Table 2 - Productive Assets

2022-03-16

Load the **productive assets** model variables

**productive assets**: This is the basic benchmarking model utilizing the default, uninformed priors

productive\_assets\_bayesmodel <-  
 brm(formula = productiveassets\_asinh | weights(samp\_wgt) ~  
 cost\_deviation + treat\_any + treat\_GK +  
 productiveassets\_asinh\_R1 + Lhh\_wealth\_asinh + Lvill\_eligible\_ratio +  
 Lconsumpti\_x\_Lassetscon +  
 (1 | block) + (1 | vid),  
 data = productive\_assets\_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\\productive\_assets\_bayes")

Model Summery

summary(productive\_assets\_bayesmodel)

## Family: gaussian   
## Links: mu = identity; sigma = identity   
## Formula: productiveassets\_asinh | weights(samp\_wgt) ~ cost\_deviation + treat\_any + treat\_GK + productiveassets\_asinh\_R1 + Lhh\_wealth\_asinh + Lvill\_eligible\_ratio + Lconsumpti\_x\_Lassetscon + (1 | block) + (1 | vid)   
## Data: productive\_assets\_data (Number of observations: 1751)   
## 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) 0.34 0.07 0.22 0.51 1.00 1725 2455  
##   
## ~vid (Number of levels: 248)   
## Estimate Est.Error l-95% CI u-95% CI Rhat Bulk\_ESS Tail\_ESS  
## sd(Intercept) 0.43 0.04 0.36 0.51 1.00 1686 2826  
##   
## Population-Level Effects:   
## Estimate Est.Error l-95% CI u-95% CI Rhat Bulk\_ESS  
## Intercept 6.90 0.21 6.50 7.31 1.00 5301  
## cost\_deviation 0.00 0.00 0.00 0.00 1.00 4537  
## treat\_any 0.37 0.10 0.17 0.56 1.00 3377  
## treat\_GK -0.27 0.10 -0.47 -0.07 1.00 3520  
## productiveassets\_asinh\_R1 0.33 0.02 0.30 0.36 1.00 7625  
## Lhh\_wealth\_asinh -0.00 0.01 -0.01 0.01 1.00 10011  
## Lvill\_eligible\_ratio 0.12 0.39 -0.65 0.90 1.00 3244  
## Lconsumpti\_x\_Lassetscon 0.01 0.00 0.00 0.01 1.00 4606  
## Tail\_ESS  
## Intercept 3001  
## cost\_deviation 3053  
## treat\_any 3211  
## treat\_GK 3132  
## productiveassets\_asinh\_R1 3385  
## Lhh\_wealth\_asinh 3507  
## Lvill\_eligible\_ratio 3218  
## Lconsumpti\_x\_Lassetscon 2829  
##   
## Family Specific Parameters:   
## Estimate Est.Error l-95% CI u-95% CI Rhat Bulk\_ESS Tail\_ESS  
## sigma 1.50 0.02 1.47 1.53 1.00 7948 3108  
##   
## 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(productive\_assets\_bayesmodel)

## prior class coef group resp dpar  
## (flat) b   
## (flat) b cost\_deviation   
## (flat) b Lconsumpti\_x\_Lassetscon   
## (flat) b Lhh\_wealth\_asinh   
## (flat) b Lvill\_eligible\_ratio   
## (flat) b productiveassets\_asinh\_R1   
## (flat) b treat\_any   
## (flat) b treat\_GK   
## student\_t(3, 11.4, 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   
## nlpar bound source  
## default  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## default  
## default  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## (vectorized)  
## default

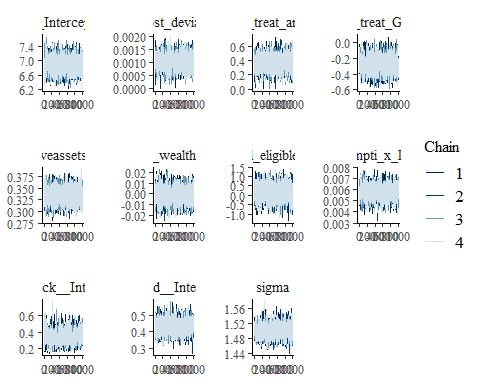
check\_prior(productive\_assets\_bayesmodel)

## Warning: Some priors could not be simulated.

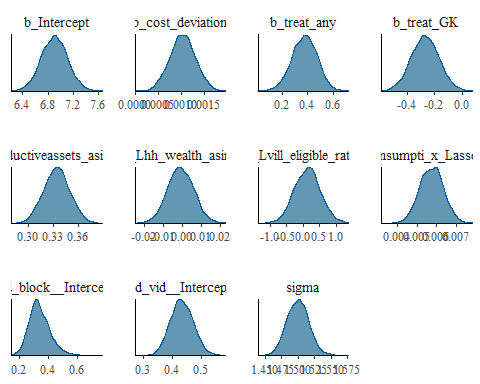
## Parameter Prior\_Quality  
## 1 b\_Intercept uninformative  
## 2 b\_cost\_deviation not determinable  
## 3 b\_treat\_any not determinable  
## 4 b\_treat\_GK not determinable  
## 5 b\_productiveassets\_asinh\_R1 not determinable  
## 6 b\_Lhh\_wealth\_asinh not determinable  
## 7 b\_Lvill\_eligible\_ratio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

Diagnostics

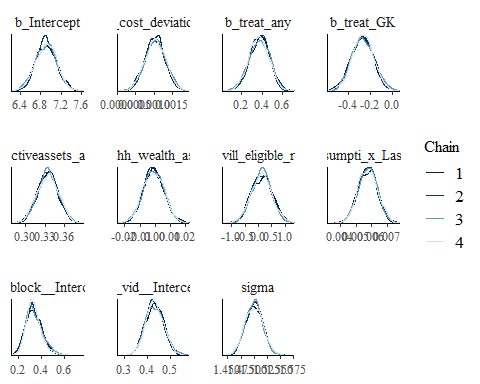
# trace diagnostic plot  
mcmc\_trace(productive\_assets\_bayesmodel, n\_warmup = 0,  
 pars = c("b\_Intercept", "b\_cost\_deviation", "b\_treat\_any", "b\_treat\_GK",  
 "b\_productiveassets\_asinh\_R1", "b\_Lhh\_wealth\_asinh", "b\_Lvill\_eligible\_ratio",  
 "b\_Lconsumpti\_x\_Lassetscon",  
 "sd\_block\_\_Intercept", "sd\_vid\_\_Intercept", "sigma"))



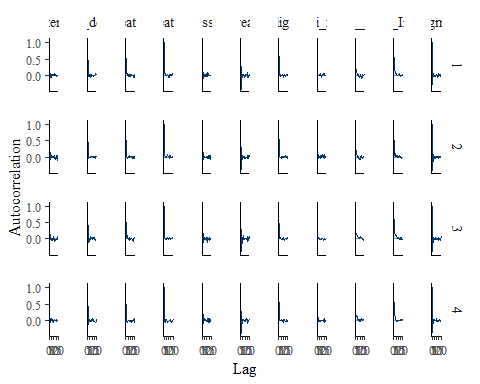
ggsave("table\_2\_diagnostics\\productive\_assets\_trace.png", plot = last\_plot(), width = 12, height = 5)  
  
#density diagnostic plots  
mcmc\_dens(productive\_assets\_bayesmodel,  
 pars = c("b\_Intercept", "b\_cost\_deviation", "b\_treat\_any", "b\_treat\_GK",  
 "b\_productiveassets\_asinh\_R1", "b\_Lhh\_wealth\_asinh", "b\_Lvill\_eligible\_ratio",  
 "b\_Lconsumpti\_x\_Lassetscon",  
 "sd\_block\_\_Intercept", "sd\_vid\_\_Intercept", "sigma"))



ggsave("table\_2\_diagnostics\\productive\_assets\_dens.png", plot = last\_plot(), width = 12, height = 5)  
  
mcmc\_dens\_overlay(productive\_assets\_bayesmodel,  
 pars = c("b\_Intercept", "b\_cost\_deviation", "b\_treat\_any", "b\_treat\_GK",  
 "b\_productiveassets\_asinh\_R1", "b\_Lhh\_wealth\_asinh", "b\_Lvill\_eligible\_ratio",  
 "b\_Lconsumpti\_x\_Lassetscon",  
 "sd\_block\_\_Intercept", "sd\_vid\_\_Intercept", "sigma"))



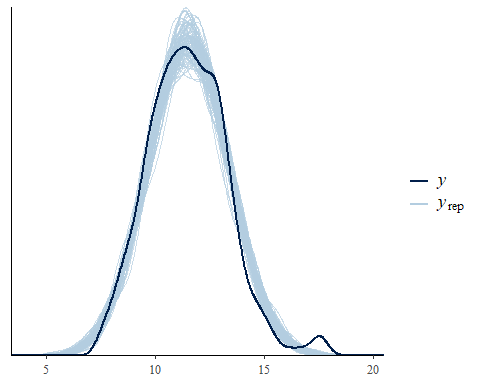
ggsave("table\_2\_diagnostics\\productive\_assets\_dens\_overlay.png", plot = last\_plot(), width = 12, height = 5)  
  
#acf (auto-correlation) diagnostic plot  
mcmc\_acf(productive\_assets\_bayesmodel,  
 pars = c("b\_Intercept", "b\_cost\_deviation", "b\_treat\_any", "b\_treat\_GK",  
 "b\_productiveassets\_asinh\_R1",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



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

posterior predictive checks

pp\_check(productive\_assets\_bayesmodel, ndraws = 100)



pp\_check(productive\_assets\_bayesmodel, ndraws = 10, type = 'error\_scatter\_avg', alpha = .1)

