

Estimate Correlation

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Correlation estimation strategy

- For $s = 1, \dots, S$:
 - Input DGP parameters, including assumed correlation ρ .
 - Generate full simulated data.
 - Generate treatment assignments and observed data.
 - Calculate t statistics from regressions for each outcome. So for M outcomes, we have a M -vector of test statistics.
- Returns a matrix of test statistics $S \times M$.

Next:

- Calculate correlation of matrix of test statistics.
- Take upper triangle of matrix and take average.
- Returns a single mean estimated correlation.

Code

The following function returns the $S \times M$ matrix of test statistics:

```
get_rawt <- function(d_m, model.params.list, Tbar, n.sims = 100)
{
  M <- model.params.list$M
  rawt.all <- matrix(NA, nrow = n.sims, ncol = M)
  dgp.params.list <- PUMP::convert_params(model.params.list)

  # number of simulations
  for(s in 1:n.sims)
  {
    if (s %% 20 == 0){ message(paste0("Now processing simulation ", s, " of ", n.sims)) }

    # generate simulated data
    samp.full <- PUMP::gen_full_data(dgp.params.list)
    S.id <- samp.full$ID$S.id
    D.id <- samp.full$ID$D.id

    # generate treatment assignments
    T.x <- PUMP::gen_T.x(d_m = d_m,
                        S.id = S.id, D.id = D.id,
                        nbar = dgp.params.list$nbar,
                        Tbar = 0.5)
```

```

# convert full data to observed data
samp.obs <- samp.full
samp.obs$Yobs <- PUMP::gen_Yobs(samp.full, T.x)

# calculate t statistics
dat.all <- makelist_samp(samp.obs, T.x)
rawpt.out <- get_rawpt(dat.all, d_m = d_m, model.params.list = model.params.list)
rawt <- sapply(rawpt.out[['rawpt']], function(s){ return(s[['tstat']])})
rawt.all[s,] <- rawt
}

return(rawt.all)
}

```

The following function takes in the matrix of test statistics and returns the estimated correlation.

```

get_cor <- function(rawt.all)
{

# calculate correlation
cor.tstat <- cor(rawt.all)
est.cor <- cor.tstat[lower.tri(cor.tstat)]
mean.est.cor <- mean(est.cor)

return(mean.est.cor)
}

```

Simulation Results

d_m	input.rho	output.rho	n.sims
d2.1_m2fr	0.1	0.475	1000
d2.1_m2fr	0.5	0.507	1000
d2.1_m2fr	0.8	0.458	1000
d2.2_m2rc	0.1	0.496	1000
d2.2_m2rc	0.5	0.453	1000
d2.2_m2rc	0.8	0.501	1000
d3.1_m3rr2rr	0.1	0.372	1000
d3.1_m3rr2rr	0.5	0.412	1000
d3.1_m3rr2rr	0.8	0.357	1000
d3.2_m3rr2rc	0.1	0.490	1000
d3.2_m3rr2rc	0.5	0.450	1000
d3.2_m3rr2rc	0.8	0.497	1000