Description of MATLAB files for replication of Tables 7, 8, 9 and 10 in paper "Contracting under Uncertainty: Groundwater in South India" by Xavier Giné and Hanan G. Jacoby

The estimation and analysis codes use MATLAB.

<u>Estimation</u>

1) `rep_ml.m` This program runs the maximum likelihood estimation for the baseline parameterization of the model in Table 7.

   Uses data file `d_est_allhold_final.mat` and saves the estimated parameters in `Bparml_final.mat`.

2) `rep_ml4ac.m` Analogous program to `rep_ml.m` for the extended parameterization of the model in Table 7.

   Uses data file `d_est_allhold_final.mat` and saves the estimated parameters in `Bparml4ac_final.mat`.

<u>Analysis</u>

3) `rep_res_dat.m` This program computes the SEs using a bootstrap sample and computes the parameters and statistics reported in Tables 7, 8, 9 and 10.

   Uses data file `d_est_allhold_final.mat` and estimated parameters in `Bparml_final.mat` and saves the statistics and other variables in a structure called `Rres` in the file `Res_final.mat`

   The computation of SEs using bootstrap can take several days, and for some samples, the optimization routine can crash. For this reason, the structure `Rres` does not contain the matrix of parameters for all bootstrap samples. Rather, the file `ParM_final.txt` contain the estimated parameters of successful runs that are used in the actual computation of SEs reported in Table 7. A successful run is one where the optimization routines finds a set of parameters that is different from the starting values (set at the estimated parameters of Table 7 using the whole sample).

   The matrix in `Rres.Rese` contains the variables V_{Ui}, $V_{\kappa_{T=0}i}$, V_i, $\log I_i$, $SD(\log I_i)$ and η_i, where for each observation i, the variable is the average over draws of ε_i. Variable $SD(\log I_i)$ is the standard deviation of irrigated area I over draws of ε_i. All of these variables but for η_i are saved in `prediction_final.dta`. The first three variables (V_{Ui}, $V_{\kappa_{T=0}i}$ and V_i) are used in the computations of Table 10 and Figure 7.

4) `rep_res4ac_dat.m` Analogous program to `rep_res_dat.m` for the extended parameterization of the model in Table 7.

Uses data file `d_est_allhold_final.mat` and estimated parameters in `Bparml4ac_final.mat` and saves the statistics and other variables in a structure called `Rres` in the file `Res4ac_final.mat`. The file with successful bootstrap sample runs used for the computation of SEs are in `ParM4ac_final.txt`.

Results

5) `rep_res_tex.m` Produces latex tables from statistics and parameters in structure `Rres`. Note that `Rres` contains many more statistics than those used in Tables 7 – 9 in the paper.

Uses `Res_final.mat` and saves the tables in `res_final.tex`.

6) `rep_res4ac_tex.m` Analogous to `rep_res_tex.m`. One table appears in Online Appendix Table C.4.

Uses `Res4ac_final.mat` and saves the tables in `res4ac_final.tex`.

The rest of MATLAB files (with extension `.m`) are functions used by the routines described above.