Table 2 - Per Capita Consumption

2022-03-15

**per capita consumption**: This is the basic bechmarking model utilzing the default, uninformed priors

per\_cap\_consumption\_Bayesmodel <-  
 brm(formula = consumption\_asinh | weights(samp\_wgt) ~  
 cost\_deviation + treat\_any + treat\_GK +  
 consumption\_asinh\_R1 + Lhh\_wealth\_asinh + Lvill\_eligible\_ratio +  
 (1 | block) + (1 | vid),  
 data = per\_cap\_consumption\_data,  
 family = gaussian("identity"),  
 seed = 1272022,  
 warmup = 1000,  
 iter = 2000,  
 thin = 1,  
 control = list(adapt\_delta = .95, max\_treedepth = 10),  
 #backend = "cmdstanr",  
 cores = 4, #overrides default 1 core  
 #threads = 3,need to get cmdstanr package working here  
 save\_pars = save\_pars(all = TRUE), # potentially allows for more post-processing functionality  
 file = "uninformed\_prior\_outcomes\\per\_cap\_consumption\_Bayes")

Model Summery

summary(per\_cap\_consumption\_Bayesmodel)

## Family: gaussian   
## Links: mu = identity; sigma = identity   
## Formula: consumption\_asinh | weights(samp\_wgt) ~ cost\_deviation + treat\_any + treat\_GK + consumption\_asinh\_R1 + Lhh\_wealth\_asinh + Lvill\_eligible\_ratio + (1 | block) + (1 | vid)   
## Data: per\_cap\_consumption\_data (Number of observations: 1750)   
## Draws: 4 chains, each with iter = 2000; warmup = 1000; thin = 1;  
## total post-warmup draws = 4000  
##   
## Group-Level Effects:   
## ~block (Number of levels: 22)   
## Estimate Est.Error l-95% CI u-95% CI Rhat Bulk\_ESS Tail\_ESS  
## sd(Intercept) 0.27 0.06 0.17 0.39 1.00 1397 2021  
##   
## ~vid (Number of levels: 248)   
## Estimate Est.Error l-95% CI u-95% CI Rhat Bulk\_ESS Tail\_ESS  
## sd(Intercept) 0.38 0.03 0.33 0.44 1.00 1931 2534  
##   
## Population-Level Effects:   
## Estimate Est.Error l-95% CI u-95% CI Rhat Bulk\_ESS  
## Intercept 8.52 0.19 8.16 8.89 1.00 3533  
## cost\_deviation 0.00 0.00 0.00 0.00 1.00 2814  
## treat\_any 0.11 0.08 -0.06 0.27 1.00 2121  
## treat\_GK -0.13 0.08 -0.30 0.03 1.00 2005  
## consumption\_asinh\_R1 0.18 0.01 0.16 0.21 1.00 7235  
## Lhh\_wealth\_asinh 0.02 0.00 0.01 0.03 1.00 8408  
## Lvill\_eligible\_ratio 0.16 0.34 -0.50 0.83 1.00 1748  
## Tail\_ESS  
## Intercept 2753  
## cost\_deviation 2818  
## treat\_any 2844  
## treat\_GK 2553  
## consumption\_asinh\_R1 3135  
## Lhh\_wealth\_asinh 2906  
## Lvill\_eligible\_ratio 2304  
##   
## Family Specific Parameters:   
## Estimate Est.Error l-95% CI u-95% CI Rhat Bulk\_ESS Tail\_ESS  
## sigma 1.16 0.01 1.14 1.19 1.00 7158 2934  
##   
## Draws were sampled using sampling(NUTS). For each parameter, Bulk\_ESS  
## and Tail\_ESS are effective sample size measures, and Rhat is the potential  
## scale reduction factor on split chains (at convergence, Rhat = 1).

Prior summery - how informative are priors

prior\_summary(per\_cap\_consumption\_Bayesmodel)

## prior class coef group resp dpar nlpar  
## (flat) b   
## (flat) b consumption\_asinh\_R1   
## (flat) b cost\_deviation   
## (flat) b Lhh\_wealth\_asinh   
## (flat) b Lvill\_eligible\_ratio   
## (flat) b treat\_any   
## (flat) b treat\_GK   
## student\_t(3, 10.7, 2.5) Intercept   
## student\_t(3, 0, 2.5) sd   
## student\_t(3, 0, 2.5) sd block   
## student\_t(3, 0, 2.5) sd Intercept block   
## student\_t(3, 0, 2.5) sd vid   
## student\_t(3, 0, 2.5) sd Intercept vid   
## student\_t(3, 0, 2.5) sigma   
## bound source  
## default  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## default  
## default  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## default

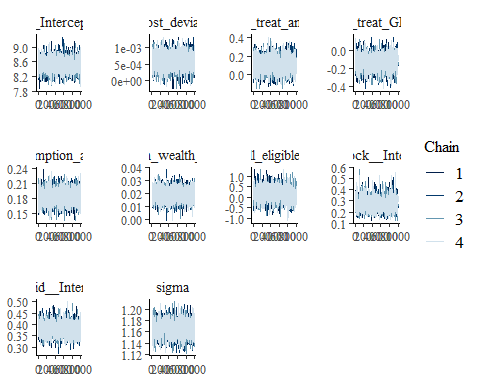
check\_prior(per\_cap\_consumption\_Bayesmodel)

## Warning: Some priors could not be simulated.

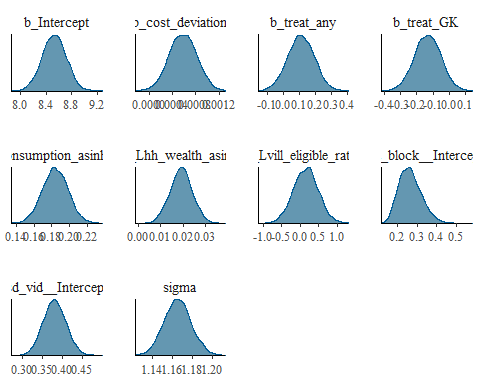
## Parameter Prior\_Quality  
## 1 b\_Intercept uninformative  
## 2 b\_cost\_deviation not determinable  
## 3 b\_treat\_any not determinable  
## 4 b\_treat\_GK not determinable  
## 5 b\_consumption\_asinh\_R1 not determinable  
## 6 b\_Lhh\_wealth\_asinh not determinable  
## 7 b\_Lvill\_eligible\_ratio not determinable

Diagnostics

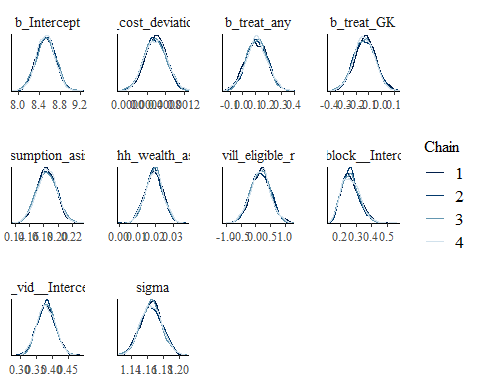
# trace diagnostic plot  
mcmc\_trace(per\_cap\_consumption\_Bayesmodel, n\_warmup = 0,  
 pars = c("b\_Intercept", "b\_cost\_deviation", "b\_treat\_any",   
 "b\_treat\_GK", "b\_consumption\_asinh\_R1", "b\_Lhh\_wealth\_asinh",  
 "b\_Lvill\_eligible\_ratio", "sd\_block\_\_Intercept",   
 "sd\_vid\_\_Intercept", "sigma"))



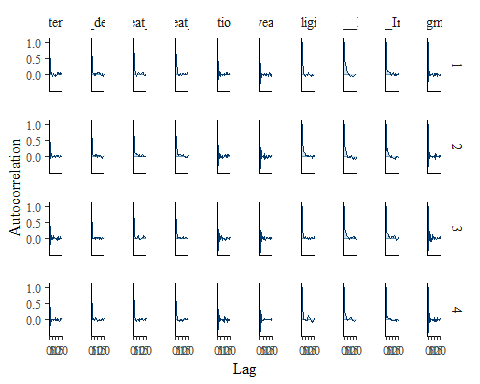
ggsave("table\_2\_diagnostics\\per\_cap\_consumption\_trace.png", plot = last\_plot(), width = 12, height = 5)  
  
  
#density diagnostic plot  
mcmc\_dens(per\_cap\_consumption\_Bayesmodel,  
 pars = c("b\_Intercept", "b\_cost\_deviation", "b\_treat\_any",   
 "b\_treat\_GK", "b\_consumption\_asinh\_R1", "b\_Lhh\_wealth\_asinh",  
 "b\_Lvill\_eligible\_ratio", "sd\_block\_\_Intercept",   
 "sd\_vid\_\_Intercept", "sigma"))



ggsave("table\_2\_diagnostics\\per\_cap\_consumption\_dens.png", plot = last\_plot(), width = 12, height = 5)  
  
mcmc\_dens\_overlay(per\_cap\_consumption\_Bayesmodel,  
 pars = c("b\_Intercept", "b\_cost\_deviation", "b\_treat\_any",   
 "b\_treat\_GK", "b\_consumption\_asinh\_R1", "b\_Lhh\_wealth\_asinh",  
 "b\_Lvill\_eligible\_ratio", "sd\_block\_\_Intercept",   
 "sd\_vid\_\_Intercept", "sigma"))



ggsave("table\_2\_diagnostics\\per\_cap\_consumption\_overlay.png", plot = last\_plot(), width = 12, height = 5)  
  
  
#acf (auto-correlation) diagnostic plot  
mcmc\_acf(per\_cap\_consumption\_Bayesmodel,  
 pars = c("b\_Intercept", "b\_cost\_deviation", "b\_treat\_any",   
 "b\_treat\_GK", "b\_consumption\_asinh\_R1", "b\_Lhh\_wealth\_asinh",  
 "b\_Lvill\_eligible\_ratio", "sd\_block\_\_Intercept",   
 "sd\_vid\_\_Intercept", "sigma"))

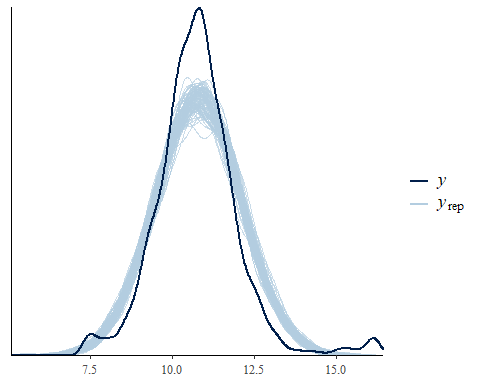


ggsave("table\_2\_diagnostics\\per\_cap\_consumption\_acf.png", plot = last\_plot(), width = 12, height = 5)

posterior predictive checks

pp\_check(per\_cap\_consumption\_Bayesmodel, nsamples = 100)

## Warning: Argument 'nsamples' is deprecated. Please use argument 'ndraws'  
## instead.



pp\_check(per\_cap\_consumption\_Bayesmodel, nsamples = 10, type = 'error\_scatter\_avg', alpha = .1)

## Warning: Argument 'nsamples' is deprecated. Please use argument 'ndraws'  
## instead.

