



Figure S8: Distribution of the estimated  $XtX$  of the SNPs as a function of their underlying regression coefficient  $\beta_i$  from analyses under different model parameterizations (same as Figure S6 except that  $\Omega = \widehat{\Omega}_{HSA}^{benv}$  for SpaH and  $\Omega = \widehat{\Omega}_{BTA}^{benv}$  for SpaB data). For a given scenario (SpaH and SpaB), results from the ten replicates are combined. In each plot, the solid line represent the theoretical expectation of the  $XtX$  statistic (i.e., the number of populations  $J$ ) and the dashed line the 1% threshold defined using values obtained for SNPs with  $\beta_i = 0$ .