*Supplementary Appendix 1: CHARLS 4-item main scale*

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| *Domain* | *Operationalized as* | *Operational Limitations* | | *Interpretation* |
| *Number of NAs(%)*  *Imputation Method* | *Limitations* |
| *Economy* |  | 1582(3.6%)  Excluded | Missing or incorrect records may bias results | The amount of money spent on food, communication, transportation, and entertainment per month. The price of food is normalized by the number of people who eat together in the household in order to account for different household sizes.  The economy component is a composite measure of monthly household expenditure and proportion of people working in agriculture. The assumption behind this measure is that urban areas are more likely to have higher commodity prices, and that rural area have a larger population that engages in agricultural work. |
|  | 3259(7.4%)  Excluded |
|  | 2235(5.1%)  Excluded |
|  | 1884(4.3%)  Excluded |
| The scores are divided into upper and lower groups at the median. They are then scored on a scale of 0 to 10 at 0.5-point intervals by dividing the upper and lower groups into 10 bins of equal size. | |
|  | 55(0.07%)  Excluded | Missing or incorrect records may bias results |
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| *Communications* |  | 52(0.1%)  Excluded | Effect of missing variables is negligible, but insufficient justification. | The communications component can be interpreted as a measure of a household’s access to modern information technologies. |
|  | 152(0.3%)  Excluded | Effect of missing variables is negligible |
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*Supplementary Appendix 1 Continued: CHARLS 4-item scale*

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| *Domain* | *Operationalized as* | *Operational Limitations* | | *Interpretation* |
| *Imputation Method* | *Limitations* |
| *Housing* |  | 21(0.03%)  Excluded | The proportion of missing records are small enough such that their effects are negligible. However, incorrect records may bias results. | The housing component can be interpreted as a composite measure of the average housing environment of a community. It combines takes into account the proportion of houses in the community that are made of concrete and steel, running water, using LPG or natural gas as cooking fuel, has an indoor flushable toilet, and has an inhouse bath. |
|  | 16(0.03%)  Excluded |
|  | 17(0.03%)  Excluded |
|  | 29(0.05%)  Excluded |
|  | 17(0.03%)  Excluded |
|  | |
| *Sanitation* |  | 19792(44.7%)  County-level average | Imputation of missing values may be skewing the results | The sanitation component can be interpreted as a measure that assesses the human waste disposal capabilities of a household. Multiple studies have shown that a lack of proper waste disposal facilities is correlated with adverse health outcomes(Smith et al., 2013). |
|  | 4595(10.4%)  County-level averaage |
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