

vary_distribution

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Behavior of raw wpd (weighted pairwise distances)

Simulation study

We conduct simulations to understand the behavior of raw WPD for different parameters l_x (levels of x-axis), l_f (levels of facets), λ (tuning parameter), ω (increment in each panel design) *data* (data sets), *sample-size* (tuning parameter), *nsim* (number of simulations), *nperm* (number of permutations (might not need depending on if norm works) and designs

D_{null} (No difference in distribution)

D_{var_f} (Difference in distribution only across facets)

D_{var_x} (Difference in distribution only across x-axis)

$D_{var_{all}}$ (Difference in distribution in both facets and x-axis)

Location and scale of the distribution under null design

Null design only where all combinations are equal for fixed values of μ and σ Dist 1: $N(0, 1)$ individual graph Dist 2: $N(\mu, 1)$ (faceted with different values of μ : not yet just for one value now) Dist 3: $N(0, \sigma)$ (faceted with different values of σ : not yet just for one value now) Dist 4: $N(\mu, \sigma)$ faceted with different values of μ and σ , for all levels of x and facet to see how value of wpd changes with that of change in parameters.

Objective: 1. Behavior of wpd under different null designs $N(0,1)$, $N(5, 1)$, $\text{Gamma}(0.5,1)$, $\text{Gamma}(2,1)$ for different n_x and n_{facets} . Here, we have to fix a value of $\lambda = 0.67$.

Assumptions: There is no difference in distribution between any facet or x -category $n_{\text{sim}} = 200$ $\lambda = 0.67$

Questions: - How raw value of wpd changes with different n_x and n_{facet} for different location and scale of a Normal and non-normal distribution

Standard normal distribution

Comparing normal distributions with different means

Gamma Distribution with different locations

Gamma Distribution with different locations after quantile transformation

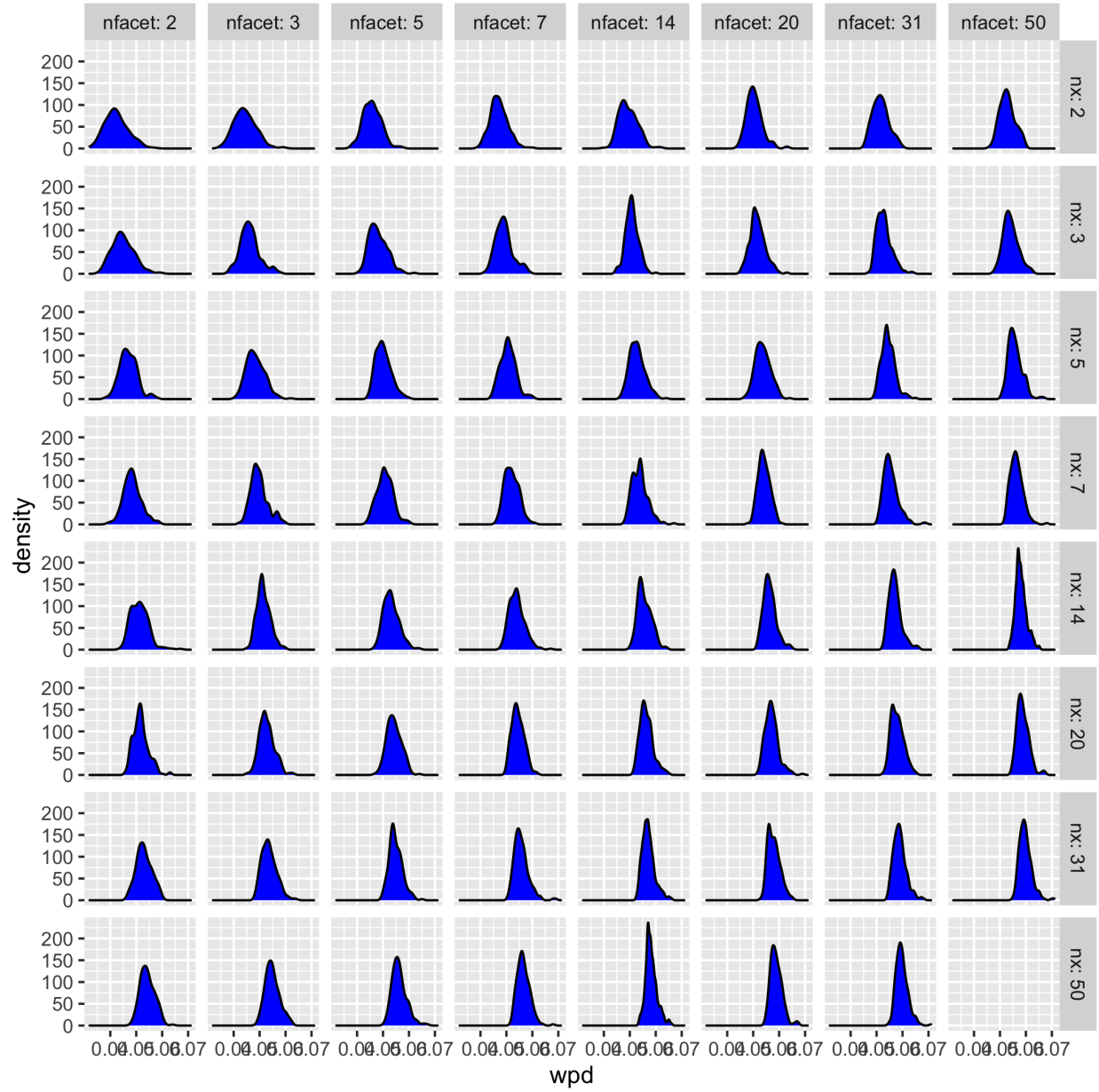


Figure 1: Density plots of raw wpd is shown for $N(0,1)$ distribution. The densities change across different facet and x levels, which implies wpd value changes with increasing and facet levels

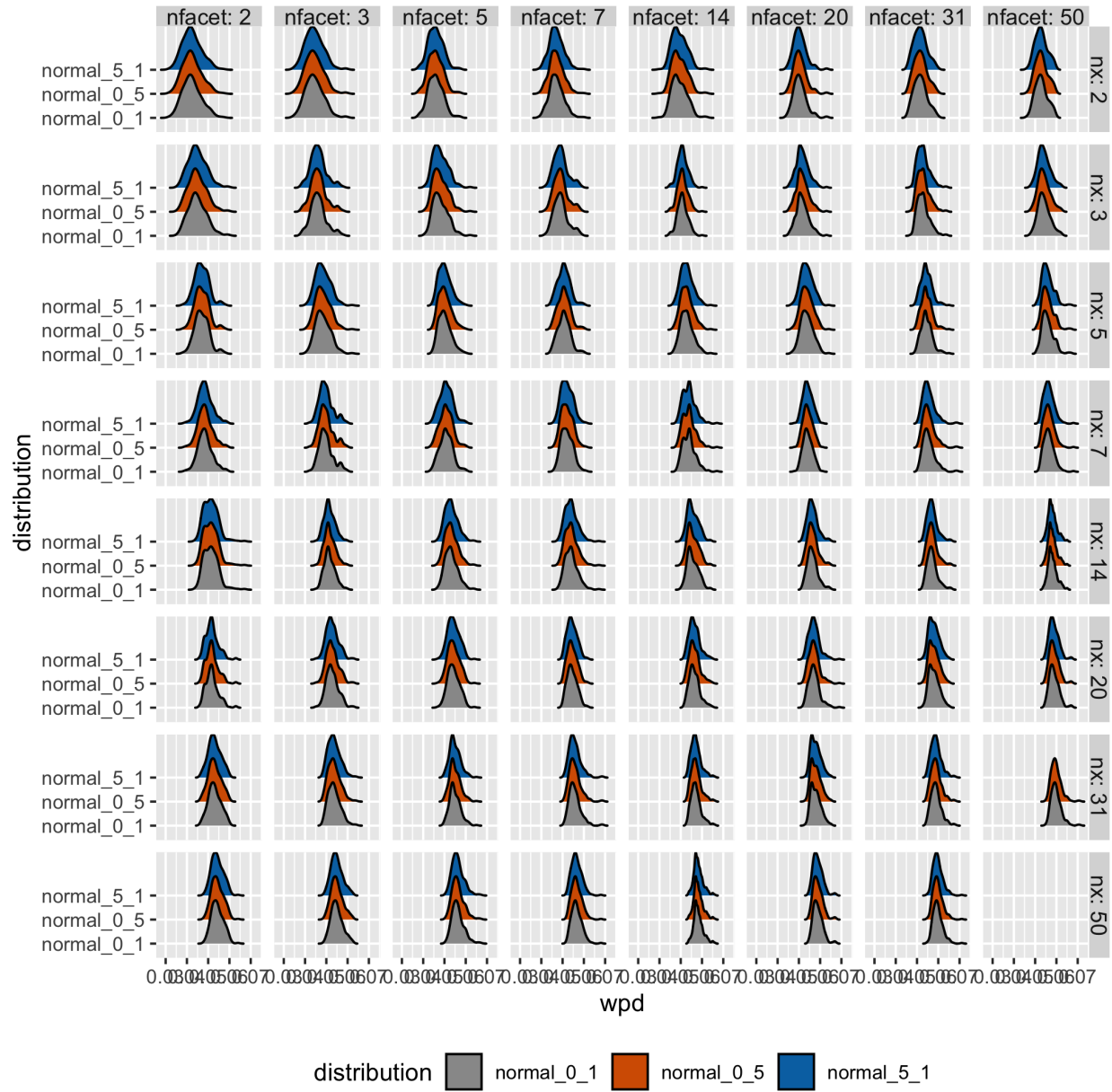


Figure 2: Ridge plots of raw wpd is shown for $N(0,1)$ and $N(5,1)$ distribution. The densities change across different facet and x levels but look same for the two distributions, which implies wpd value is unaffected by the change in mean value of the normal distribution

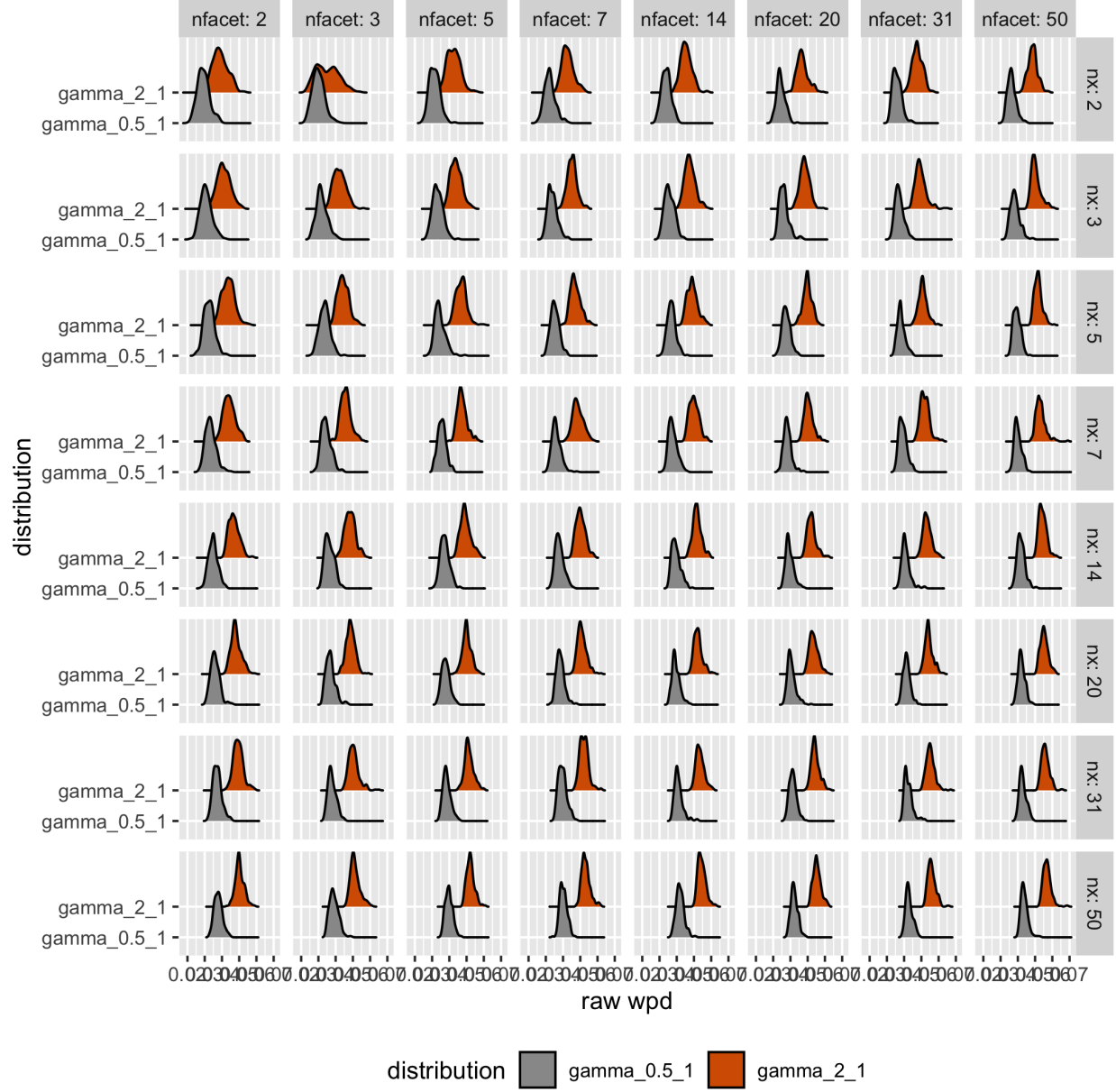


Figure 3: Ridge plots of raw wpd is shown for $G(0.5,1)$ and $G(2,1)$ distribution. The densities change across different facet and x levels and also for the two distributions, which implies wpd value is affected by the change in location value when distributions are not normal.

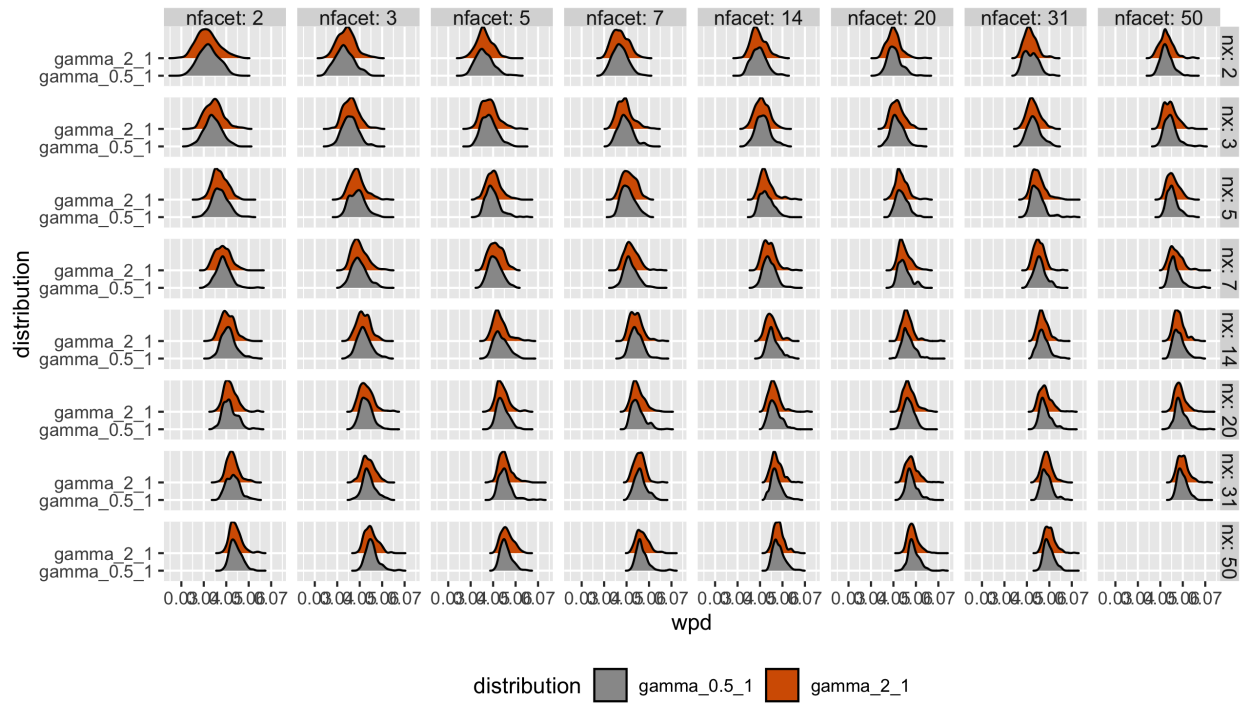


Figure 4: Ridge plots of raw wpd is shown for $G(0.5,1)$ and $G(2,1)$ distribution after quantile transformation looks similar and hence is unaffected by change in location