# Dialing into Dynamics:

## Enhancing Measurement of Food Insecurity Experience via High-Frequency Phone Surveys

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World Bank Conference - The Pulse of Progress: Harnessing High-Frequency Survey Data for Development Research in the Polycrisis Era

# Motivation

- Food insecurity fluctuates rapidly, but traditional surveys are rolled out at low frequency
- The non-poor generally manage to smooth consumption, so infrequent food security measures may be sufficient - but for the poor who cannot, these will miss a lot of information
- High-Frequency Phone Surveys (HFPS) may offer cost-effective, timely means to provide new insights into food insecurity dynamics
- **Value-added of HFPS for understanding food insecurity**
  - Nationally representative high-frequency data across countries
  - Detailed knowledge about these households from Integrated Surveys on Agriculture (ISA)
  - Reasons for caution: mobile phone ownership bias and coverage across agricultural seasons
  - New research: differential smoothing strategies and capacities

# Related literature

- Seasonal variation of household income and food insecurity
  - ⇒ Abay and Hirvonen (2017), Ma and Maystadt (2017)
- Stochastic farmer wealth and income dynamics, risk management
  - ⇒ Lybbert et al. (2004); Kazianga and Udry (2006); Lybbert and Carter (2012); Macours et al. (2022)
- High frequency data collection
  - ⇒ Gourlay et al. (2021), Anderson et al. (2024)
- Emerging work on transitions through food insecurity and insights into survey recall using HFPS data across all countries
  - ⇒ Joliffe, Markhof and Wollburg (2024)

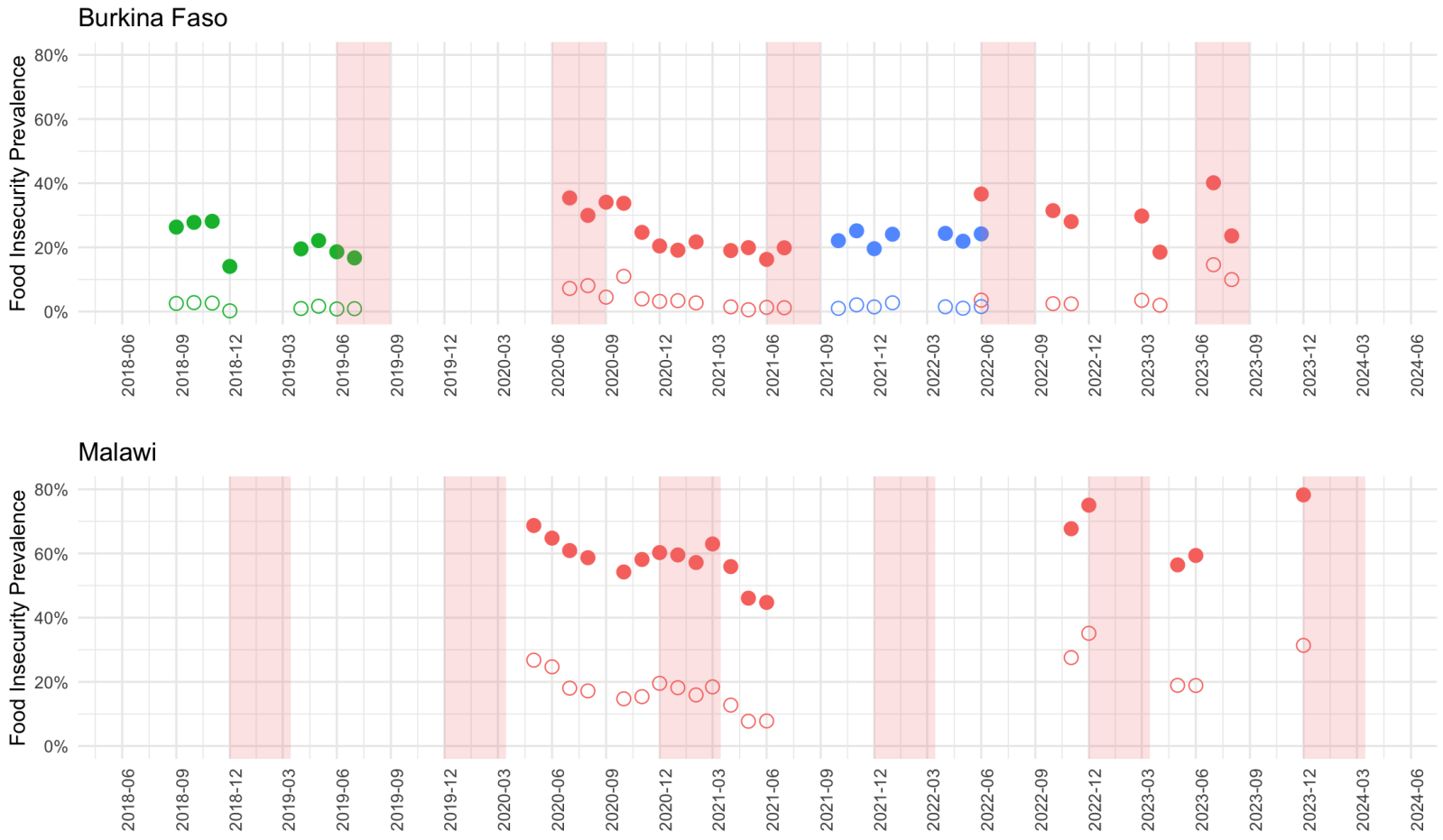
# Context and Data

- Burkina Faso and Malawi have experienced significant food insecurity with approx. 8.1 million people facing acute or chronic food insecurity (World Food Programme, 2024)
- Our primary focus lies on food insecurity experience scale (FIES) rolled out as part of LSMS-HFPS
- Computed standardized probabilities for moderate and severe food insecurity prevalence following FAO methods
- LSMS-ISA provided sampling frames - which we draw on to learn more about the surveyed households
- We use household locations to complement survey with geospatial data

# Figure 1: Higher-frequency phone surveys can inform about periods not covered by lower frequency ISA

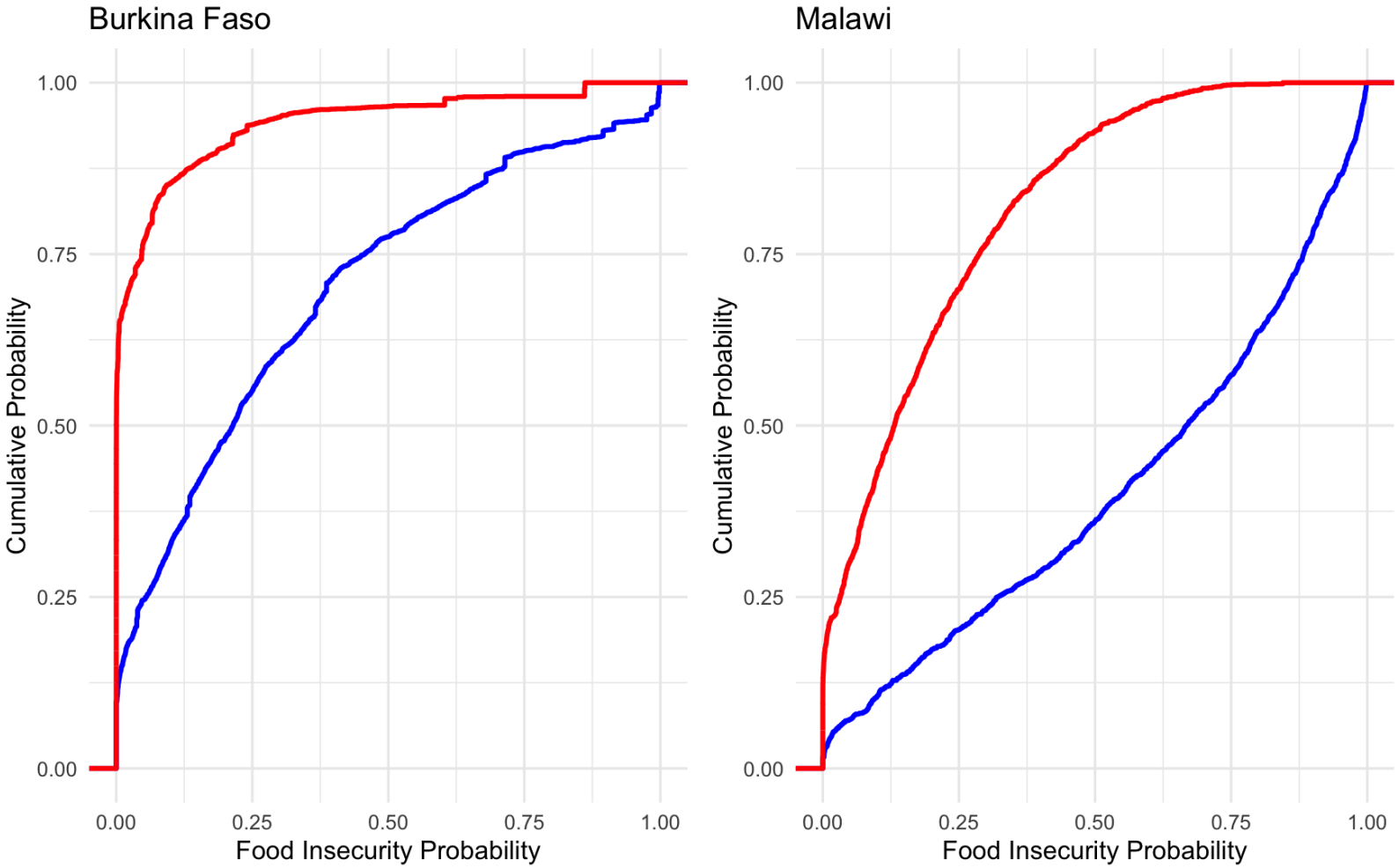

Note: Based on interview dates from survey data. ISA survey periods in turquoise and HFPS in orange.

# Figure 2: Substantial fluctuations in FI follow no clear seasonal pattern across time in ISA and HFPS survey rounds




Note: Solid (hollow) dots indicate >= moderate (severe) food insecurity. Average annual lean seasons shaded in light-red.

# Figure 3: While moderate food insecurity is prevalent across, households in Malawi are substantially more food insecure




Note: Household-level mean FIES across HFPS rounds. 'At least moderate' FIES in blue and severe FIES in red.

# The unique data setting allows for measuring within-HH differences in food insecurity between the HFPS and ISA

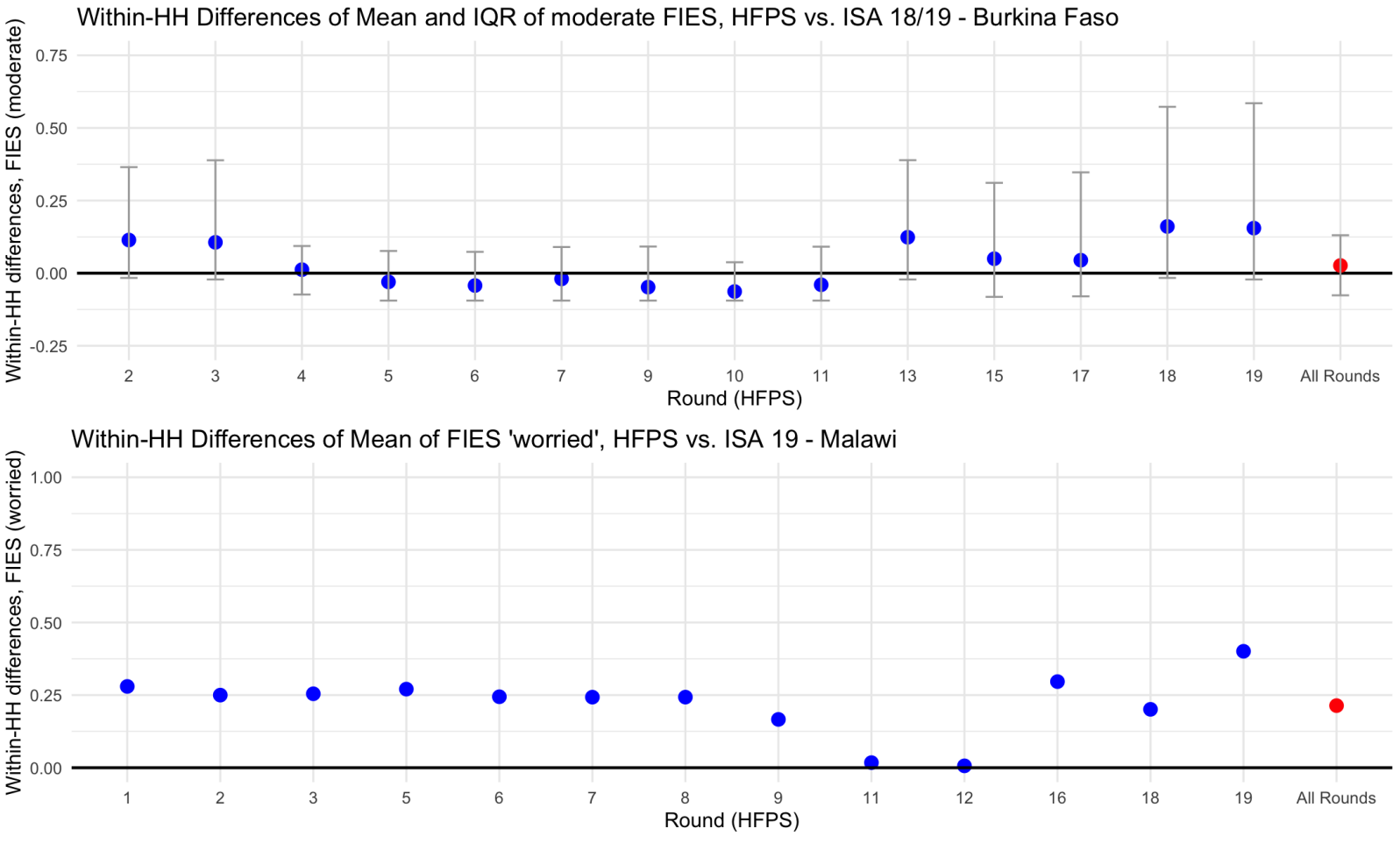
- Objective: To analyze deviations in food insecurity responses between face-to-face surveys (ISA) and high-frequency survey rounds (HFPS) for the same households
- For Burkina Faso, we can compare the moderate FIES probability; for Malawi 'worried' incidence[1]
- We report mean and interquartile ranges of the distribution of within-household differences between FIES values for individual rounds of the HFPS vs. the ISA sampling frame

For each household $i$ and HFPS round $j$

$$within - HHdifference_{ij} = FIES_{ij}^{HFPS} - FIES_{i}^{ISA}$$

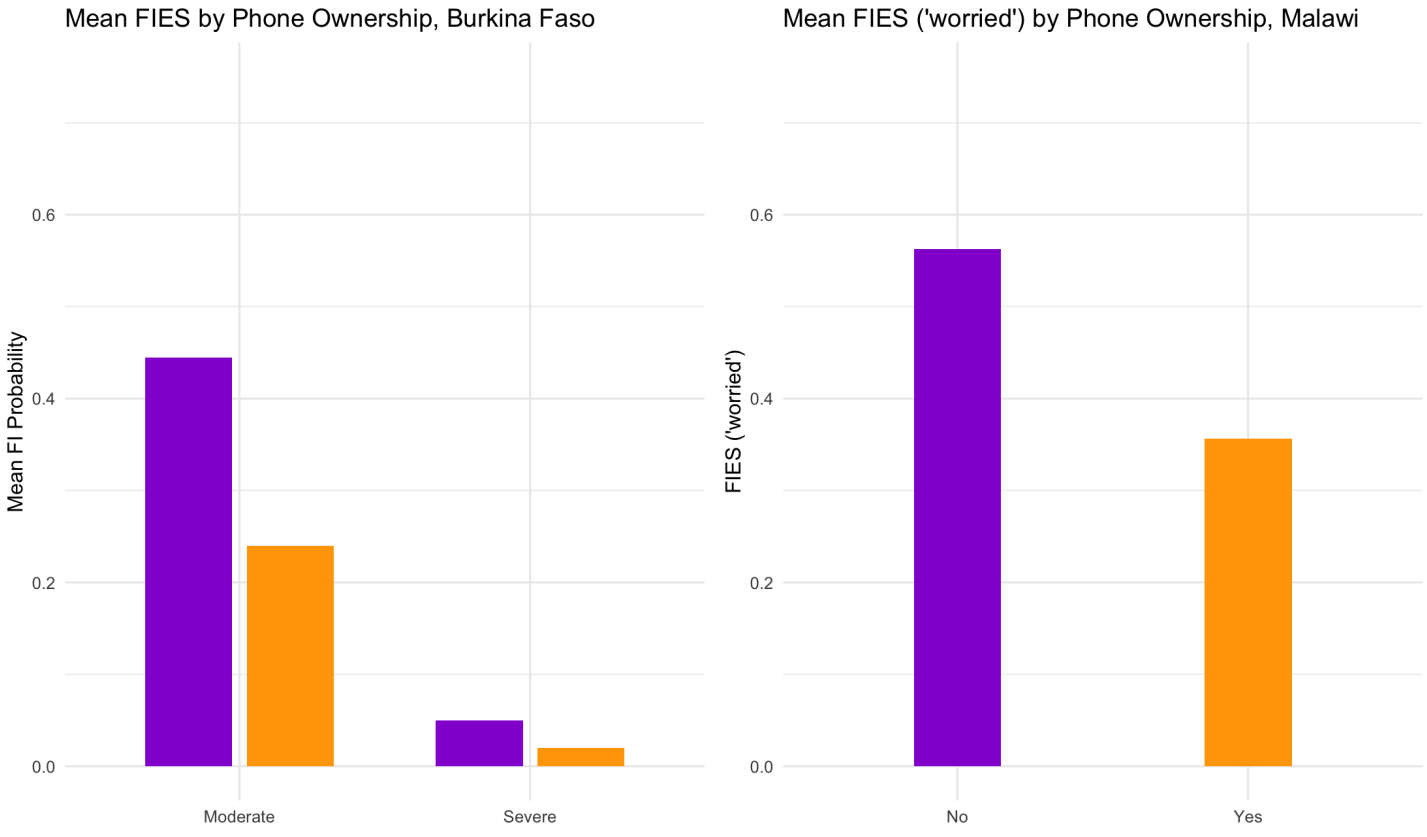
[1] In the last 30 days, were you worried you would not have enough food to eat?

# Figure 4: Within-HH differences reveal a substantial underestimation of FIES via the ISA




Note: Single-round differences (HFPS - ISA) in blue and overall difference (mean-HFPS - ISA) in red.

# Figure 5: Phone ownership is strongly linked to lower levels of food insecurity experienced

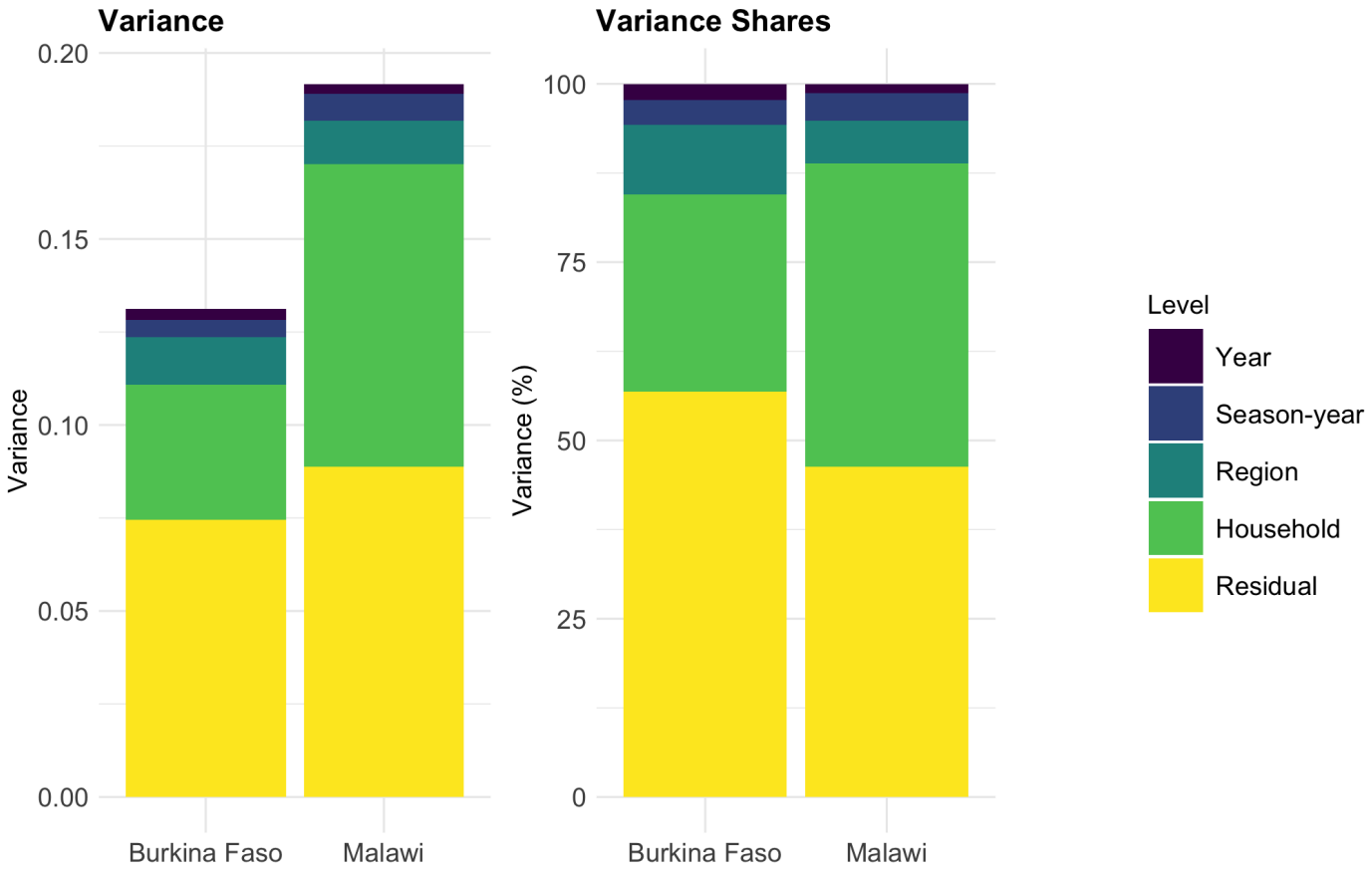



Note: Bars in orange (purple) show mean FIES for households with (non) phone-owning HH heads. Data from ISA.

# We investigate the sources of variability in food insecurity and their relative importance using multilevel modeling

- We examine the different sources of food insecurity variability using a multilevel/hierarchical regression framework
- This approach accounts more fully for the covariance structure of the data than a standard regression framework
- We isolate the amount of variance due to differences between households, regions, seasons and time

# Figure 6: Multilevel - Variance Decomposition: HFPS - Moderate Food Insecurity Incidence



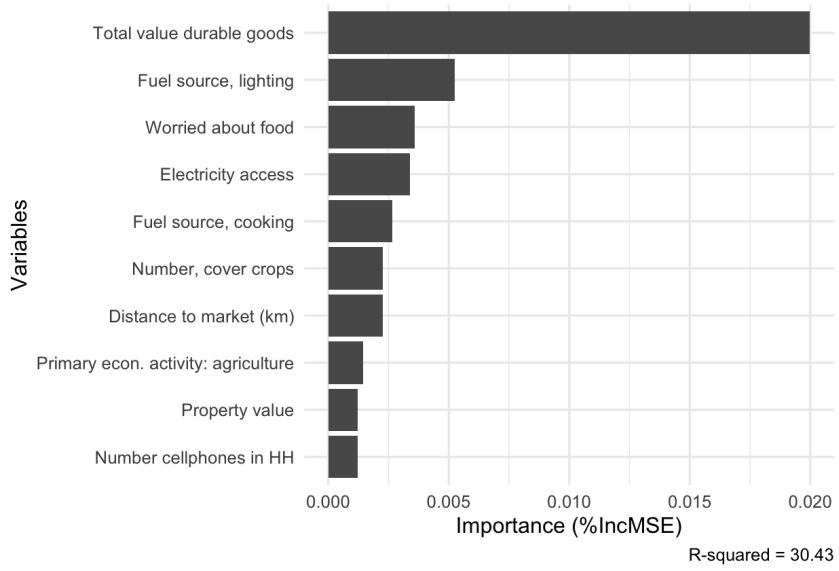

Note: Results estimated with multi-level random effects models.

# First conclusions

- High-frequency surveys shine light on variation missed by lower-frequency ISA
- Mobile-phone ownership remains a key constraint to high-frequency surveys of the most vulnerable and poor
    - HFPS provide a strict lower-bound estimate of overall FIES
- While only 1-5% of variation in FIES can be attributed to well-established seasonal patterns, 27-43% of variation is at the household and 6-10% at regional levels

# Next steps: employ ML methods to identify smoothing strategies and characterize vulnerable subgroups

- Non-parametric methods are suited to test for observable dimensions that differentiate consumption and asset smoothers
- Further investigate rich ISA data for critical levels that split the sample into distinct populations
- Leverage weather and other shocks recorded in HFPS to explore causal relationships




Note: Variable importance for predicting moderate FIES in Malawi.

**Thank you!**

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