mpitb: A toolbox for calculating multidimensional poverty indices in R

by Ignacio Girela

Abstract This article presents **mpitb**, an R package for calculating multidimensional poverty indices (MPIs) based on the popular Alkire-Foster measurement approach. **mpitb** package provides a tractable and extensive framework for researchers, analysts, and practitioners working on mutltidimensional poverty measurement projects in the same vein of the well-known global MPI workflow.

Introduction

Although poverty is widely understood as the inability to achieve basic standards of living, the measurement of poverty has traditionally been based on monetary deficits. However, over the past two decades, there has been a significant increase in the use of multidimensional approaches to measuring poverty in an attempt to capture different dimensions of this phenomenon. In this context, the dual-cut-off-counting measurement approach proposed by Alkire and Foster (2011) (AF, hereafter) has become particularly popular due to its flexibility and ability to inform policy. For example, the AF method is the basis of the global Multidimensional Poverty Index (MPI) which is yearly published by the United Nations Development Programme and the Oxford Poverty and Human Development Initiative (**UNDP-OPHI_2021?**). In addition, many countries are developing their own official MPIs to track poverty reduction progress using the AF method.

This measurement approach stands out both for providing an extensive policy information platform and remaining relatively understandable by the general public.

Despite the increasing popularity of this approach, calculating AF measures in practice is still a challenging task due to the lack of an integrated framework on how to generate, analyse and present various poverty estimates together. Motivated by this problem, OPHI launched a Stata package (Suppa 2023) with the aim of facilitating the production process of the global MPI to researchers, analysts and practitioners. To do so, Suppa (2023) (continue…). This package adapts this framework for R users.

The AF method stands out both for providing an extensive policy information platform and remaining relatively understandable by the general public. Hence, calculating the point estimates underlies simple linear algebra operations. Some very recent R packages that computes AF measures include **MPI** (Kukiattikun and Chainarong 2022) and **mpindex** (Abdulsamad 2023). Notwithstanding, these packages do not account for the complex survey designs from where data are drawn. This issue affects the estimation of the standard errors and, consequently, impacts further statistical inference exercises of interest. Namely, is multidimensional poverty in one subgroup of the population greater than another? Has poverty been reduced over time?

Measuring multidimensional poverty: the Alkire-Foster Method

Overview of mpitb

mpitb is a packages for …

Applications

Suppa (2023) provide a set of examples …. With the view of consistency, we apply … on the same data…

The **palmerpenguins** data features three penguin species which has a lovely illustration by Alison Horst in Figure 1.

```
library(mpitb)

data <- swz_mics14
```

Table 1 prints at the first few rows of the `penguins` data:

Figure 2 shows an plot of the penguins data, made using the **ggplot2** package.

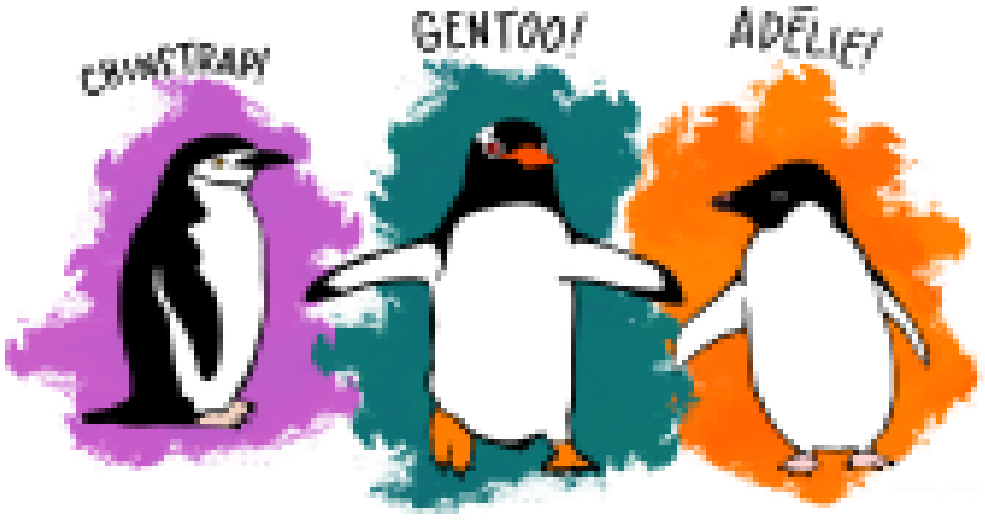

Figure 1: Artwork by allison_horst

Table 1: A basic table

species	island	bill_length_mm	bill_depth_mm	flipper_length_mm	body_mass_g	sex	year
Adelie	Torgersen	39.1	18.7	181	3750	male	2007
Adelie	Torgersen	39.5	17.4	186	3800	female	2007
Adelie	Torgersen	40.3	18.0	195	3250	female	2007
Adelie	Torgersen	NA	NA	NA	NA	NA	2007
Adelie	Torgersen	36.7	19.3	193	3450	female	2007
Adelie	Torgersen	39.3	20.6	190	3650	male	2007

```
penguins %>%
  ggplot(aes(x = bill_depth_mm, y = bill_length_mm,
             color = species)) +
  geom_point()
```

Summary

In this paper, we introduced a package for calculating multidimensional poverty indices based on the Alkire-Foster method

Acknowledgements

I want to thank

References

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Alkire, Sabina, and J. E. Foster. 2011. "Counting and Multidimensional Poverty Measurement." *Journal of Public Economics* 95 (7): 476–87.

Kukiattikun, Kittiya, and Chainarong Chainarong. 2022. *MPI: Computation of Multidimensional Poverty Index (MPI)*. https://CRAN.R-project.org/package=MPI.

Suppa, Nicolai. 2023. "mpitb: A Toolbox for Multidimensional Poverty Indices." *The Stata Journal* 23 (3): 625–57. https://doi.org/10.1177/1536867X231195286.

Ignacio Girela
CONICET - Universidad Nacional de Córdoba

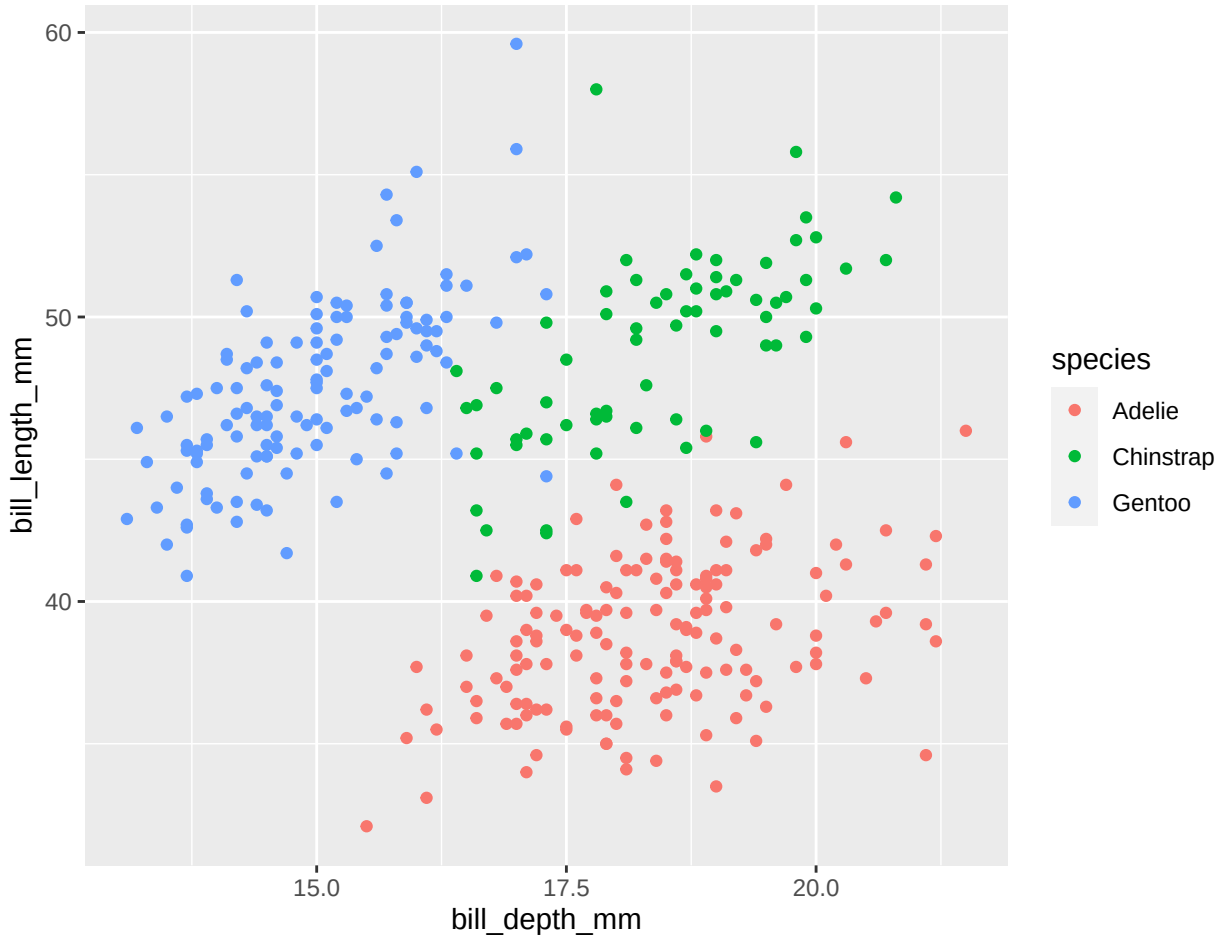

Figure 2: A basic non-interactive plot made with the ggplot2 package on palmer penguin data. Three species of penguins are plotted with bill depth on the x-axis and bill length on the y-axis. Visit the online article to access the interactive version made with the plotly package.

Facultad de Ciencias Económicas
Córdoba, Argentina
https://www.eco.unc.edu.ar/
ORCiD: 0000-0003-3297-3854
ignacio.girela@unc.edu.ar