



Research Memorandum 1/2018

GLD.gu.se/en/resources/memos/

Distance to Boreholes

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Main Take away

There is no significant relationship between the distance to boreholes and whether a respondent had NOT have enough to drink in the past week. (Only for the population who only have access to boreholes; n=1440.) However, more wealthy respondents report to have had enough to drink in the past week which is significant.

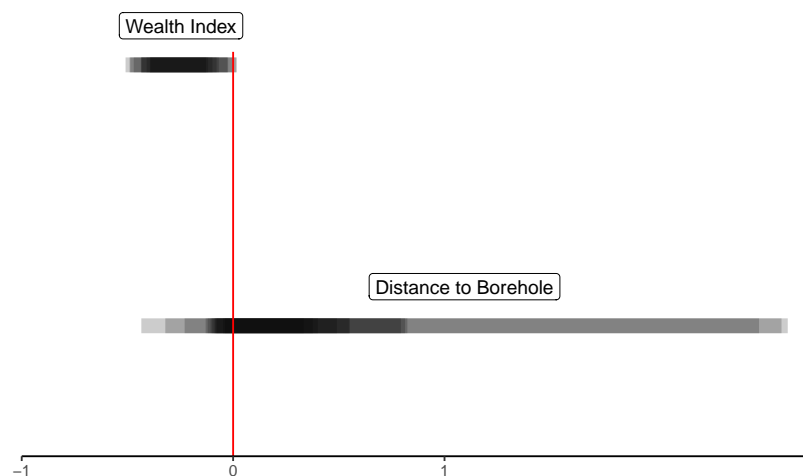


Figure 1: Coefficient plot of different models.

Descriptives

The landmark data accounts for 82 boreholes.

Where do household get their water from?

By far the most prominent water extraction is an open water well. Less than 2000 households report that they actually rely on open water wells. When leaving out the urban population, the numbers of open water well and borehole extractions do not decrease much.

Table 1: Water extraction by households. (Multiple answers were allowed)

Form of water extraction	All households	Rural households
Mineral water (bottled)	3	3
Water tap to home	640	129
Shared water tap at a common place	1142	423
Borehole	1863	1680
Open water well	3972	3820
Covered well	307	216
River/Lake water	538	533
Rain water	39	38
Other	50	35

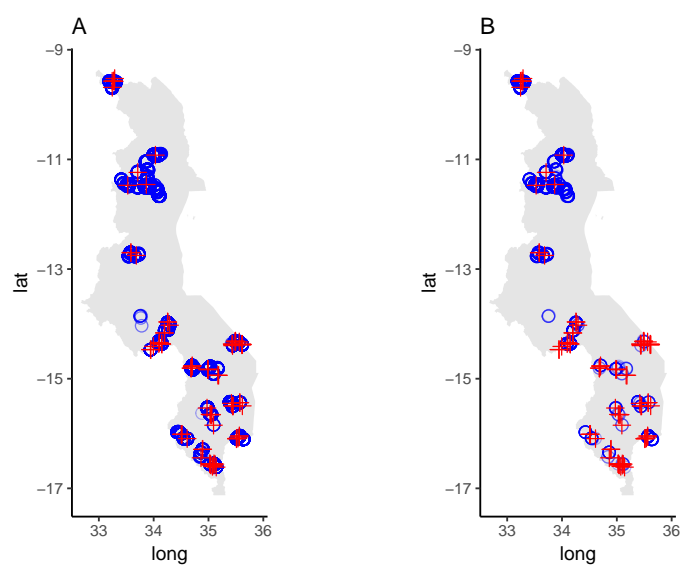


Figure 2: Respondents (blue dots) and boreholes (red crosses) in Malawi. Panel A includes all respondents. Panel B only includes respondents who extract water from boreholes and are located in a rural environment.

Location of boreholes and respondents

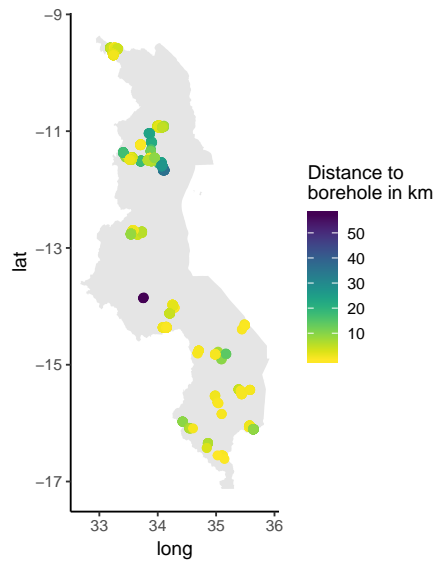


Figure 3: Distance to boreholes for respondents who are located in a rural environment and extract water from boreholes.

Regression tables

Table 2: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1): logit q429_2 distance2water_z educat_z items_MCA1d_z age_z q37_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Distance to Water	0.156	0.117	1.34	0.197	-0.089	0.401
Education	-0.008	0.197	-0.04	0.966	-0.422	0.405
Asset Index	-0.313	0.093	-3.35	0.003	-0.509	-0.118
Age	-0.041	0.147	-0.28	0.785	-0.349	0.267
Gender	-0.136	0.151	-0.90	0.380	-0.451	0.180

Table 3: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1): logit q429_2 distance2water_log_z educat_z items_MCA1d_z age_z q37_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Log of Distance to Water	0.214	0.160	1.34	0.196	-0.120	0.548
Education	-0.036	0.176	-0.21	0.838	-0.405	0.333
Asset Index	-0.307	0.086	-3.58	0.002	-0.486	-0.127
Age	-0.053	0.139	-0.38	0.706	-0.345	0.238
Gender	-0.138	0.145	-0.95	0.354	-0.442	0.166

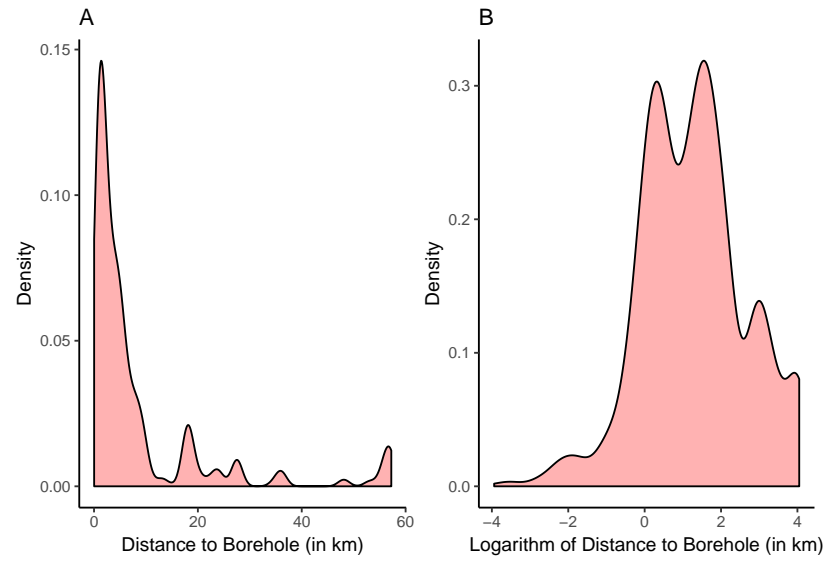


Figure 4: Density for the distance to boreholes (panel A) and logarithmized distance to boreholes (panel B). For both graphs, respondents that rely on the extraction of borehole water only were included.

Table 4: Stata regression output. (Stata command: "svy, subpop(if only-borehole==1&distance2water<10000): logit q429_2 distance2water_z educat_z items_MCA1d_z age_z q37_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Distance to Water	1.197	0.682	1.76	0.095	-0.229	2.624
Education	-0.169	0.189	-0.89	0.383	-0.564	0.227
Asset Index	-0.210	0.087	-2.41	0.026	-0.392	-0.027
Age	-0.146	0.129	-1.13	0.272	-0.416	0.124
Gender	-0.252	0.175	-1.44	0.166	-0.618	0.114

Table 5: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1&distance2water<10000): logit q429_2 distance2water_log_z educat_z items_MCA1d_z age_z q37_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Log of Distance to Water	0.392	0.206	1.90	0.072	-0.039	0.824
Education	-0.192	0.173	-1.11	0.282	-0.555	0.171
Asset Index	-0.209	0.088	-2.36	0.029	-0.394	-0.023
Age	-0.149	0.127	-1.18	0.254	-0.414	0.116
Gender	-0.249	0.177	-1.41	0.176	-0.619	0.122

Table 6: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1):
logit q429_2 distance2water_z items_MCA1d_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Distance to Water	0.164	0.102	1.62	0.122	-0.048	0.377
Asset Index	-0.284	0.098	-2.89	0.009	-0.490	-0.079

Table 7: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1):
logit q429_2 distance2water_log_z items_MCA1d_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Log of Distance to Water	0.223	0.157	1.42	0.173	-0.106	0.553
Asset Index	-0.284	0.089	-3.19	0.005	-0.470	-0.097

Table 8: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1):
logit q429_2 distance2water_log_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Log of Distance to Water	0.181	0.148	1.22	0.238	-0.13	0.491

Table 9: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1):
logit q429_2 distance2water_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Distance to Water	0.128	0.098	1.3	0.209	-0.078	0.334

Table 10: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1):
logit q429_2 items_MCA1d_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Asset Index	-0.239	0.082	-2.92	0.009	-0.41	-0.068

Table 11: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1&distance2water<10000):
logit q429_2 distance2water_z items_MCA1d_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Distance to Water	1.080	0.723	1.49	0.152	-0.434	2.594
Asset Index	-0.208	0.107	-1.94	0.067	-0.432	0.016

Table 12: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1&distance2water<10000): logit q429_2 distance2water_log_z items_MCA1d_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Log of Distance to Water	0.357	0.218	1.64	0.118	-0.099	0.813
Asset Index	-0.216	0.105	-2.05	0.054	-0.436	0.004

Table 13: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1&distance2water<10000): logit q429_2 distance2water_log_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Log of Distance to Water	0.355	0.21	1.69	0.107	-0.084	0.793

Table 14: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1&distance2water<10000): logit q429_2 distance2water_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Distance to Water	1.084	0.671	1.62	0.123	-0.321	2.488

Table 15: Stata regression output. (Stata command: "svy, subpop(if onlyborehole==1&distance2water<10000): logit q429_2 items_MCA1d_z")

Variables	Coef.	Std. Err.	t	P> t	[95% Con	f. Interval]
Asset Index	-0.21	0.108	-1.95	0.067	-0.435	0.016

Annex

sessionInfo()

```
## R version 3.5.1 (2018-07-02)
## Platform: x86_64-w64-mingw32/x64 (64-bit)
## Running under: Windows 7 x64 (build 7601) Service Pack 1
##
## Matrix products: default
##
## locale:
## [1] LC_COLLATE=English_United States.1252
## [2] LC_CTYPE=English_United States.1252
## [3] LC_MONETARY=English_United States.1252
## [4] LC_NUMERIC=C
## [5] LC_TIME=English_United States.1252
##
## attached base packages:
## [1] stats      graphics  grDevices  utils      datasets  methods    base
##
## other attached packages:
##  [1] bindrcpp_0.2.2          gdistance_1.2-2
##  [3] Matrix_1.2-14          igraph_1.2.2
##  [5] raster_2.6-7           xlsx_0.6.1
##  [7] data.table_1.11.4      viridis_0.5.1
##  [9] viridisLite_0.3.0      gridExtra_2.3
## [11] rgdal_1.3-4            sp_1.3-1
## [13] rgeos_0.3-28           knitr_1.20
## [15] readstata13_0.9.2      ggplot2_3.0.0
## [17] dplyr_0.7.6            sebstoolkit2_0.0.0.9000
##
## loaded via a namespace (and not attached):
##  [1] tidyselect_0.2.4 purrr_0.2.5      rJava_0.9-10      lattice_0.20-35
##  [5] colorspace_1.3-2 htmltools_0.3.6  yaml_2.2.0        rlang_0.2.2
##  [9] pillar_1.3.0     glue_1.3.0       withr_2.1.2       pryr_0.1.4
## [13] bindr_0.1.1      plyr_1.8.4       stringr_1.3.1     munsell_0.5.0
## [17] gtable_0.2.0     rvest_0.3.2      codetools_0.2-15  kableExtra_0.9.0
## [21] evaluate_0.11    xlsxjars_0.6.1   highr_0.7         Rcpp_0.12.18
## [25] readr_1.1.1      scales_1.0.0     backports_1.1.2   hms_0.4.2
## [29] digest_0.6.16    stringi_1.1.7    grid_3.5.1        rprojroot_1.3-2
## [33] tools_3.5.1      magrittr_1.5     lazyeval_0.2.1    tibble_1.4.2
## [37] crayon_1.3.4     pkgconfig_2.0.2  xml2_1.2.0        httr_1.3.1
## [41] rstudioapi_0.7   assertthat_0.2.0 rmarkdown_1.10    R6_2.2.2
## [45] compiler_3.5.1
```