below:

1. $\ln\left(\frac{P(pov=rising)}{P(pov=nonpoor)}\right) = a_{10} + b_{1j}x_j + e$

2. $\ln\left(\frac{P(pov=vulnerable)}{P(pov=nonpoor)}\right) = a_{20} + b_{2j}x_j + e$

3. $\ln\left(\frac{P(pov=poor)}{P(pov=nonpoor)}\right) = a_{30} + b_{3j}x_j + e$

where b_{kj} is the regression coefficient for outcome *k* for the independent variable j,

controlling for all other independent variables.

We included nine socio-demographic and economic characteristics as independent variables based on a previous research findings on the factors influencing multidimensional child poverty (E. Kim & Nandy, 2018; Yeo, 2018). These were: number of household members, housing tenure status (homeowner=0, *jeonse*[6]=1, renters=2), residential area (metropolitan city=0, middle-sized city=1, and rural area=3), number of earners (dual earner=0, sole earners=1), household structure (single parent, grandparent headed, or others =0, two parents =1), child's age, child's age squared, and gender (female=0, male=1), and heads' gender (male=0, female=1), marital status (married=0, divorced/widowed/separated/single=1), disability (non-disabled=0, disabled=1), and employment type (permanent employees=0, unemployed =1, fixed term, short-term, and casual employees=2, self-employed=3, and subsidized/contributing family employees=4). We added the quadratic effect of age to allow a more accurate modelling of the effect of age. In addition, we cannot include heads' education level despite its importance in the model due to too many missing values in this variable[7].

Regression coefficients are reported in the tables as odds-ratios ($\exp(b_{kj})$). As the sample of the Korean National Children Survey was overrepresented by low-income households, we applied the post-stratification weight provided with the survey to enhance the generalizability of all univariate, bivariate and multivariate analyses in this paper. *Stata 17* was used for the analysis.

---

[6] *Jeonse* system is a unique rent type in Korea. *Jeonse* renters put down a large rental deposit (approximately 65% of the market price of the property on average) instead of paying monthly rent (Yoon, 2003).

7 This may be because every household respondent in this survey is a primary caregiver, with 86% of them being spouses of the household head. As a result, there are no missing values in the education level of primary caregivers. However, there is a 20% rate of missing values in the education level of household head as this information was obtained by proxy.

Findings

Multidimensional Deprivation

To construct the child deprivation index, we conducted the validity, reliability, and additivity test following the methodology of the PSE study using 15 child-derived and 31 household-derived items. Of 46 items, we excluded six items which did not meet more than two criteria: (a) Three meals a day (food1_ch), (b) eating fast food more than three times a week (food4_ch), (c) accessing to metro or bus stop by at most 10-min walking (housing3), (d) living on a ground-floor, not basement or roof-top house (housing4), (e) skipping meals or did not have enough to eat (difficulties1), and (f) unable to pay child's college tuition for more than one month (difficulties7). None of these items passed the additivity and validity tests (Appendix A). As a result, 40 items were included in the final index used to estimate multidimensional child deprivation in Korea in 2018. The final set of child and household items had Cronbach's alphas of 0.86 and 0.92 respectively, showing a high degree of reliability. We also fitted a one-factor model and found no clear signs of strong multidimensionality. All standardized factor loadings were above 0.4 and fit indices for the one-factor model indicated a reasonably good fit (RMSEA=0.04, CFI=0.9, TLI=0.9)[8]. All items were strongly associated with the three validators (income poverty, household head's economic activity status, and subjective poverty), and showed clear statistically-significant (negative) relationships with poverty with the exceptions of *Health 1*, *Health 3, Difficulty 3, and Difficulty 6*[9] which showed positive, but non-significant relationships with poverty and economic activity status. However, as these items passed reliability and additivity tests (and

---

[8] We also fitted a one-factor model constraining factor loadings to equality which resulted in very similar model fit findings. The factor analysis was run using *Mplus Version 8.6.*

[9] These items were: *Health 1*: Visiting doctor regularly when having a long-term disease (more than three months); *Health 3*: Able to purchase or take medication; *Difficulty 3*: Electricity, telephone, or water has been turned off because you couldn't pay the bill; *Difficulty 6*: Moving to another home (being evicted) because couldn't pay the rent

have clear face validity) they were not excluded from the final deprivation index.

Figure 1 presents the proportion of children deprived in each of the nine domains: food, clothing, housing, health, leisure activity, social support, financial security, education, and financial difficulties. To be identified as deprived in a given domain, children have to be deprived of at least one domain-specific indicator. Of the nine domains, the highest rates of deprivation were seen for leisure activity (44.0%), financial security (savings) (26.0%), and education (22.0%). When inspecting individual household-level items (Table 1), the most prevalent deprivations were for children in households not being able to make regular saving for emergencies (18.4%) or retirement (14.8%), and not being able to have a holiday away from home (14.1%). Around one in three households with children (30.7%) were deprived of a leisure activity and 15% of those having children experienced at least one education-related deprivation. Among child-derived list of items, the most prevalent deprivation was for a lack of regular leisure activities (26.0%), no opportunities to invite friends (15.2%), and no outdoor leisure equipment (15.1%)

[INSERT FIGURE 1 ABOUT HERE]

Prevalence of Multidimensional Child Poverty Rate

To create the multidimensional child poverty measure, we first ran ANOVA and logistic regression models to determine the optimal deprivation threshold by defining the point where differences between the poor and non-poor are maximized and differences within each group are minimized (Table 2) (Gordon, 2006). The dependent variable in the ANOVA model was logged equivalised household monthly disposable income using the OECD square root scale[10] and the independent variables were deprivation group and the number of

---

[10] An equivalent scale of the cube root of family size captured the survey respondents' perception of the growth in income necessary to maintain the same standard of living with increasing family size (Chanfreau & Burchardt, 2008).

household members. With the logistic regression model, the dependent variable was the deprivation group and the independent variable was logged household monthly disposable income and the number of household members. Results from ANOVA test and logistic regression model showed that the optimum deprivation threshold was six or more deprivations. The largest F value from the ANOVA test and highest chi square indicate at which point in the deprivation scale between-group variation is larger than within group variation and where this ratio is maximized, six or more deprivations in this case.

[INSERT TABLE 2 ABOUT HERE]

The derived income poverty threshold was USD 1,700[11] This is around 30% higher than the Korean official poverty line in 2018, of USD 1,150 (50% of equivalised disposable income according to the official estimates by Statistics Korea). The left pane for Figure 2 shows how the monthly disposable income cut-off was obtained (the poverty line was drawn at the upper bound 95% confidence interval estimate for those experiencing 6 and 7 deprivations). The red line shows the obtained cut-off of 1,700 USD.

[INSERT FIGURE 2 ABOUT HERE]

Table 3 shows the multidimensional child deprivation rate in Korea measured by the number of 40 household-derived and child-derived items (and not incorporating household income). When applying the standardized sample weight, 42.9% of children did not experience any deprivations. The proportion of children exposed to six or more deprivations was 15.2% - this is higher than the official child poverty rate measured by the 50% of disposable income (12.3%), just over 1.2 million children (out of a total of 8.2 million).

[INSERT TABLE 3 ABOUT HERE]

---

[11] Income values were reported in constant US dollars for an international comparison (1:1,000 = USD: KRW).

Table 4 presents the weighted multidimensional child poverty rate. When dividing children into four groups – Poor, Rising, Vulnerable, and Not Poor – using the combined income and deprivation poverty measure, over half (56.5%, 4.6 million) of Korean children are classed as 'Not Poor' – that is, both their household income and standard of living are both above the poverty threshold; around 5% of children (392,000) are in the 'Rising' group, in households whose income is above the poverty threshold but who are experiencing six or more deprivations. Around a third of children (28%, 2.3 million) in Korea are identified as being 'Vulnerable', living in households which although not lacking six or more necessities do have incomes below the threshold identified (USD 1,700/month). And lastly, around one in ten Korean children (10%, 844,000) experience six or more deprivations and live in households with a monthly income below the threshold set, and thus count as 'Poor'. Together, the Poor and Rising groups account for around one in every six children in Korea (15%), and a higher proportion (28%) are Vulnerable to poverty.

[INSERT TABLE 4 ABOUT HERE]

Table 5 presents the overlaps between official income poverty and multidimensional child poverty. It shows that around one in every three children (30%) of vulnerable children and 59% of multidimensionally poor (children experiencing both low income and six or more deprivations) are identified as poor by the official poverty line. This suggests that benefits linked to the official poverty line may be insufficient to avoid the experience of low income and deprivation.

[INSERT TABLE 5 ABOUT HERE]

Further analysis suggests that as a general poverty detection tool, the official poverty line errs on the side of caution. All children in households below the official poverty line are either experiencing low income or both six or more deprivations and low income jointly.

However, 11% of children above the official monetary poverty line experienced six or more deprivations and 29% had an income below USD 1,700. If both deprivation and household income were used to identify children in need the estimate would jump from the current 15% (below the official monetary poverty line) to 24% (below the official poverty line or experiencing 6 or more deprivations) and finally to 44% (household income below USD 1,700 or experiencing 6 or more deprivations, i.e. poor, vulnerable and rising).

Figure 3 presents the types of domain children were deprived by their poverty condition groups. For all types of poverty groups, leisure activity was most deprived followed by education or savings. Furthermore, the Rising and Poor groups who experienced six or more deprivations showed that they even suffered from basic needs such as food, housing, and clothing. In particular, half of children in the Rising group suffered housing deprivation despite their above-poverty-level income and 36% of the Poor group showed housing deprivation.

[INSERT FIGURES 3 ABOUT HERE]

Subsample Analysis

To investigate how multidimensional child poverty is patterned across Korea, we conducted several subsample analyses. Figure 4 presents the proportion of children deprived in each domain by different household types. First, when dividing the sample by the number of earners, there were no substantial differences in the child deprivation between dual-earners and sole-earner headed households. In both groups, the domain of the greatest deprivation was leisure activity with around 44% of children deprived. There were larger differences with the financial security (savings) domain, with children in dual earner households less likely to be deprived than children in households with a single earner (22% compared to 29%).

There were more pronounced differences in deprivation rates when the sample was

divided to reflect household structure and disability status of the head of household. Children living in a household headed by either a single-parent or grandparents were highly deprived not only from leisure activities (63%) and financial security (58%), but also in domains related to basic needs such as food (38%), clothing (24%), and housing (15%). On the other hand, most children living with two parents had their basic needs met to some degree, but they also experienced high rates of deprivation with regards leisure activity (42%) and financial security (23%). Deprivation rates were highest for children living households with a disabled head; they were the most likely to deprived of leisure activity (84%), financial security (73%) and education-related activities (65%). Around half of the children in these households could not meet key basic needs such as food (50%) and clothing (41%); rates of deprivation for children living in households where no disability was reported with regards food and clothing were 16% and 8% respectively, far lower than the comparison group.

[INSERT FIGURE 4 ABOUT HERE]

Table 6 presents the multidimensional child poverty and deprivation rates according to household type. More children experienced multidimensional poverty when their households were headed by either a sole-earner (16%), single-parent or grandparents (49%), or by head reporting a disability (65%). The proportion of children identified as 'Poor' were highest for children living in a household whose head reported a disability (57%), or who were living in single-parent or grandparent headed households (42%) – around six times greater than for children living with two parents (8%). The highest rates of 'Not Poor' children were for in dual earner households (62%). Sole earner households, which account for 56% of the sample, had the high rates of 'Vulnerable' to poverty (31%), which should raise a warning for policy makers; the fact that across Korea one in three children are identified as 'Vulnerable' means there is the potential for multidimensional child poverty to

increase sharply and quickly in the face of an economic or unexpected shock, like the Covid-19 pandemic. For example, according to the World Bank & UNICEF (2022), the effects of the COVID-19 pandemic disproportionately affected vulnerable segment of the population, already in poverty or vulnerable to falling into poverty. In particular, households with children were more likely to experience income loss and food insecurity than those with no children since the onset of pandemic.

[INSERT TABLE 6 ABOUT HERE]

Correlates of Multidimensional Child Poverty

Table 7 presents the odds ratios of either being 'Rising', 'Vulnerable', and 'Poor', according to different characteristics. For this analysis, we conducted the multinomial logistic regression model using the Non-Poor group as the reference group[12].

First, children were more likely to be in the Rising group relative to the Non-Poor (when other variables were held constant) if their families did not own their home, were headed by a single parent-headed or where the household head was a temporary worker. For example, the odds of being in the Rising group were 1.62 times greater for *Jeonse* renters and 2.23 times greater for renters paying monthly rents. If a child's head of household was a temporary worker, the odds of that child being in the Rising group would be nearly four times greater (4.07).

Next, children were more likely to be in the Vulnerable group relative to the Non-Poor if they lived in larger households, lived in a rented home, in a rural area, or when their household was headed by either a sole earner, a single-parent or grandparents, a disabled head, or a precarious worker. For example, the odds of a rural child being Vulnerable relative

---

[12] We re-ran the same model using the number of children in the household and the results remained unchanged.

to the Non-Poor would be nearly three times greater (2.92) than children in a metropolitan city. Compared to children whose parents were dual earners, the odds would increase by a factor of 1.53 for those having sole-earner in their households. For children whose household heads are temporary workers, the odds of being Vulnerable relative to the Non-Poor would increase by a factor of 3.17 compared to those having permanent workers as heads of the household.

Lastly, children were more likely to be in the Poor group when they lived in larger households, in homes which their families did not own, when they lived in a rural area, and where their head of household was either a single parent or grandparent, disabled, or a precarious worker. For example, given other variables in the model were held constant, living in a rented house significantly increased the odds of being poor by a factor of 11.21. If the household head reported a disability or precarious employment status, the odds of being poor increased by a factor of more than 10 (10.87 and 16.14 respectively). In addition, the strong negative effect of age suggests that older children are more likely to escape combined income and deprivation poverty as they grow older, although the quadratic effect suggests that the effect is marginally weaker for older children than younger children.

[INSERT TABLE 7 ABOUT HERE]

Discussion

This study estimated the prevalence of multidimensional child poverty in Korea by constructing child deprivation index using both child-derived and household-derived items. It classified the child population of Korea into four groups - 'Poor', 'Rising', 'Vulnerable', and 'Non-Poor' - using a combination of income and material deprivation measures, to understand how forms of child poverty were patterned in society.

Our findings indicate that key basic needs, such as food and clothing, are being met

to a decent standard for most children in Korea. However, precarity is also an issue, with a significant proportion of the country's children either Poor (10%) or Vulnerable (28%) to poverty; this is especially so for children living in households headed by either a single-parent or grandparents, or in households headed by someone with a disability. These households all show concerningly high rates of deprivation for food, clothing, and housing. Using the same survey conducted in 2013, E. Kim & Nandy (2018) showed higher proportion of children suffering from either income poverty or deprivation (49.5%) than our findings (44%). The proportion of the "Poor" who were income poor and deprived was similar to ours (10%). One important point is that child poverty rate estimated by the official monetary poverty one (12%) hides the fact that if both deprivation and household income were used to identify children in need, 44% of children in Korea experience 6 or more deprivations and have a household income below USD 1,700 (the cut-off suggested in this paper).

Our analysis of the deprivations which children in Korea face provides useful information concerning the ongoing needs of children across all ages. Issues like home ownership, household structure, disability, and the precarity of employment status of adults all play a significant role in whether families experience poverty. We show that the children of homeowners are better off than children of renters across most deprivation measures, suggesting that a degree of economic and social security, as reflected by parental capacity to own the family home plays an important role in children's well-being. This is supported by other empirical evidence on parental financial assets and home ownership being linked to investments in children's future and educational attainment (Y. Kim & Sherraden, 2011; Zhan & Sherraden, 2003). Children whose head of household was disabled and/or lived in rural areas and/or were unemployed were considerably more likely to experience low income, deprivation or both when compared to those without disabilities, living urban areas and

employed. Interestingly, children whose head of household was a subsidized or family worker and temporary worker had an even greater chance of being poor than those where the head of household was unemployed, suggesting not all employment is necessarily protective against poverty. Temporary workers suffer from lower wages and fewer social protections than permanent workers. For example, in 2018, average wage per hour of temporary workers was only 68.3% of that of permanent workers (Statistics Korea, 2020b). In addition, for temporary workers, the national pension insurance coverage was 36.6% and health insurance coverage was 45.9% compared to 86.2% and 90.1% for permanent workers (Statistics Korea, 2019b). Subsidized jobs are offered by the government with the intention of providing employment opportunities for the poor until they can successfully graduate into the regular labor market, and thus escape poverty. However, our results suggest that the subsidized employment model may be inefficient for tackling poverty as intended. Previous research supports this, showing that subsidized workers were likely to be excluded from cash benefits due to their above-poverty-level wages, and only 24% of them had successfully transited into the regular labor market (Jeong et al., 2018).

Comparing the Rising, Vulnerable, and Poor groups suggests that socio-economic disadvantage is most prevalent among the Poor (those experiencing both low income and deprivation). This follows our initial expectations. Interestingly, the Rising group are more likely to engage in temporary employment than the Vulnerable group which suggests that the living standards of precarious workers may be overestimated if measured solely on the basis of their income. The reason behind this may be the unpredictable size and frequency of their earnings.

Limitations and research implications

Despite the high reliability and quality of the survey data used in this study, it is still

worth reflecting on potential limitations and cautions for interpretation. First, the data used

are cross-sectional, so reporting and discussing poverty dynamics can be tricky, not least

because current deprivation status reflect both previous and current levels of resources (Hick,

2016; Gordon, 2017). However, in Korea the 'Rising' group is likely to be comprised of the

working poor who earn above the poverty level but still have a low standard of living (Weon,

2021). Given that working poverty remains a persistent issue in Korea (Weon & Rothwell,

2020), further research needs to better establish the extent and drivers of this "Rising" group,

by further investigating the relationship between employment income and deprivation.

Previous research conducted in Hong Kong, a region that also experiences labour polarization

due to economic restructuring similar to Korea, has similarly revealed that workers in low-

skill sectors and those with temporary employment are more likely to experience deprivation.

Relying solely on income measurement can lead to an overestimation of their living standards

(Cheung et al., 2019). To better understand the dynamics of multidimensional child poverty,

future research needs to combine measures of both previous resources (like household

income) and present-day outcomes, like deprivation; this is best done using longitudinal or

panel data. Additionally, it is possible that certain unobserved characteristics of respondents

(of both children and parents) such as personality traits, attitudes, and expectations may affect

the likelihood of the experience of material deprivation. To categorize the items in each

domain, this study follows the rule suggested by the Korean National Child Survey. However,

further studies may also investigate the best way to group and report deprivations as well as

the reliability of these deprivation sub-domains. Lastly, unlike other studies which have

applied the PSE methodology, the Korean National Children Survey does not ask respondents

if they consider items and activities to be 'necessities/essential' in Korea today; doing so, and

seeing which items are considered necessities by a majority of the Korean population, would

facilitate operationalization of a 'democratic' definition of poverty, and align estimates even more closely with what is envisioned by SDG target 1.2.2. Lastly, since this study utilized data from 2018, future research using data from 2023 needs to be conducted in order to estimate the changes in the condition of child's multidimensional poverty after the COVID-19 pandemic.

Policy Implications

Our findings suggest that continuing to define and measure child poverty by only household income underestimates the extent and nature of child poverty in Korea, and thus may distort the effectiveness of current anti-poverty policy efforts. Accordingly, our first policy recommendation centers on developing and using alternative standards based on both income and material deprivation to estimate multidimensional (child) poverty. The combined income-deprivation criterion provides a better understanding of the welfare needs of Korean children to maintain a decent standard of living, and it is also valuable in assessing the extent to which SDGs are being met, and specifically whether and how poverty is being reduced in all its dimensions, according to national definitions (SDG 1.2). We show, for example, that one in four Korean children (26%) experienced deprivation in the dimension of leisure activities (Appendix B); Cash transfers as well as in-kind benefits such as vouchers for travel or sports activities for children in low-income households (Reece et al., 2020) might be an effective way of tackling this issue. Next, child allowance should expand its coverage and increase the benefit level. According to Y. S. Lee et al. (2020), increasing the age criteria for child allowance from seven to 18 years old may reduce the poverty rate by 1.06%. In addition, to improve the effectiveness of income maintenance programs, it is necessary to integrate cash benefit for single-parent and grandparent families (monthly payment of $200) with the universal child allowance program, and increase the benefit amount for this

vulnerable group (Cho et al., 2019). Besides the expanding income transfer program, our findings show that complementary asset-building programs need to be extended to mitigate child poverty.

Despite the important role of savings playing in maintaining a basic standard of living, particularly as a reserve during temporary hard times, around 26% of all households with a dependent child reported being financially insecure, and unable to save for the future; this figure rose to 84% for households with a disabled head. As such, expanding matched-savings programs and alleviating eligibility rules would provide opportunities for the asset poor to build their own assets. For example, in Korea, there is a matched-savings program known as the "*Didim-Seed Account*". However, it is important to know to note that this program is exclusively accessible to the institutionalized children and children residing in households with an income below 40% of the median income. In light of research findings, which indicate that the income poor do not necessarily overlap with the deprived, it is crucial to broaden the program's eligibility rules. In September 2023, the Korean government announced that they would change the income eligibility rule of the *Didim-Seed Account* from 40% to 50% of the median income and widen the age criteria from 7 -12 to 0 – 17 as of 2024. However, Child Development Accounts (CDAs) are intended to be universal (including all children), progressive (greater subsidies for the disadvantaged), and potentially lifelong (starting at birth with growth and investments throughout life) with respect to policy design (Sherraden & Zou, 2022). In countries as diverse as Singapore, Israel, the UK, and a number of US states, CDAs have been adopted as universal policies at some point. In addition, although our findings indicate the importance of home ownership in reducing child poverty, home ownership is unequally distributed in Korea. While around 80% of households in the top 20% of the income distribution are home owners, less than half (49%) of those in the

bottom 40% own their home (Korean Ministry of Land, Infrastructure, and Transport [KMLIT], 2019). Furthermore, home value held by the top 10% of the income distribution was 33.8 times higher than that held by the bottom 10% (KMLIT, 2019). To address the inequality in home ownership, a more progressive policy strategy is needed to facilitate home ownership. For example, an expansion of subsidized public housing construction could be considered to provide housing to the low- and moderate-income households at lower cost, and property tax increases should be considered to discourage speculation and stabilize the housing market (S. W. Lee et al., 2018). Lastly, findings from the subsample analysis showed that children living with a single-parent or grandparents or in households with a disabled head were highly deprived, even for the most basic of needs such as food, clothing, and housing. Considering that 23% of households with dependent children in Korea are single-parent or grandparents-headed households (Statistics Korea, 2019a), our finding suggests that public resources should take into much greater consideration children in these very precarious living arrangements.

List of References

Abe, A. K. (2019). Developing Deprivation Index for Children Taking into Account of Adaptive Preferences. *Child Indicators Research,* 12(2), 647–665. https://doi.org/10.1007/s12187-018-9553-4

Alkire, S., Dorji, L., Sonam, G., & Thomas, M. (2016). *Child Poverty in Bhutan: Insights from Multidimensional Child Poverty Index (C-MPI) and Qualitative Interviews with Poor Children.* National Statistics Bureau [Government of Bhutan].

Alkire, S., Foster, J., Seth, S., Santos, M. E., Roche, J. M., & Ballón, P. (2015). 'Overview of Methods for Multidimensional Poverty Assessment'. in S. Alkire, J. Foster, S. Seth, M. E. Santos, J. M. Roche, & P. Ballon (eds.), *Multidimensional Poverty Measurement and Analysis*. Oxford University Press, pp.70-122

https://doi.org/10.1093/acprof:oso/9780199689491.003.0003

Barnes, H., & Wright, G. (2012). 'Defining child poverty in South Africa using the socially perceived necessities approach'. in A. Minujin & S. Nandy (Eds.), *Global Child Poverty and Well-Being: Measurement, Concepts, Policy and Action*. The Policy Press. pp. 135–154

Boltvinik, J. (1999). *Poverty Measurement Methods - An Overview*. New York: UNDP.

Boltvinik, J. (2013). Medición multidimensional de la pobreza. AL de precursora a rezagada. *Revista Sociedad y Equidad,* (5). https://doi.org/10.5354/rse.v0i5.26337

Bradshaw, J., & Finch, N. (2003). Overlaps in Dimensions of Poverty. *Journal of Social Policy,* 32(04), 513–525. https://doi.org/10.1017/S004727940300713X

Chanfreau, J., & Burchardt, T. (2008). *Equivalence scales: Rationales, uses and assumptions.* Available at:

https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.494.8200&rep=rep1&type=pdf (Accessed: 5 June 2021)

Cheung, K. C.-K., Chan, W.-S., & Chou, K.-L. (2019). Material Deprivation and Working Poor in Hong Kong. *Social Indicators Research,* 145(1), 39–66. https://doi.org/10.1007/s11205-019-02093-0

Cho, S. E., Lee, S. J., Jun, J. A., Ju, B. H., & Kim, H. J. (2019). *A Study on Developing the Child Allowance Program in Korea,* Policy Report 2019–12. https://repository.kihasa.re.kr/handle/201002/36462

Chzhen, Y., de Neubourg, C., Plavgo, I., & de Milliano, M. (2016). Child Poverty in the European Union: The Multiple Overlapping Deprivation Analysis Approach (EU-MODA). *Child Indicators Research,* 9(2), 335–356. https://doi.org/10.1007/s12187-015-9321

Chzhen, Y., de Neubourg, I. P., & de Milliano, M. (2014). *Understanding Child Deprivation in the European Union: The Multiple Overlapping Deprivation Analysis (EU-MODA) Approach* (Innocenti Working Paper 2014–18). Available at: https://www.unicef-irc.org/publications/744-understanding-child-deprivation-in-the-european-union-the-multiple-overlapping-deprivation.html (Accessed 10 March 2021)

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika,* 16(3), 297–334. https://doi.org/10.1007/BF02310555

de Milliano, M., & Plavgo, I. (2014). *Analysing Child Poverty and Deprivation in sub-Saharan Africa: CC MODA - Cross Country Multiple Overlapping Deprivation Analysis.* Innocenti Working Paper No. 2014-9. Available at: https://www.oecd-ilibrary.org/content/paper/01772a94-en (Accessed: 9 March 2021)

Dermott, E., & Main, G. (2017). *Poverty and social exclusion in the UK: Volume 1-the nature and extent of the problem.* Bristol: Policy Press.

Gordon, D. (2006). The concept and measurement of poverty, in C. Pantazis, D. Gordon, & R. Levitas (Eds.), *Poverty and Social Exclusion in Britain: The Millennium Survey*. Bristol: The

Policy Press. pp. 29–69

Gordon, D. (2017). *PSE-UK 2012 Survey Producing an "objective" poverty line in eight easy steps.* Economic & Social Research Council. Available at: https://www.poverty.ac.uk/sites/default/files/attachments/Steps-to-producing-the-PSEpoverty-line_Gordon.pdf (Accessed: 18 May 2021)

Gordon, D., & Nandy, S. (2012). 'Measuring child poverty and deprivation', in A. Minujin & S. Nandy (eds.), *Global child poverty and well-being: Measurement, concepts, policy and action*. Bristol: Policy Press. pp. 57–101

Gordon, D., Nandy, S., Pantazis, C., Pemberton, S., & Townsend, P. (2003). *Child poverty in the developing world*. Bristol: The Policy Press.

Government of Uganda, & UNICEF. (2019). *Multidimensional child poverty and deprivation in Uganda, Volume 1: The extent and nature of multidimensional child poverty and deprivation, appendices.* Available at: https://www.poverty.ac.uk/sites/default/files/attachments/MultidimensionalChildPoverty-and-Deprivation-in-Uganda-Volume1-appendices.pdf (Accessed: 17 June 2022)

Guio, A.-C., Gordon, D., Marlier, E., Najera, H., & Pomati, M. (2018). Towards an EU measure of child deprivation. *Child Indicators Research,* 11(3), 835–860. https://doi.org/10.1007/s12187-017-9491-6

Guio, A.-C., Gordon, D., Najera, H., & Pomati, M. (2017). *Revising the EU material deprivation variables.* Available at http://dx.doi.org/10.2785/33408 (Accessed: 21 Oct 2021)

Hick, R. (2016). Between Income and Material Deprivation in the UK: In Search of Conversion Factors. *Journal of Human Development and Capabilities,* 17(1), 35–54. https://doi.org/10.1080/19452829.2015.1076772

Jeong, H. S., Jeong, Y. C., Cho, S. E., Ham, Y. J., & Cho, H. N. (2018). *A Study on the Poverty*

Exit of the Working Poor in Korea, Policy Report 2018–127. Korea Institute for Health and Social Affairs. Available at:

https://www.kihasa.re.kr/publish/report/view?type=policy&seq=29075 (Accessed: 21 March 2022)

Jung, E. H. (2014). Findings of characteristic of poor children using Deprivation index. I*ssue and Focus,* 237 (2014-16), 1–8.

Kelleher, J.P., 2013. Capabilities Versus Resources. *Journal of Moral Philosophy,* 10, 151–171. https://doi.org/10.1163/17455243-4681031

Kim, E., & Nandy, S. (2018). Multidimensional Child Poverty in Korea: Developing Child-Specific Indicators for the Sustainable Development Goals. *Child Indicators Research,* 11(3), 1029–1050. https://doi.org/10.1007/s12187-017-9517-0

Kim, Y., & Sherraden, M. (2011). Do parental assets matter for children's educational attainment? Evidence from mediation tests. *Children and Youth Services Review,* 33(6), 969–979. https://doi.org/10.1016/j.childyouth.2011.01.003

Korean Ministry of Land, Infrastructure, and Transport. (2019). *Korea Housing Survey.* Available at

http://stat.molit.go.kr/portal/cate/statView.do?hRsId=327&hFormId=&hSelectId=&sStyleNum=&sStart=&sEnd=&hPoint=&hAppr= (Accessed: 23 Sept. 2021)

Lee, S. W., Kang, S. W., & Bang, B. R. (2018). *Policy strategy to mitigate the inequality in the housing market* (KRIHS Policy Brief No. 678). Available at:

http://www.krihs.re.kr/issue/cbriefList.do?pageIndex=21&q_idx=28308 (Accessed: 16 September 2020)

Lee, Y. S., Ha, S. Y., Kim, E. J., Kuk, J. H., Son, D. K., Koh, J. I., & Park, Y. S. (2020). *A Study on the Strategy to Develop the Child Allowance Program in Korea,* Policy Report 2020–118.

Available at https://repository.kihasa.re.kr/handle/201002/38681 (Accessed: 31 Oct. 2023)

Lyte, R., Maître, B., Nolan, B., & Whelan, C. T. (2001). Persistent and Consistent Poverty in the 1994 and 1995 Waves of the European Community Household Panel Survey. *Review of Income and Wealth,* 47(4), 427–449. https://doi.org/10.1111/1475-4991.00028

Mack, J., & Lansley, S. (1985). *Poor Britain*. London: George Allen & Unwin.

Main, G., & Bradshaw, J. (2012). A Child Material Deprivation Index. *Child Indicators Research,* 5(3), 503–521. https://doi.org/10.1007/s12187-012-9145-7

Minujin, A., Delamonica, E., Davidziuk, A., & Gonzalez, E. D. (2006). The definition of child poverty: A discussion of concepts and measurements. *Environment and Urbanization,* 18(2), 481–500. https://doi.org/10.1177/0956247806069627

Najera, H., Pomati, M., Nandy, S., forthcoming. 'Towards a better measurement of child poverty: relative deprivation of socially perceived needs and the consensual approach', in: Delamonica, E., Minujin, A. (eds.), *Handbook of Child Poverty and Inequality. A Practical Guide on Concepts, Measures, and Policies.* Edward Elgar Publishing, Cheltenham

Nolan, B., & Whelan, C. T. (1996). *Resources, deprivation and poverty*. Bristol: Clarendon Press.

Nolan, B., & Whelan, C. T. (2011). *Poverty and Deprivation in Europe*. Bristol: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199588435.001.0001

Oxford Poverty and Human Development Initiative (OPHI). (2020). *Global Dimensional Poverty Index 2020: Charting pathways out of multidimensional poverty: Achieving the SDGs.* http://hdr.undp.org/sites/default/files/2020_mpi_report_en.pdf (Accessed: 3 September 2021)

Pomati, M., & Nandy, S. (2020). Measuring Multidimensional Poverty According to National Definitions: Operationalising Target 1.2 of the Sustainable Development Goals. *Social Indicators Research,* 148(1), 105–126. https://doi.org/10.1007/s11205-019-02198-6

Pomati, M., Shailen, N., Angemi, D., Gordon, D., & Depio, S. (2020). 'Multidimensional child

poverty and the SDGs: From measurement to action'. in D. Lawson, D. Angemi, & I. Kasirye (eds.), *What Works for Africa's Poorest Children. From measurement to action* (pp. 1–280). Available at https://doi.org/10.3362/9781780448572 (Accessed: 31 August 2021)

Qi, D., & Wu, Y. (2019). Comparing the Extent and Levels of Child Poverty by the Income and Multidimensional Deprivation Approach in China. *Child Indicators Research,* 12(2), 627–645. https://doi.org/10.1007/s12187-018-9544-5

Reece, L., Foley, B., Bellew, W., Owen, C., Cushway, D., Srinivasan, N., Hamdorf, P., & Bauman, A. (2020). Active Kids: Evaluation protocol for a universal voucher program to increase children's participation in organised physical activity and sport. *Public Health Res Pract,* 31(2). https://doi.org/10.17061/phrp3012200

Ridge, T. (2011). The Everyday Costs of Poverty in Childhood: A Review of Qualitative Research Exploring the Lives and Experiences of Low-Income Children in the UK. *Children & Society,* 25(1), 73–84. https://doi.org/10.1111/j.1099-0860.2010.00345.x

Ringen, S. (1988). Direct and Indirect Measures of Poverty. *Journal of Social Policy,* 17(03), 351–365. https://doi.org/10.1017/S0047279400016858

Ryu, J. H., Lee, S. J., Jun, J. A., Park, S. K., Yeo, Y. J., Lee, J. Y., Kim, J. M., Song, H. J., Yoo, M. S., & Lee, B. J. (2019). *Report on the 2018 Korean National Children Survey.* Policy Report No. 2019–17. Korea Institute for Health and Social Affairs. Available at http://www.mohw.go.kr/react/jb/sjb030301vw.jsp?PAR_MENU_ID=03&MENU_ID=032901&CONT_SEQ=350493&page=1 (Accessed: 8 May 2021)

Saunders, P., & Naidoo, Y. (2009). Poverty, Deprivation and Consistent Poverty. *Economic Record,* 85(271), 417–432. https://doi.org/10.1111/j.1475-4932.2009.00565.x

Saunders, P., & Tang, V. M. (2019). Adult and child deprivation in Hong Kong. *Social Policy & Administration,* 53(6), 820–834. https://doi.org/10.1111/spol.12533

Sen, A. (1979). Issues in the Measurement of Poverty. *The Scandinavian Journal of Economics,* 81(2), 285–307. https://doi.org/10.2307/3439966

Sherraden, M., & Zou, L. (2022). *Global Child Development Accounts: A "moon shot" to develop every child and the planet.* CSD Perspective No. 22-27. https://doi.org/10.7936/s6qa-9q90

Spicker, P. (2007). *The idea of poverty* (1st ed.). Bristol University Press. https://doi.org/10.2307/j.ctt1t899tg

Statistics Korea. (2019a). *Household Projections for Korea (2017 ~ 2047).* Available at: http://kostat.go.kr/portal/eng/pressReleases/8/2/index.board?bmode=read&bSeq=&aSeq=380767&pageNo=1&rowNum=10&navCount=10&currPg=&searchInfo=&sTarget=title&sTxt= (Accessed: 10 May 2021)

Statistics Korea. (2019b). *Supplementary Results of the Economically Active Population Survey by Employment Type.* Available at: http://kostat.go.kr/portal/eng/pressReleases/5/1/index.board?bmode=read&bSeq=&aSeq=379554&pageNo=3&rowNum=10&navCount=10&currPg=&searchInfo=&sTarget=title&sTxt= (Accessed: 18 August 2020)

Statistics Korea. (2020a). *Annual statistics on child provided by the food benefit.* Available at: https://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=2707 (Accessed: 9 March 2021)

Statistics Korea. (2020b). *Wage difference between permanent and temporary workers*. Available at: https://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=2478 (Accessed: 7 June 2021)

Stewart, D., & Okubo, T. (2017). *A world free from child poverty.* Available at: www.unicef.org/media/65161/file/Child-Poverty-SDG-Guide-EN.pdf

Tafere, Y. (2012). *Children's Experiences and Perceptions of Poverty in Ethiopia.* Young Lives

    Working Paper No.85. Available at: https://www.younglives.org.uk/content/childrens-

    experiences-and-perceptions-poverty-ethiopia (Accessed: 13 January 2021)

Townsend, P. (1979). *Poverty in the United Kingdom: A survey of household resources and*

    standards of living. London: Penguin Books

UNICEF. (2005). *The State of the World's Children 2005: Childhood Under Threat.* Available at:

    https://doi.org/10.18356/604d135c-en (Accessed: 7 August 2021)

UNICEF. (2019). *Voluntary National Reviews for the Sustainable Development Goals: Are*

    Countries Committed to Ending Child Poverty by 2030? Available at:

    https://static1.squarespace.com/static/56588879e4b0060cdb607883/t/5da64a4bf9c6a86bc67e

    2c6a/1571179083417/VNRs+-

    +Are+countries+committed+to+ending+extreme+child+poverty+by+2030+-+Oct14.pdf

    (Accessed: 4 August 2021)

UNICEF. (2020). *Measuring and monitoring child poverty*. Available at:

    https://data.unicef.org/resources/measuring-and-monitoring-child-poverty/ (Accessed: 7 May

    2021)

Weon, S. (2021). Multidimensional poverty among working households in South Korea. *Asia*

    Pacific Journal of Social Work and Development, 31(3), 189–204.

    https://doi.org/10.1080/02185385.2020.1837660

Weon, S., & Rothwell, D. W. (2020). Dynamics of Asset Poverty in South Korea. *Social*

    Indicators Research, 150. https://doi.org/10.1007/s11205-020-02320-z

World Bank, & UNICEF. (2022). *The Impact of COVID-19 on the welfare of households with*

    children. Available at:

    https://documents1.worldbank.org/curated/en/099230003092226699/pdf/P1776560f3b3cc0eb

0b5b50ce9d88cf44f6.pdf (Accessed: 26 July 2022)

Yeo, Y. J. (2018). The Current Condition and Policy Issues of Child Poverty in Korea. *Health and Welfare Policy Forum,* 259, 25–39.

Yeo, Y. J., Kim, M. G., Jeong, E. H., Lee, J. M., Jeong, H. S., Kwon, J. S., Kim, K. H., Kim, E. J., Cho, J. Y., & Hwang, J. M. (2016). *Actual Condition of Child Poverty in Korea.* Policy Report. Available at:

https://scienceon.kisti.re.kr/commons/util/originalView.do?cn=TRKO201900001533&dbt=TRKO&rn= (Accessed: 8 May 2021)

Yoo, M. S. (2019). Findings from the analysis on child and youth well-being. *KOSTAT Statistics Plus,* 2019–4.

http://kostat.go.kr/sri/srikor/srikor_pbl/4/index.board?bmode=read&aSeq=379575&pageNo=1&rowNum=10&amSeq=&sTarget=title&sTxt=

Yoon, J. (2003). Structural Changes in South Korea's Rental Housing Market: The Rise and Fall of the Jeonse System. *Journal of Comparative Asian Development*, 2(1), 151–168. https://doi.org/10.1080/15339114.2003.9678376

Zhan, M., & Sherraden, M. (2003). Assets, Expectations, and Children's Educational Achievement in Female-Headed Households. *Social Service Review,* 77(2), 191–211. https://doi.org/10.1086/373905

Table 1.

Deprivation items

Child-derived deprivation items		%
Food	1. Three meals a day	5.2
	2. At least one meal a day with meat, chicken, or fish (or a vegetarian equivalent)	9.4
	3. Fresh fruit and vegetables every day	9.7
	4. Eating fast food (e.g., Ramen, burger, or coke) more than three times a week	40.2
Education/ Development	1. Books suitable for the child's age and knowledge level	8.3
	2. Indoor games(a toy per child, educational toy, board game, block, computer game)	7.7
	3. Money to participate in school (or nursery) trips and events	9.0
	4. A quiet place with enough room and light to do homework	5.1
	5. An internet connection	2.6
Clothing	1. Some new clothes (i.e., not all second hand)	3.5
	2. Two pairs of properly fitting shoes (one of them is for every season)	3.7
Leisure activity	1. Outdoor leisure equipment (bicycle, scooter, roller-skates, etc.)	15.1
	2. Regular leisure activities (swimming, playing instrument, Taekwondo, etc.)	26.0
	3. The opportunity, from time to time, to invite friends home to play and eat	15.2
	4. The opportunity to celebrate special occasions, birthday, etc.	11.7
Household-derived deprivation items		
Food	1. Meat, chicken, or fish at least once a week	2.9
	2. Fresh fruit and vegetables at least once a week	3.2
	3. Often eating favorite food (tea, coffee, snacks, ice cream, drinks, etc)	1.6
Clothing	1. Two warm winter coats	1.6
	2. Two properly fitting items of clothing (one for summer and another for winter)	3.6
Housing and environment	1. Heating to keep home adequately warm	1.3
	2. Enough space in the dwelling by taking into account household size	4.4
	3. Access to metro or bus stop by at most 10-minutes walking	7.6
	4. Living on a ground-floor, not basement or rooftop house	3.8
	5. Having indoor flushing toilet, bath, or shower for sole use of the household	1.4
Health	1. Visiting doctor regularly when having a long-term disease (more than three months)	10.1
	2. Consulting a dentist when needed	1.9
	3. Able to purchase or take medication	1.6
Leisure activity	1. A holiday away from home for two or three days a year	14.1
	2. Celebration on special occasions e.g., birthday	6.3
	3. Hobby or cultural activities such as movie or concert	10.3
Social support	1. Friends or relatives to get support in difficult times	2.5
Savings (Financial Security)	1. Making regular savings for emergencies	18.4
	2. Regular payment into a private or national pension	14.8
	3. Joining private health or life insurance	10.0
Education	1. Being able to pay for child' higher education including college/vocational school	2.3
	2. Enough money for child's private educational institution when needed	5.2
	3. Being able to buy books suitable for child's study	2.3
	4. Being able to take responsibilities for childcare(financially, emotionally, and socially)	1.8
Financial difficulties	1. Skip meals or did not have enough to eat	3.7
	2. Unable to pay bills for social insurance contribution, electricity, telephone, water before the due date	4.4
	3. Electricity, telephone, water has been turned off because you couldn't pay bills	3.2
	4. Unable to use heating system properly during the winter	3.0
	5. Need to see a doctor but couldn't afford to go	3.2
	6. Moving to another home (being evicted) because couldn't pay the rent	4.9
	7. Unable to pay child's tuition for more than one month	2.2

Figure 1.

Proportion of children deprived on each domain (% of total children)

Deprivation for each domain

Activity	Saving	Education	Food	Housing	Health	Difficulty	Clothing	Support
44.0	26.0	22.0	16.6	12.8	11.1	8.9	8.2	2.5
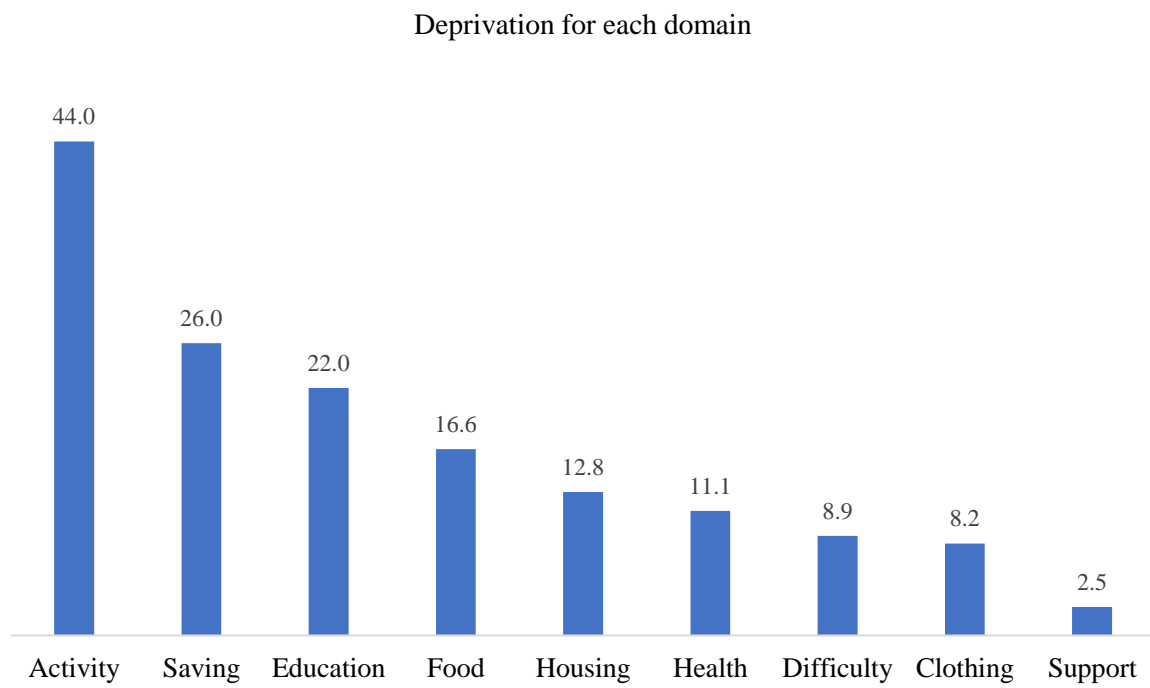
Table 2.

ANOVA and logistic regression for optimum poverty threshold

	F statistics for corrected ANOVA model	Logistic Regression model Chi-square
Null model	64.43	480.08
Deprivation score of 1 or more	64.35	479.72
Deprivation score of 2 or more	87.67	690.01
Deprivation score of 3 or more	106.68	860.12
Deprivation score of 4 or more	114.12	913.51
Deprivation score of 5 or more	115.52	905.95
Deprivation score of 6 or more	**120.96**	900.78
Deprivation score of 7 or more	109.81	**920.74**
Deprivation score of 8 or more	103.05	827.27
Deprivation score of 9 or more	94.36	706.61
Deprivation score of 10 or more	88.68	658.80
Deprivation score of 11 or more	85.89	618.80
Deprivation score of 12 or more	83.17	598.32

Figure 2.

Average Monthly Income by deprivation score (95% Confidence Intervals)
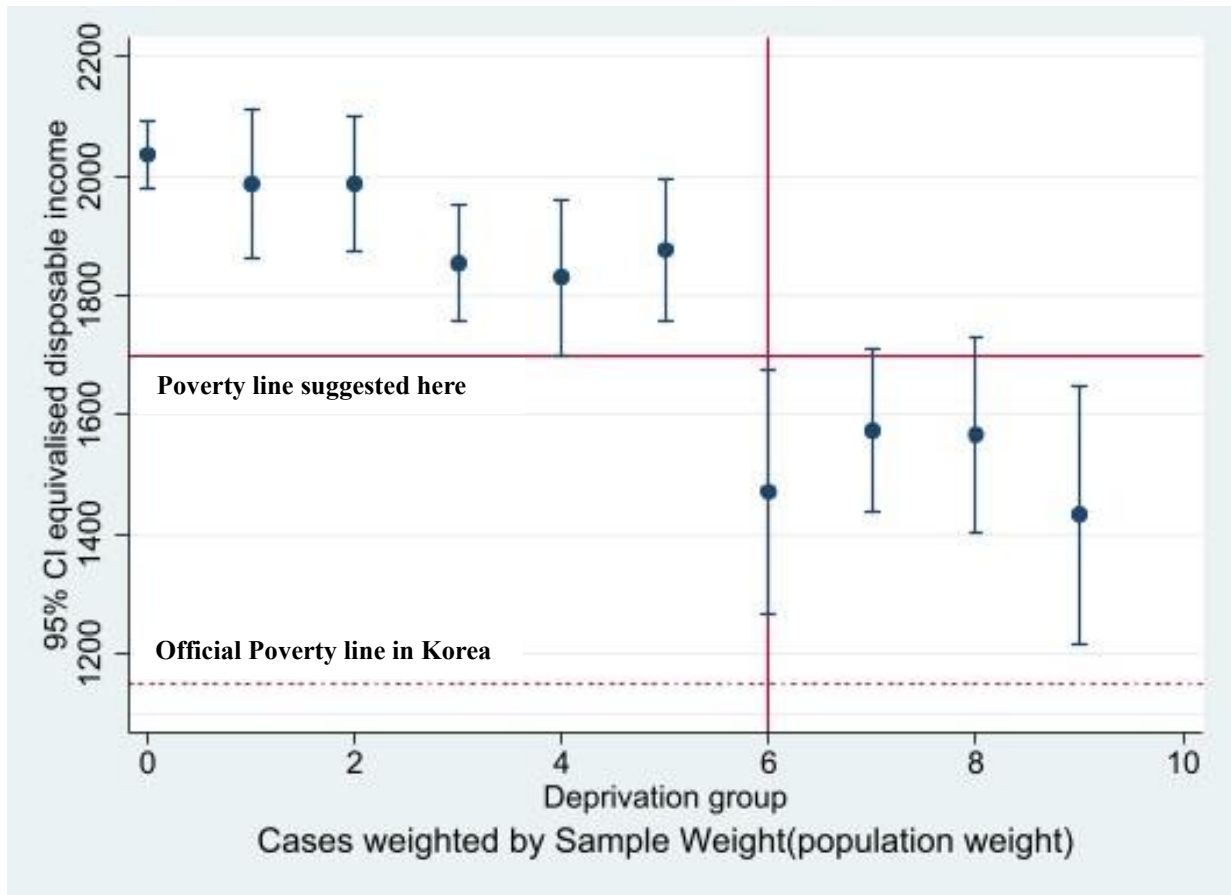
Table 3.

Multidimensional child deprivation rate

Number of deprivations	Frequency in sample (%)	
	Weighted N	Weighted %
0	3,505,195	42.87
1	992,607	12.14
2	956,631	11.70
3	587,061	7.18
4	412,905	5.05
5	481,586	5.89
6	225,236	2.75
7	231,732	2.83
8	134,839	1.65
9	101,557	1.24
10	109,279	1.34
11	63,363	0.77
12	43,850	0.54
13	46,921	0.57
14	29,390	0.36
15	29,882	0.37
16	26,556	0.32
17	25,688	0.31
18	42,400	0.52
19	11,581	0.14
20	13,948	0.17
21	24,216	0.30
22	18,992	0.23
23	9,010	0.11
24	10,278	0.13
25	7,492	0.09
26	4,738	0.06
27	3,795	0.05
28	11,208	0.14
29	3,446	0.04
30	1,666	0.02
31	2,359	0.03
32	2,414	0.03
33	1,616	0.02
34	555	0.01
35	818	0.01
36	896	0.01
Total	8,176,335[a]	100.00

Note. [a] Total number of children (u18) in 2018 in South Korea

Table 4.

Multidimensional Child Poverty in Korea (weighted by standardized weight)

Poverty status		N	%
Poor	Six or more deprivations and an equivalised household monthly disposable income below USD 1,700	843,797	10.32
Rising	Six or more deprivations and an equivalised household monthly disposable income above USD 1,700	392,464	4.84
Vulnerable	Fewer than six deprivations and an equivalised household monthly disposable income below USD 1,700	2,317,991	28.35
Not poor	Fewer than six deprivations and an equivalised household monthly disposable income above USD 1,700	4,618,811	56.49
Total		8,176,335	100.00

Table 5.

Overlap between Income poverty and Multidimensional Child Poverty

	Not poor	Rising	Vulnerable	Poor
			%	
Under 50% of median disposable income	0.00	0.00	29.61	59.28
Higher than 50% of median disposable income	100.00	100.00	70.39	40.71
Total	100.00	100.00	100.00	100.00

Figure 3.

Proportion of children deprived on each domain by the poverty condition (% of deprivation)
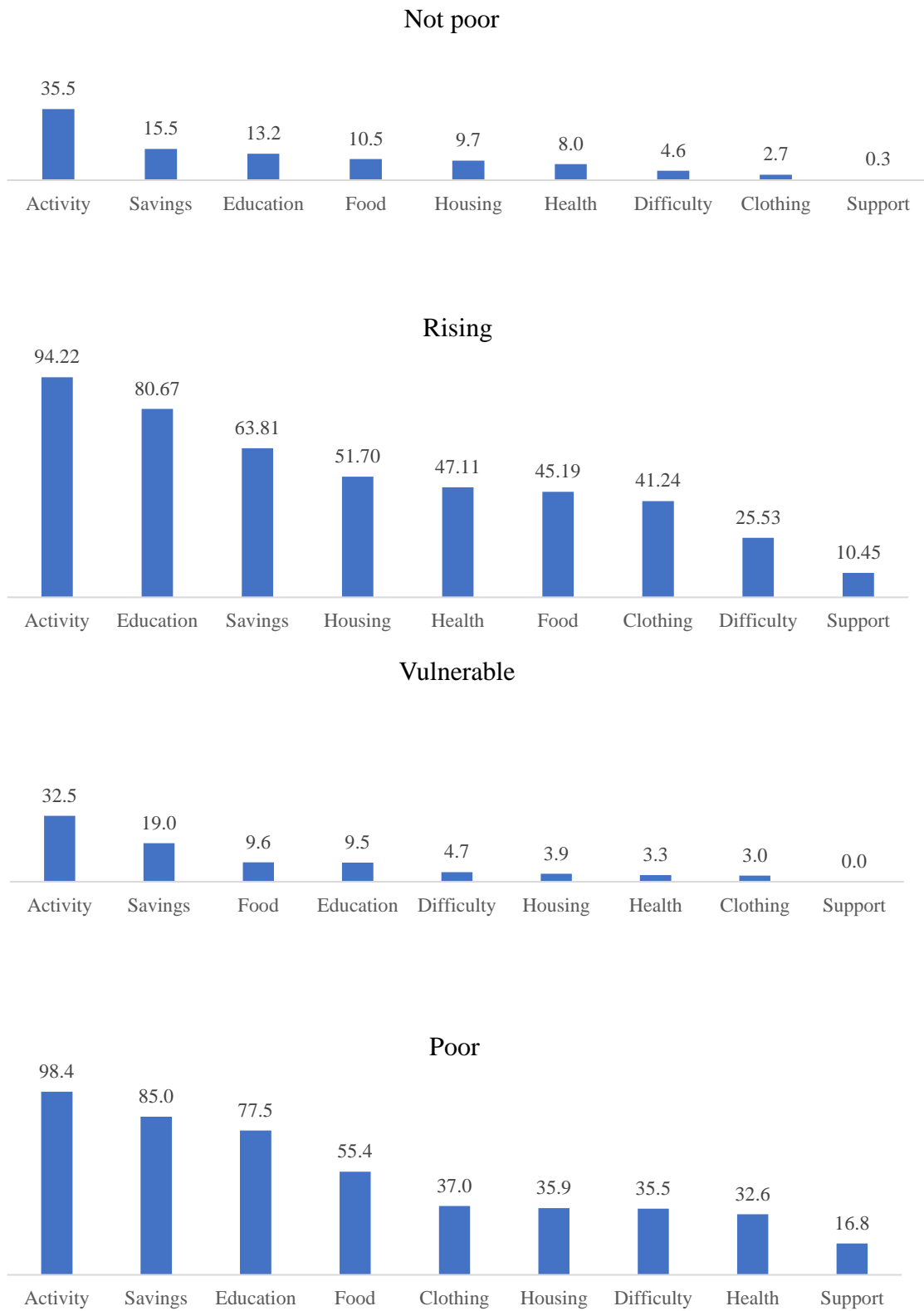
Figure 4.

Proportion of children deprived on each domain by household type (% of deprivation)
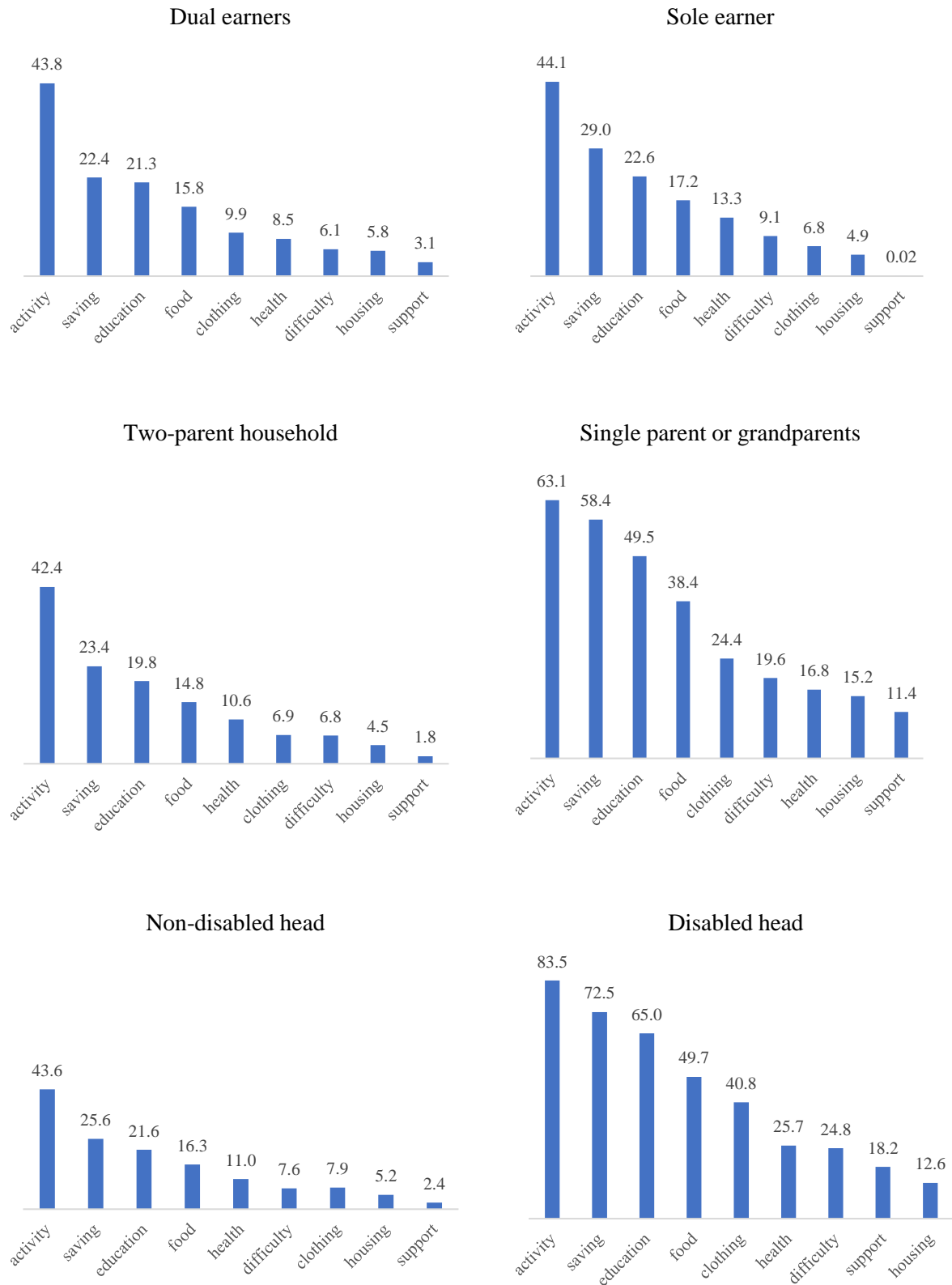
Table 6.

Subsample analysis (weighted by the standardized weight)

(a) Number of breadwinners

	Dual earners (n=1,770, 44%)	Sole earner (n=2,269, 56%)
	%	
Child deprivation rate	14.08	16.05
Poverty status		
Poor	8.55	11.80
Rising	5.54	4.26
Vulnerable	24.13	31.84
Non-poor	61.78	52.11

(b) Household structure

	Two-parents (n=3,079, 76%)	Single-parent or grandparent-headed (n=960, 24%)
	%	
Child deprivation rate	12.47	48.55
Poverty status		
Poor	7.74	42.38
Rising	4.74	6.16
Vulnerable	28.38	28.00
Non-poor	59.15	23.45

(c) *Head with a disability*

	Non-disabled (n=3,850, 95%)	Disabled (n=189, 5%)
	%	
Child deprivation rate	14.70	64.79
Poverty status		
Poor	9.88	57.15
Rising	4.82	7.65
Vulnerable	28.39	24.14
Non-poor	56.91	11.07

Table 7.
Multinomial logistic regression for child poverty: Odds Ratio (OR)

Model	Variable	OR	SE[a]	95% CI[b]	
Rising	Household size	1.08	0.18	0.78	1.48
	Housing tenure – Jeonse	1.62*	0.40	1.00	2.63
	Housing tenure – Renters	2.33*	0.70	1.28	4.21
	Region – Middle sized city	0.71	0.16	0.45	1.11
	Region – Rural area	1.90	0.68	0.95	3.82
	Earner – Sole earner	0.80	0.20	0.49	1.32
	Structure – Double parents headed	0.46*	0.32	0.11	1.82
	Child – Age	0.88	0.08	0.74	1.06
	Child - Age square	1.01	0.00	1.00	1.02
	Child – Male	0.96	0.21	0.63	1.46
	Head – Female	0.68	0.37	0.24	1.96
	Head - Divorced/widowed/separated, single	1.65	1.42	0.31	8.88
	Head – Disabled	5.47	5.64	0.73	41.19
	Head – Unemployed	1.44	0.91	0.42	4.95
	Head – Temporary worker	4.07***	1.92	1.62	10.26
	Head – Self-employed	0.52	0.17	0.27	1.00
	Head – Subsidized/family worker	0.37	0.44	0.03	3.88
Vulnerable	Household size	1.58***	0.14	1.33	1.87
	Housing tenure – Jeonse	1.36*	0.16	1.07	1.72
	Housing tenure – Renters	3.38***	0.65	2.31	4.94
	Region – Middle sized city	0.74**	0.08	0.59	0.91
	Region – Rural area	2.92***	0.56	2.01	4.25
	Earner – Sole earner	1.53***	0.17	1.23	1.91
	Structure – Double parents headed	0.12***	0.05	0.05	0.27
	Child – Age	0.99	0.04	0.91	1.07
	Child - Age square	1.00	0.00	0.99	1.00
	Child – Male	0.96	0.10	0.78	1.18
	Head – Female	0.73	0.25	0.37	1.43
	Head - Divorced/widowed/separated, single	0.31*	0.15	0.12	0.83
	Head – Disabled	4.18*	2.61	1.23	14.22
	Head – Unemployed	0.77	0.28	0.38	1.56
	Head – Temporary worker	3.17***	0.95	1.76	5.71
	Head – Self-employed	1.21	0.16	0.93	1.57
	Head – Subsidized/family worker	2.36	1.87	0.50	11.16
Poor	Household size	1.59***	0.21	1.23	2.05
	Housing tenure – Jeonse	2.24***	0.52	1.43	3.52
	Housing tenure – Renters	11.21***	2.68	7.01	17.92
	Region – Middle sized city	1.00	0.17	0.71	1.40
	Region – Rural area	2.84***	0.79	1.65	4.88
	Earner – Sole earner	1.35	0.27	0.92	1.99
	Structure – Double parents headed	0.06***	0.03	0.02	0.13
	Child – Age	0.82**	0.06	0.71	0.95
	Child - Age square	1.01*	0.00	1.00	1.02
	Child – Male	1.00	0.17	0.72	1.41
	Head – Female	0.56	0.19	0.29	1.09
	Head - Divorced/widowed/separated, single	0.49	0.25	0.18	1.32
	Head – Disabled	10.87***	7.73	2.70	43.77
	Head – Unemployed	4.95***	1.65	2.58	9.50
	Head – Temporary worker	16.14***	4.97	8.83	29.50
	Head – Self-employed	1.23	0.32	0.74	2.04
	Head – Subsidized/family worker	8.38***	5.35	2.40	29.28

Note. * $p<.05$ ** $p<.01$ *** $p<.001$; [a]Standard Error; [b]Confidence Interval

Table A1.

Logistic regression validity tests for child and household deprivation items (Odds Ratio)

| Deprivation Items	Poor	HHact	Sub_pov
Child: Food1	2.01	1.97	1.28
Child: Food2	2.05	2.78	1.88
Child: Food3	2.07	3.58	1.82
Child: Food4	0.71	1.50	1.17
Child: Education1	2.20	3.27	1.85
Child: Education2	2.91	4.45	1.85
Child: Education3	4.24	6.85	1.79
Child: Education4	2.80	4.26	2.34
Child: Education5	3.16	4.32	1.25
Child: Leisure activity1	2.44	2.67	2.35
Child: Leisure activity2	2.32	1.81	1.66
Child: Leisure activity3	1.98	3.05	2.00
Child: Leisure activity4	2.48	4.89	2.06
Child: Clothing1	3.11	2.42	1.41
Child: Clothing2	3.58	2.24	1.08
Household: Food1	9.22	14.55	17.58
Household: Food2	7.62	13.70	14.73
Household: Food3	5.01	14.39	11.70
Household: Clothing1	7.00	5.74	3.57
Household: Clothing2	5.82	8.44	5.84
Household: Housing1	4.16	3.85	1.53
Household: Housing 2	3.16	4.57	2.45
Household: Housing 3	0.82	0.89	1.27
Household: Housing 4	2.92	2.63	1.31
Household: Housing 5	3.68	2.55	0.64
Household: Health1	1.38	1.60	2.08
Household: Health2	2.24	4.77	2.36
Household: Health3	5.30	4.23	1.13
Household: Leisure1	4.74	7.42	5.42
Household: Leisure2	7.94	11.20	4.74
Household: Leisure3	5.14	7.77	4.94
Household: Social support1	6.68	6.56	2.15
Household: Saving1	3.84	5.85	4.45
Household: Saving2	6.20	8.91	4.09
Household: Saving3	7.52	8.62	5.32
Household: Education1	6.23	7.69	3.06
Household: Education2	7.05	11.63	8.74
Household: Education3	9.90	15.64	4.99
Household: Education4	5.76	15.33	3.01
Household: Difficulty1	2.04	2.18	1.12
Household: Difficulty2	4.54	5.47	2.37
Household: Difficulty3	2.62	5.63	1.54
Household: Difficulty4	3.61	4.83	2.11
Household: Difficulty5	2.61	5.00	1.64
Household: Difficulty6	1.58	3.29	4.18
Household: Difficulty7	2.13	4.65	1.31

Note. HHed: head's education level, Poor: Income poverty using 50% of equivalised income, HHact: Head's economic activity, Sub_pov: self-perceived social stratification; Items highlighted in yellow are not significant at the 5% level

Table A2.

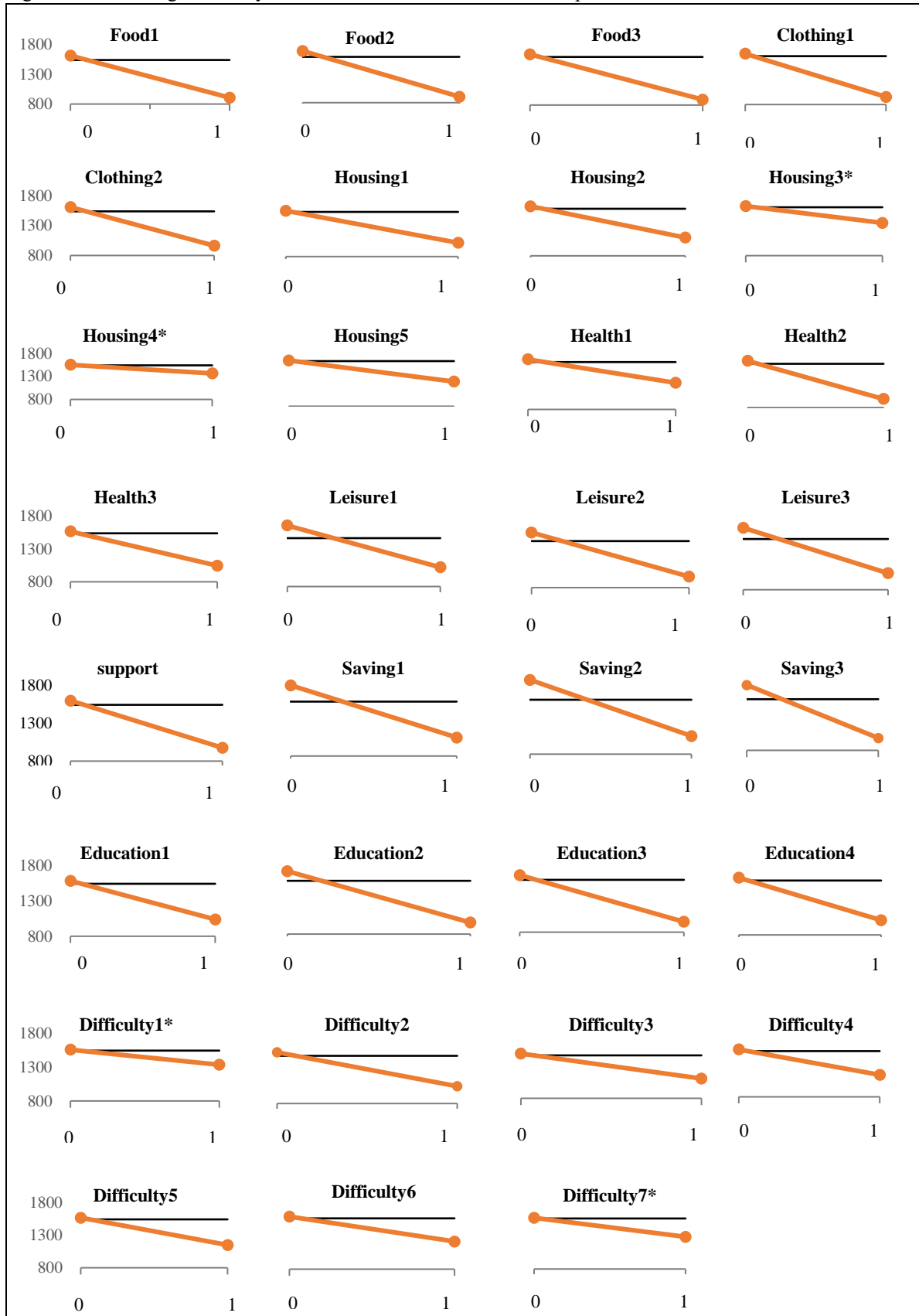Chronbach's alpha scores for child and adult/household items

Children and adult items	Alpha if deleted
Child: Food1	0.9376
Child: Food2	0.9369
Child: Food3	0.9365
Child: Food4	0.9396
Child: Education1	0.9365
Child: Education2	0.9364
Child: Education3	0.9359
Child: Education4	0.9360
Child: Education5	0.9374
Child: Leisure activity1	0.9368
Child: Leisure activity2	0.9367
Child: Leisure activity3	0.9359
Child: Leisure activity4	0.9354
Child: Clothing1	0.9373
Child: Clothing2	0.9368
Household: Food1	0.9374
Household: Food2	0.9368
Household: Food3	0.9370
Household: Clothing1	0.9370
Household: Clothing2	0.9359
Household: Housing1	0.9375
Household: Housing 2	0.9370
Household: Housing 3	0.9374
Household: Housing 4	0.9377
Household: Housing 5	0.9377
Household: Health1	0.9368
Household: Health2	0.9362
Household: Health3	0.9368
Household: Leisure1	0.9355
Household: Leisure2	0.9350
Household: Leisure3	0.9350
Household: Social support1	0.9363
Household: Saving1	0.9357
Household: Saving2	0.9355
Household: Saving3	0.9353
Household: Education1	0.9368
Household: Education2	0.9353
Household: Education3	0.9360
Household: Education4	0.9371
Household: Difficulty1	0.9379
Household: Difficulty2	0.9370
Household: Difficulty3	0.9373
Household: Difficulty4	0.9373
Household: Difficulty5	0.9373
Household: Difficulty6	0.9374
Household: Difficulty7	0.9378
Total alpha score	0.9379

Figure A1.

Checking Additivity: Main Effects Plot for Child Deprivation Items
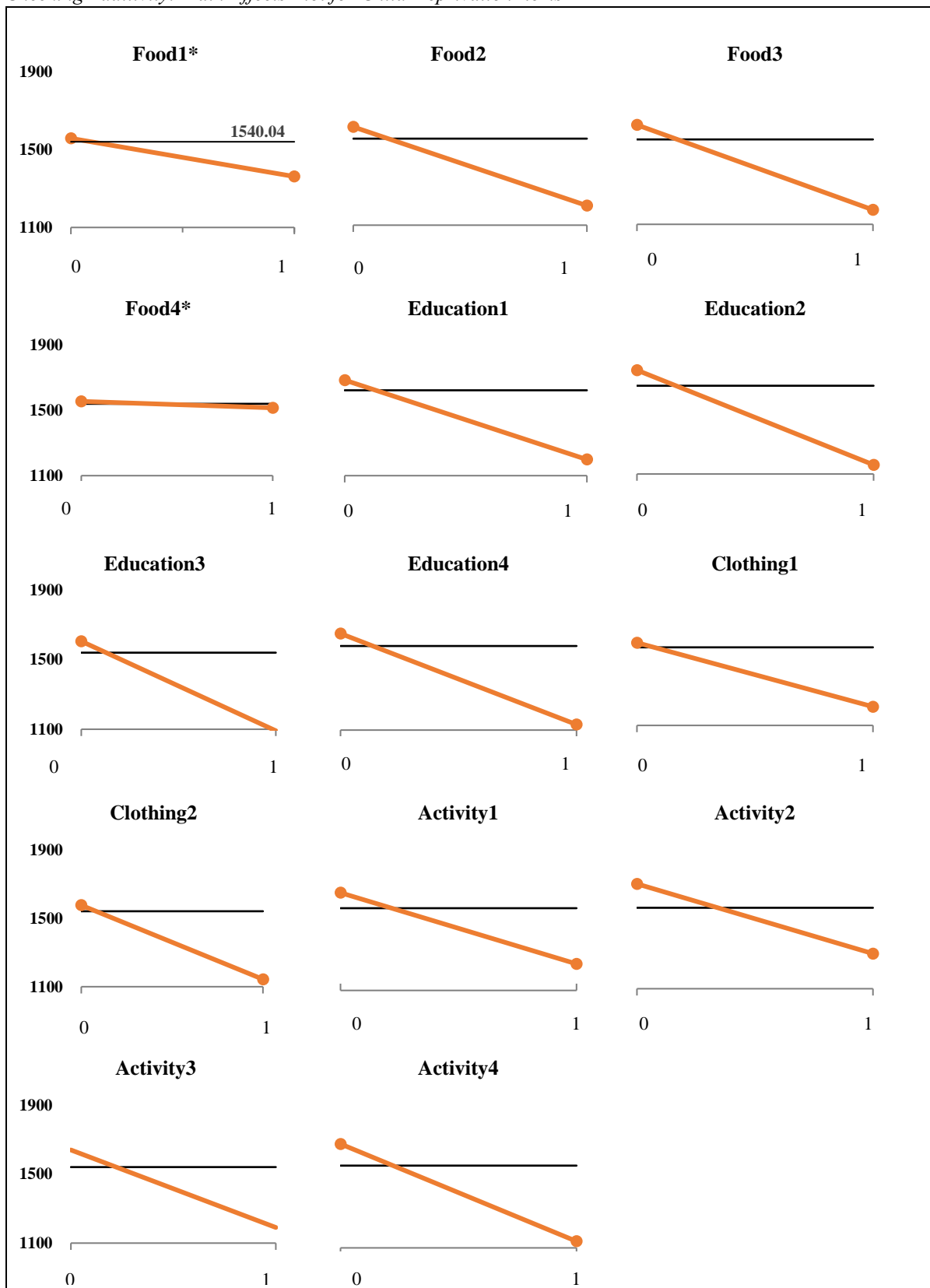
Note. Items with asterisk did not meet the criteria of additivity (not significant)

Figure A2. Checking Additivity: Main Effects Plot for Household Deprivation Items

Note. Items with asterisk did not meet the criteria of additivity (not significant)