

**Figure S3** Comparison of  $P$ -values between heteroskedastic joint analysis and population GWA. Q–Q plot for comparison of  $P$ -values obtained from: a. Joint-analysis ( $x$ -axis) vs GWA in commercial population ( $y$ -axis); b. Joint-analysis ( $x$ -axis) vs GWA in MARC population ( $y$ -axis); c. Joint-analysis ( $x$ -axis) vs GWA in MSUPRP ( $y$ -axis).

