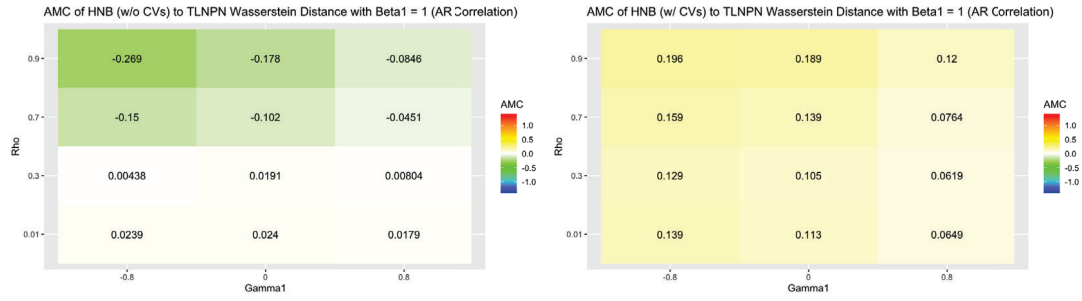**Figure 20.** These heatmaps compare the performance of the HNB model to the TLNPN model through our summary measure arithmetic mean change (AMC) given in **Equation 3** when $\beta_1 = 1$.
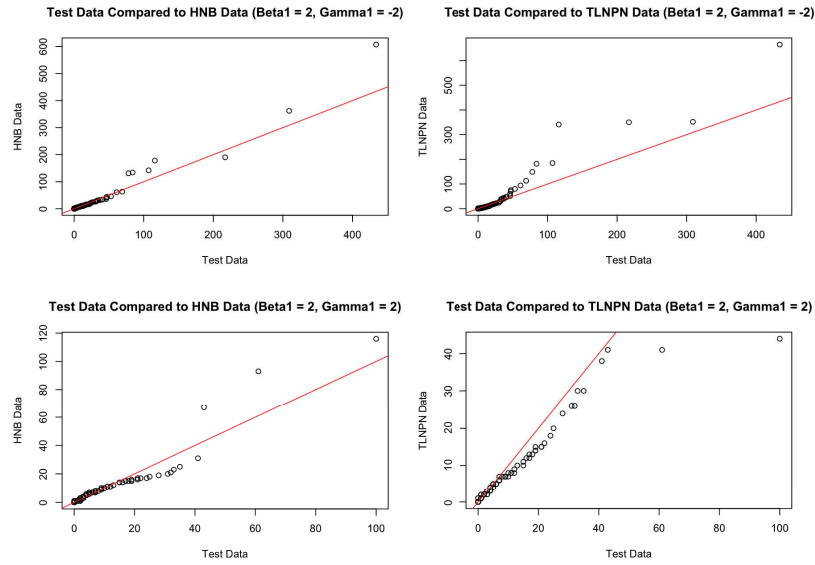

Figure 21. This shows the scatterplots of the test data against the TLNPN and HNB simulated data under varying γ_1 conditions.
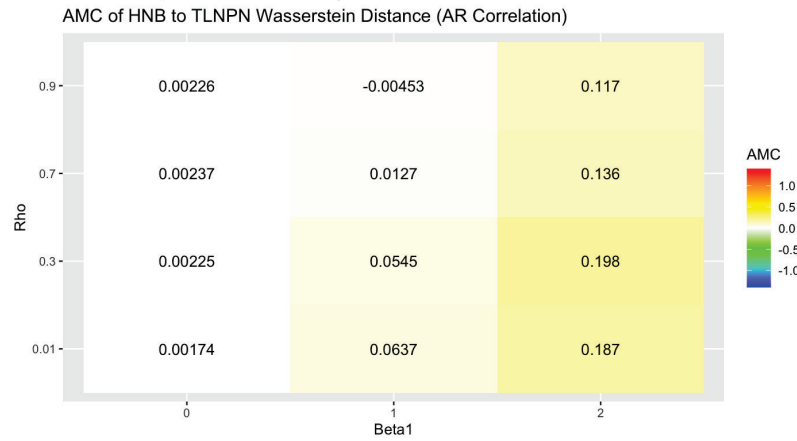

Figure 22. This figure shows a heatmap comparing the performance of the TLNPN model to the HNB model (fitted with and without covariates) under HNB population data with an AR covariance matrix for the covariates.
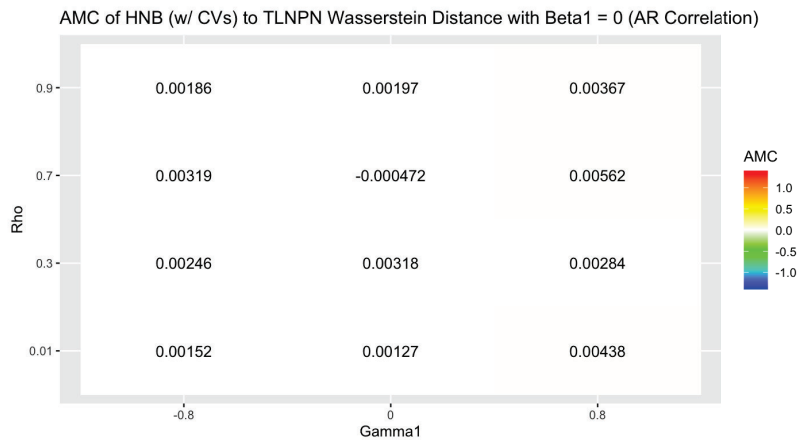
Figure 23. This figure shows no difference in performance between the HNB model fitted with covariates and TLNPN models when $\beta_1 = 0$
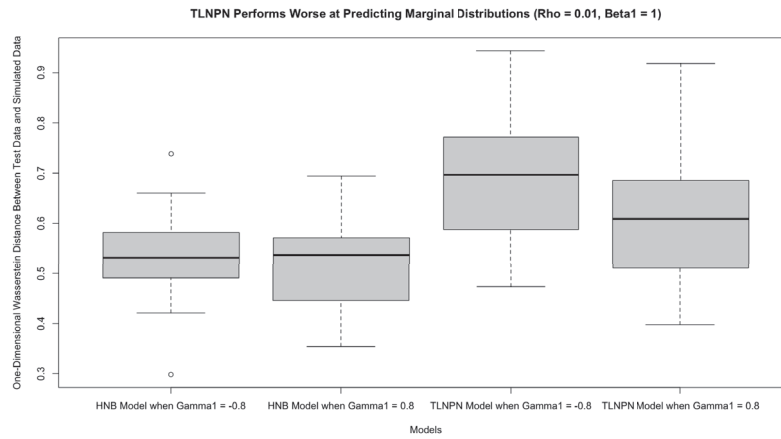

Figure 24. This figure shows the difference in the TLNPN model predicting marginal distributions as compared to the HNB model under varying γ_1 conditions when $\beta_1 = 1$.
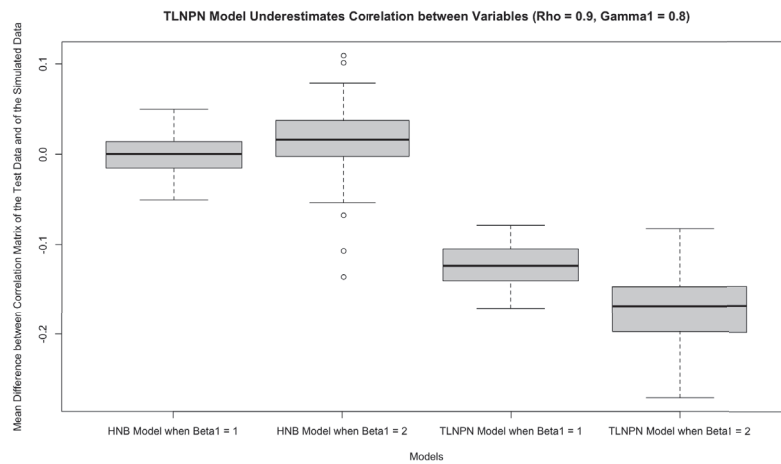

Figure 25. This figure shows the difference in the correlation matrices under varying β_1 conditions and models.