
Subject: Multilevel weights

Posted by [swinter](#) on Mon, 03 Aug 2015 15:38:48 GMT

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Greetings DHS experts and forum followers!

I am running multilevel models in Stata 14 using data appended from the most recent DHS surveys that include the domestic violence (dv) module in 20 countries in sub-Saharan Africa. I am trying to incorporate de-normalized/re-normalized domestic violence sampling weights (d005*) in my models; however, every time I use the de-normalized (and/or re-normalized weights) I have serious convergence issues. I also ran all the models without any weights and also with the original, not de-normalized weights (d005). All models ran successfully without weights and also, surprisingly, with the original, not de-normalized weights. The results of the models that don't include weights make sense conceptually (e.g. expected magnitude and direction of the coefficients); however, the senior DHS team suggest that these weights, particularly the dv weights, should not be ignored even in multilevel models that account for random effects at the PSU and country levels (see forum post: [Weighting DRC Domestic violence Data in Multilevel Analysis](#)). Convergence can be a problem in complex multilevel models, and I am willing to accept that I may just have to come up with some alternative analysis strategy; however, before I move to that I want to confirm that the issue is not with my assumptions about the d005 probabilities/weighting/etc. After reading all of the documentation (e.g. notes on pooled DHS data) and forums I could find with regard to the weights, and, in particular, the dv weights, here are my lingering questions:

(1) does the d005 variable take into account the conditional sampling probabilities that are captured in v005 and similar weights? In more specific terms, is d005 the only sample-related weight that I need to include in my models?

(2) if d005/1000000, like v005/1000000, was a conditional probability why are many of the values not between 0 and 1? is that because they were adjusted for non-response (e.g. they are no longer probabilities)? what value are they summing to?

(3) can d005 be de-normalized in the same way as other weight variables, i.e. can d005 be de-normalized in the following way for each individual country in the pooled dataset (or prior to pooling)?

$$d005^* = [d005/1000000] \times [\text{pop of womn 15-49 in the indiv cntry at time of the survey}]/[\# \text{ of complete dv responses, e.g. } v044==1]$$

(4) similarly, can d005* be re-normalized to the pooled data in the following manner?

$$d005_renorm = d005^* \times [\# \text{ of complete pooled dv responses, e.g. } v044==1 \text{ in all cntries}]/[\text{pop of womn 15-49 in all cntries, e.g. sum of the tot pop of wmn 15-49 in all cntries from previous equation}]$$

(5) the iweight versus pweight commands in Stata seem to make a fairly important difference in the probability of model convergence and in the actual outcomes of the models. I have read in a few places that using the pweight command is more appropriate than the iweight command;

however, this does not make sense to me. Stata literature says that $pweight = 1/p$ *where p is a probability (between 0 and 1). The d005, d005* and d005_renorm weights are seemingly greater than 1 even after dividing by 1000000 (e.g. they do not seem to meet the definition of a probability); so, in this case, is it more appropriate to use the iweight command?

I would appreciate any comments or suggestions. Thanks!

P.S. In case it is somehow helpful, my models look something like this in stata:

Model 1 (empty/unconditional model): `melogit y [pweight = wgt_renorm] || cntry: || psu:`

Model 2 (indv fe only): `melogit y xi1 xi2 xi3 [pweight = wgt_renorm] || cntry: || psu:`

Model 3 (indv/comm fe/re): `melogit y xi1 xi2 xi3 xc1 xc2 xc3 [pweight = wgt_renorm] || cntry: || psu: xc1 xc2 xc3`

Model 4 (indv/comm/nat fe/re): `melogit y xi1 xi2 xi3 xc1 xc2 xc3 xn1 xn2 [pweight = wgt_renorm] || cntry: xn1 xn2 || psu: xc1 xc2 xc3`
