Supplementary Materials of

Mining for gene-environment and gene-gene interactions: parametric and non-parametric tests for detecting variance quantitative trait loci

Short title: Detecting variance quantitative trait loci

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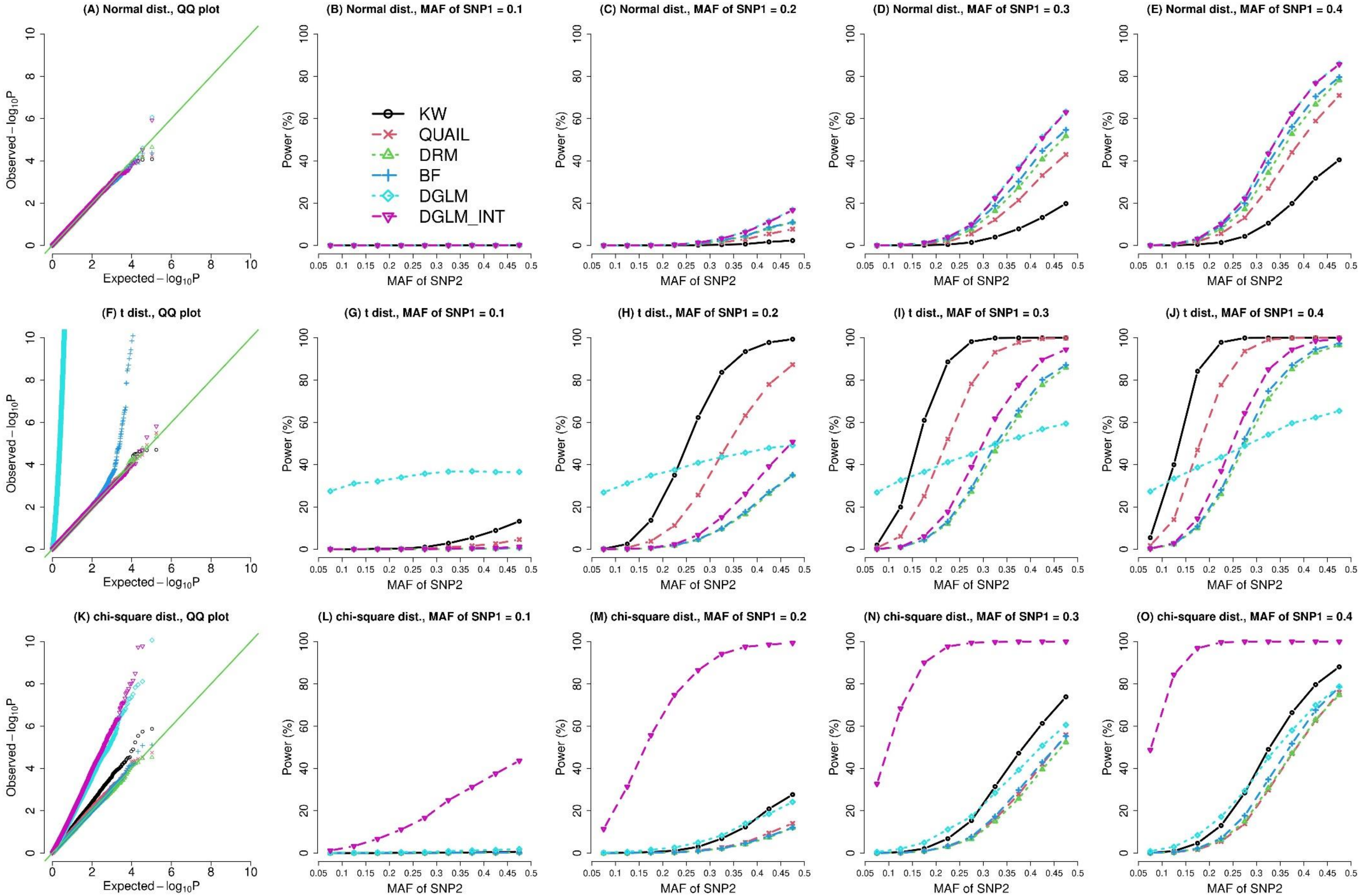


Figure S1. QQ plots (the left column) and power (α = 5E-8; columns 2-5) for vQTL tests (*N* = 30000; without SNP main effects)

The distribution for the error term: (top row) a standard normal distribution; (middle row) a *t* distribution with the degrees of freedom 3; (bottom row) a chi-square distribution with the degrees of freedom 6.

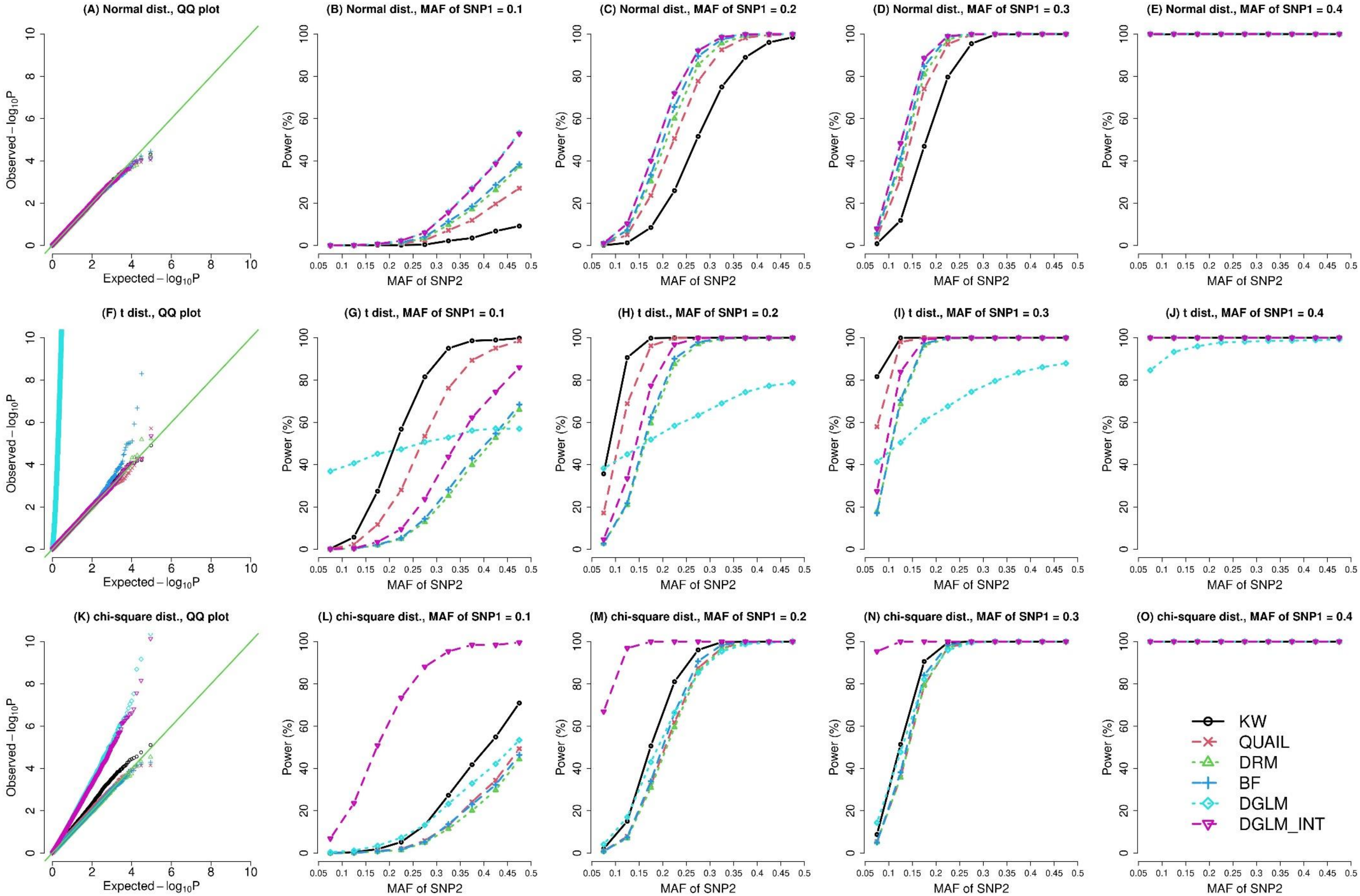


Figure S2. QQ plots (the left column) and power (α = 5E-8; columns 2-5) for vQTL tests (N = 147836; with SNP main effects)

The distribution for the error term: (top row) a standard normal distribution; (middle row) a *t* distribution with the degrees of freedom 3; (bottom row) a chi-square distribution with the degrees of freedom 6.

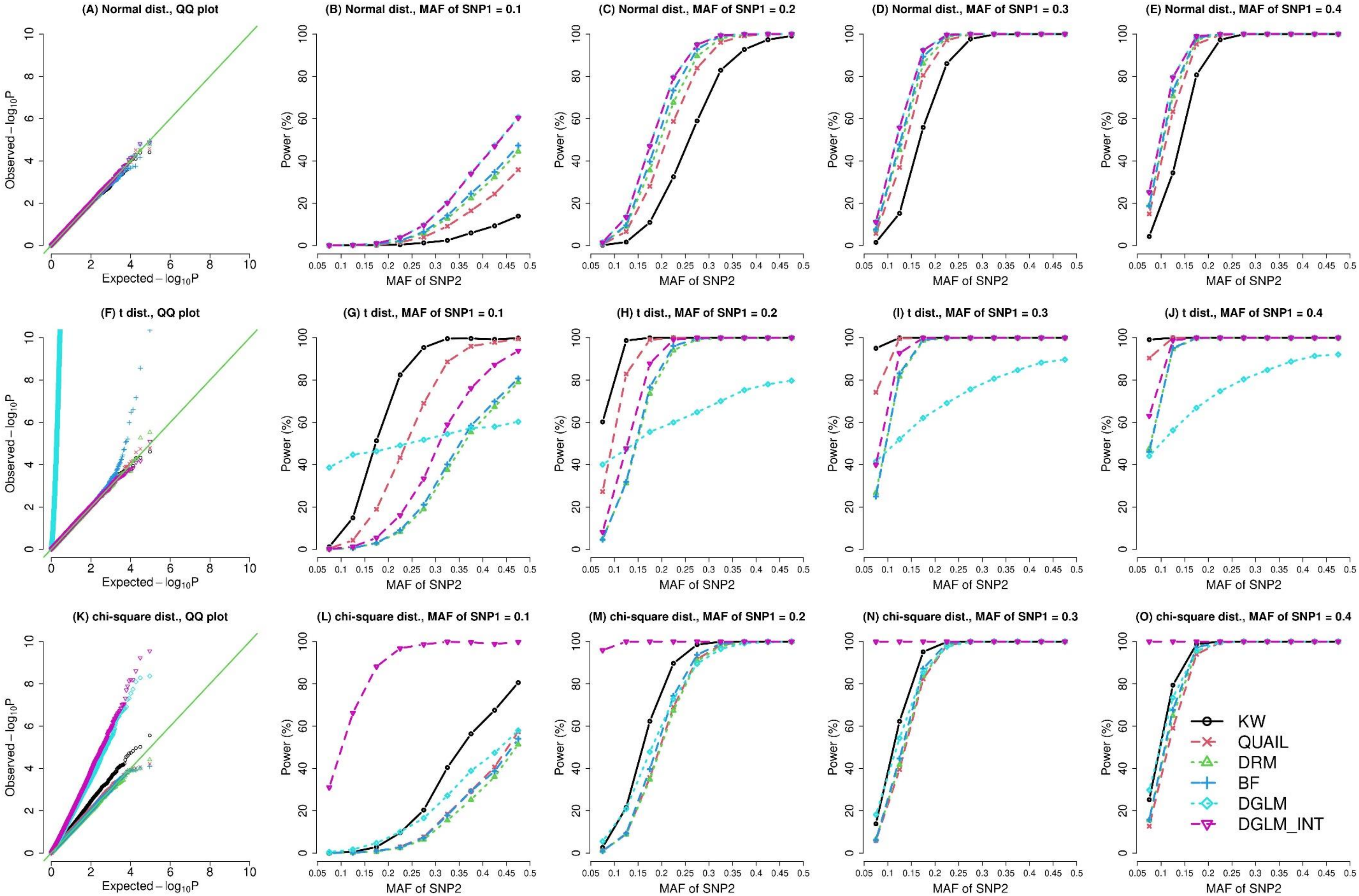


Figure S3. QQ plots (the left column) and power (α = 5E-8; columns 2-5) for vQTL tests (*N* = 147836; without SNP main effects)

The distribution for the error term: (top row) a standard normal distribution; (middle row) a *t* distribution with the degrees of freedom 3; (bottom row) a chi-square distribution with the degrees of freedom 6.

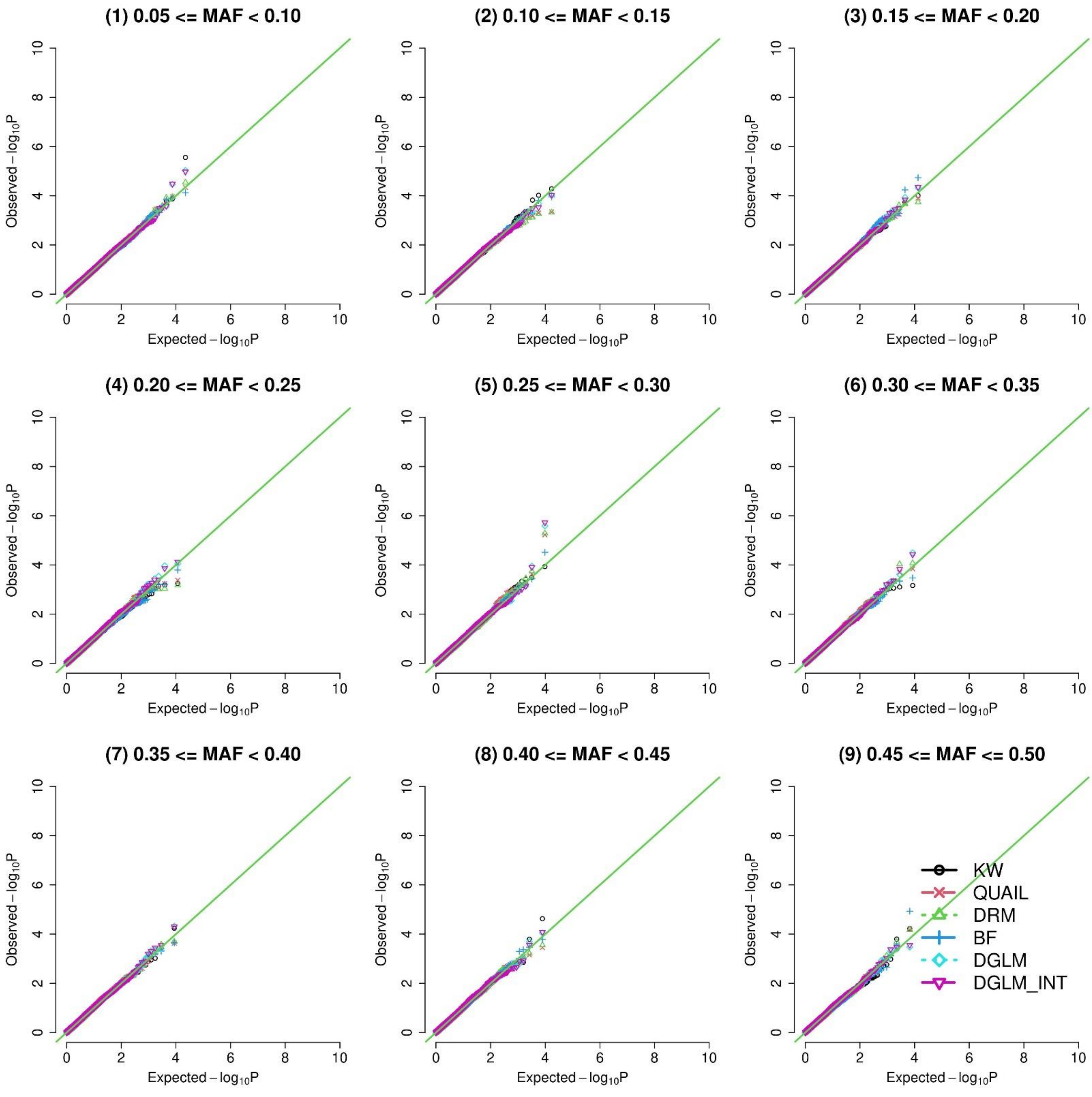


Figure S4. QQ plots when the error term follows a standard normal distribution (*N* = 30000; with SNP main effects)

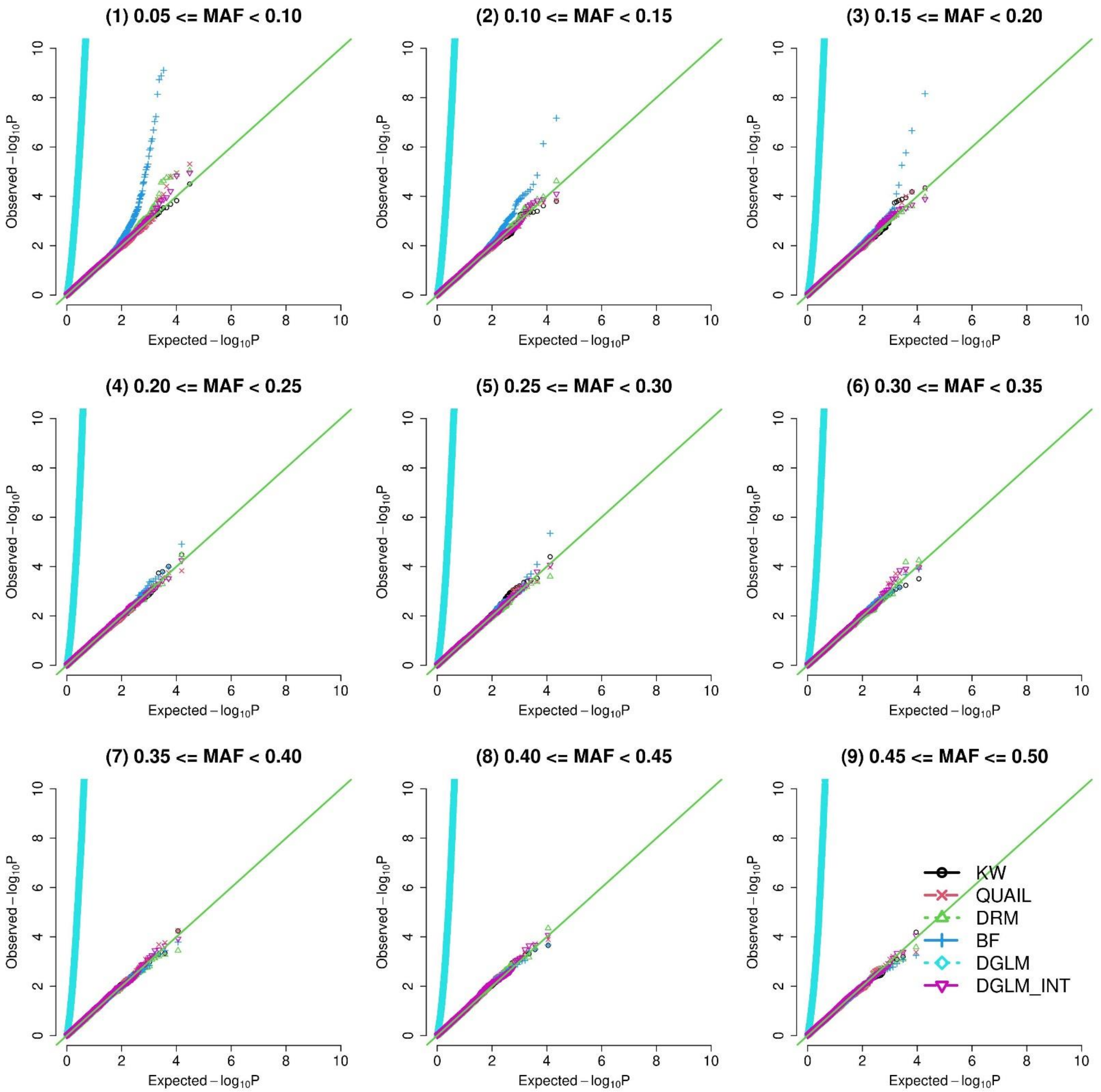


Figure S5. QQ plots when the error term follows a *t* distribution with the degrees of freedom 3 (*N* = 30000; with SNP main effects)

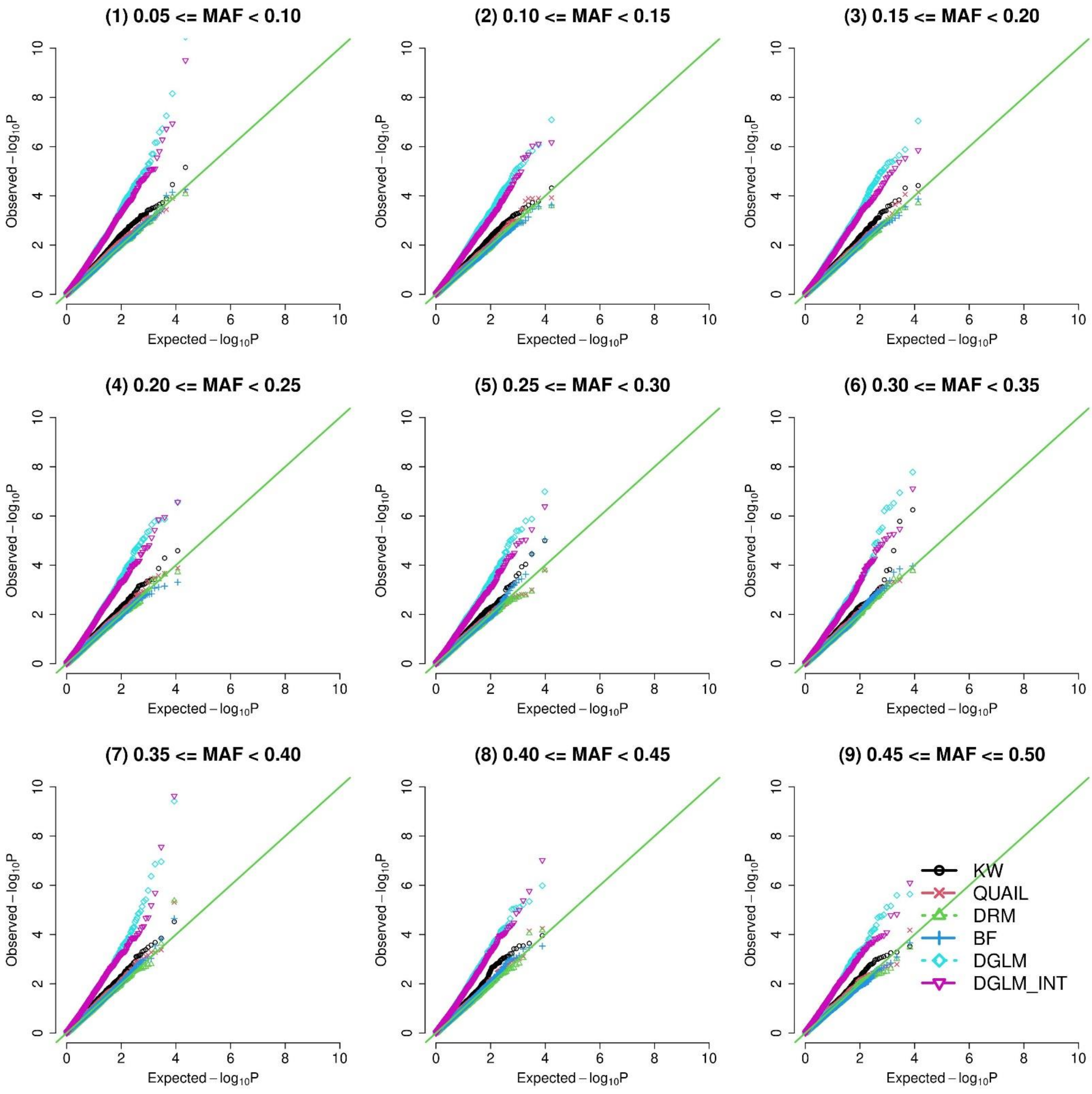


Figure S6. QQ plots when the error term follows a chi-square distribution with the degrees of freedom 6 (*N* = 30000; with SNP main effects)

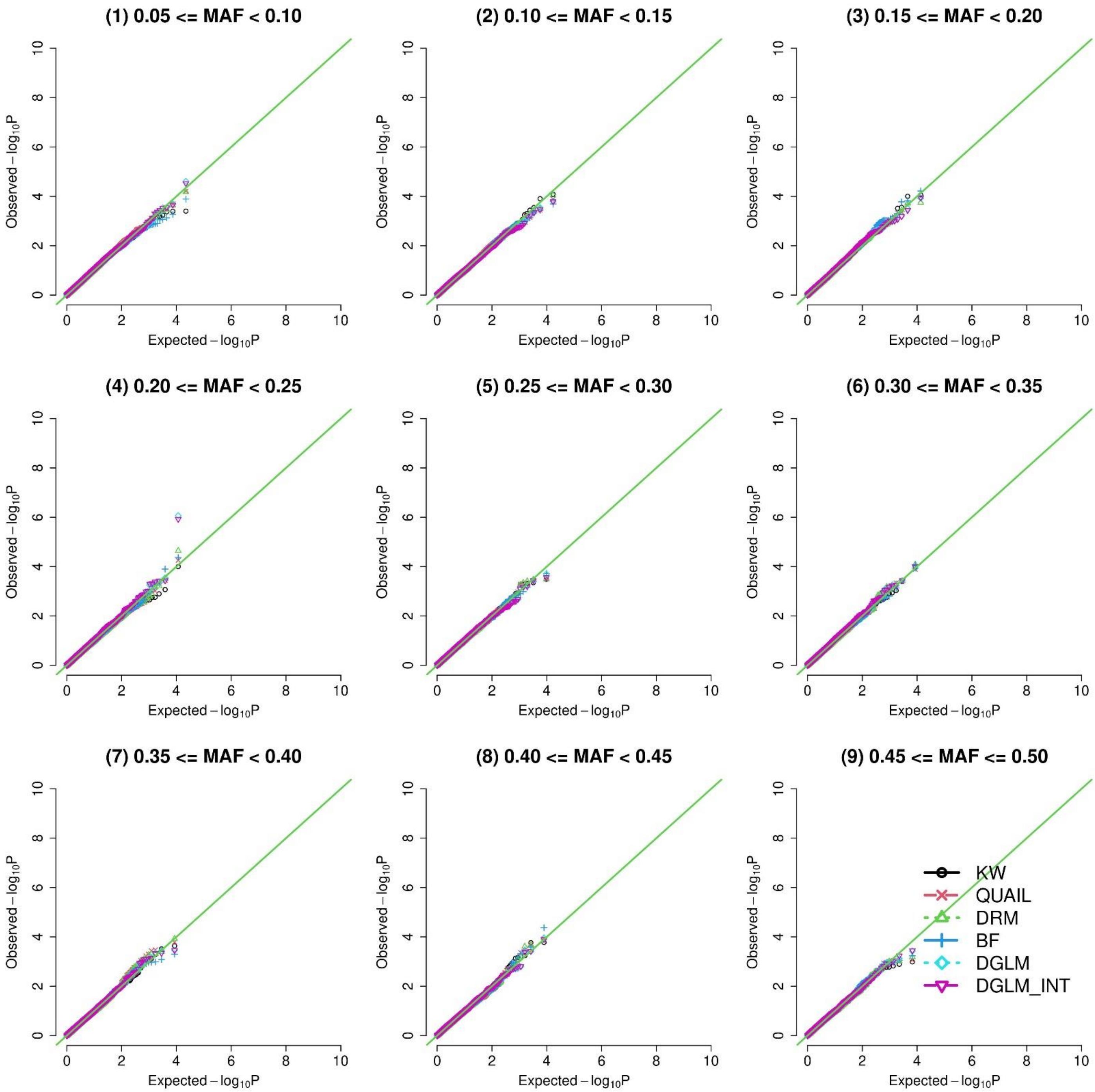


Figure S7. QQ plots when the error term follows a standard normal distribution (*N* = 30000; without SNP main effects)

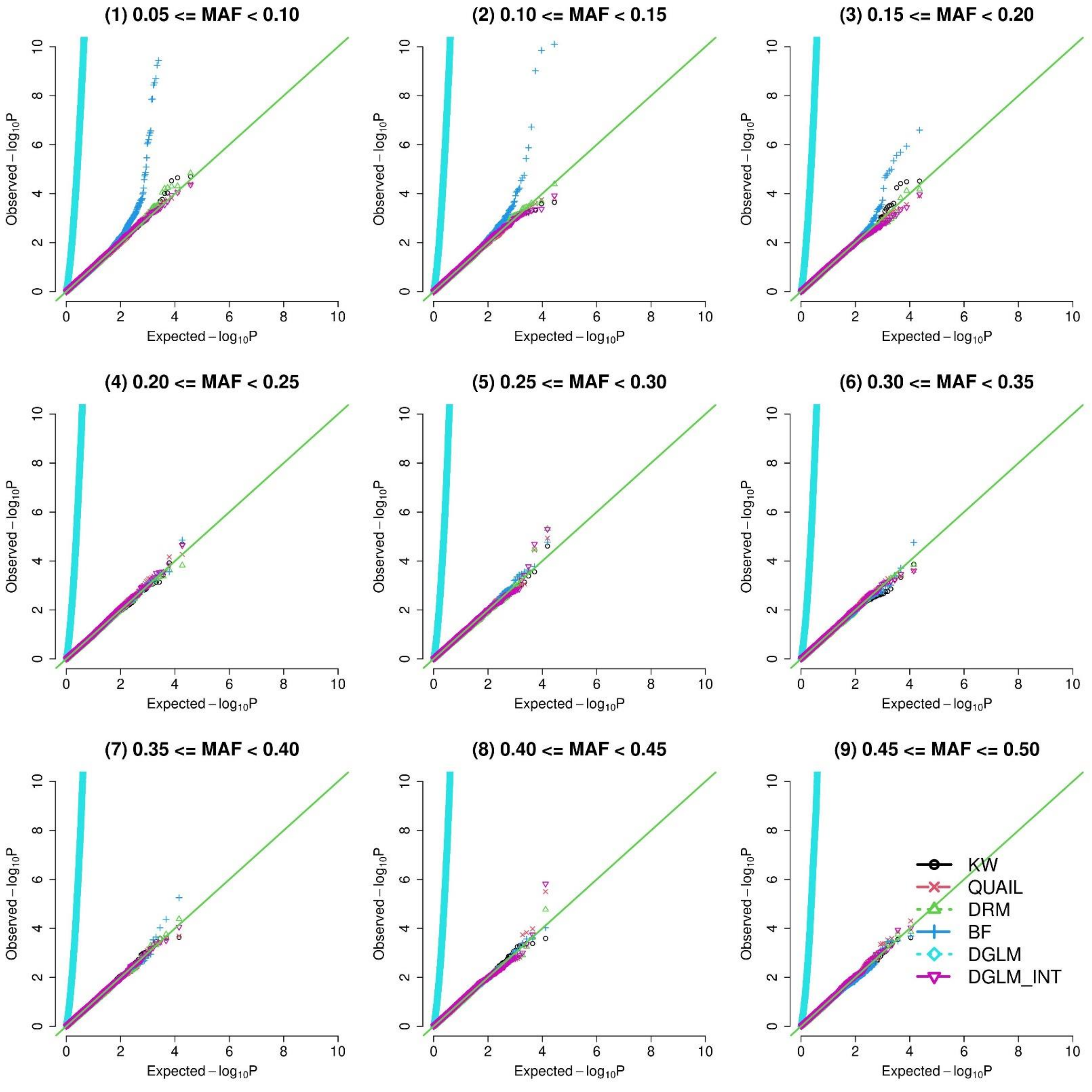
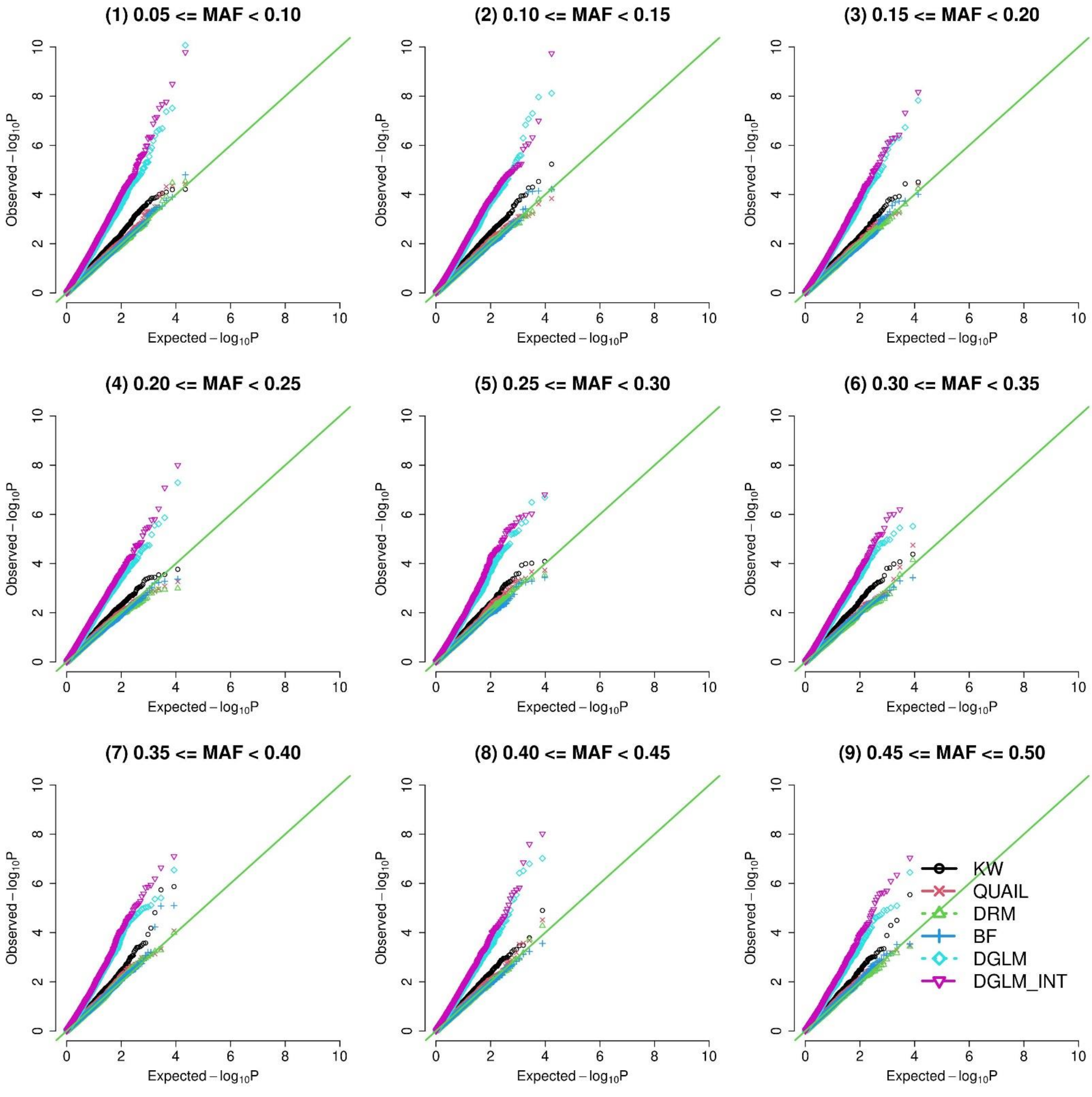


Figure S8. QQ plots when the error term follows a *t* distribution with the degrees of freedom 3 (*N* = 30000; without SNP main effects)



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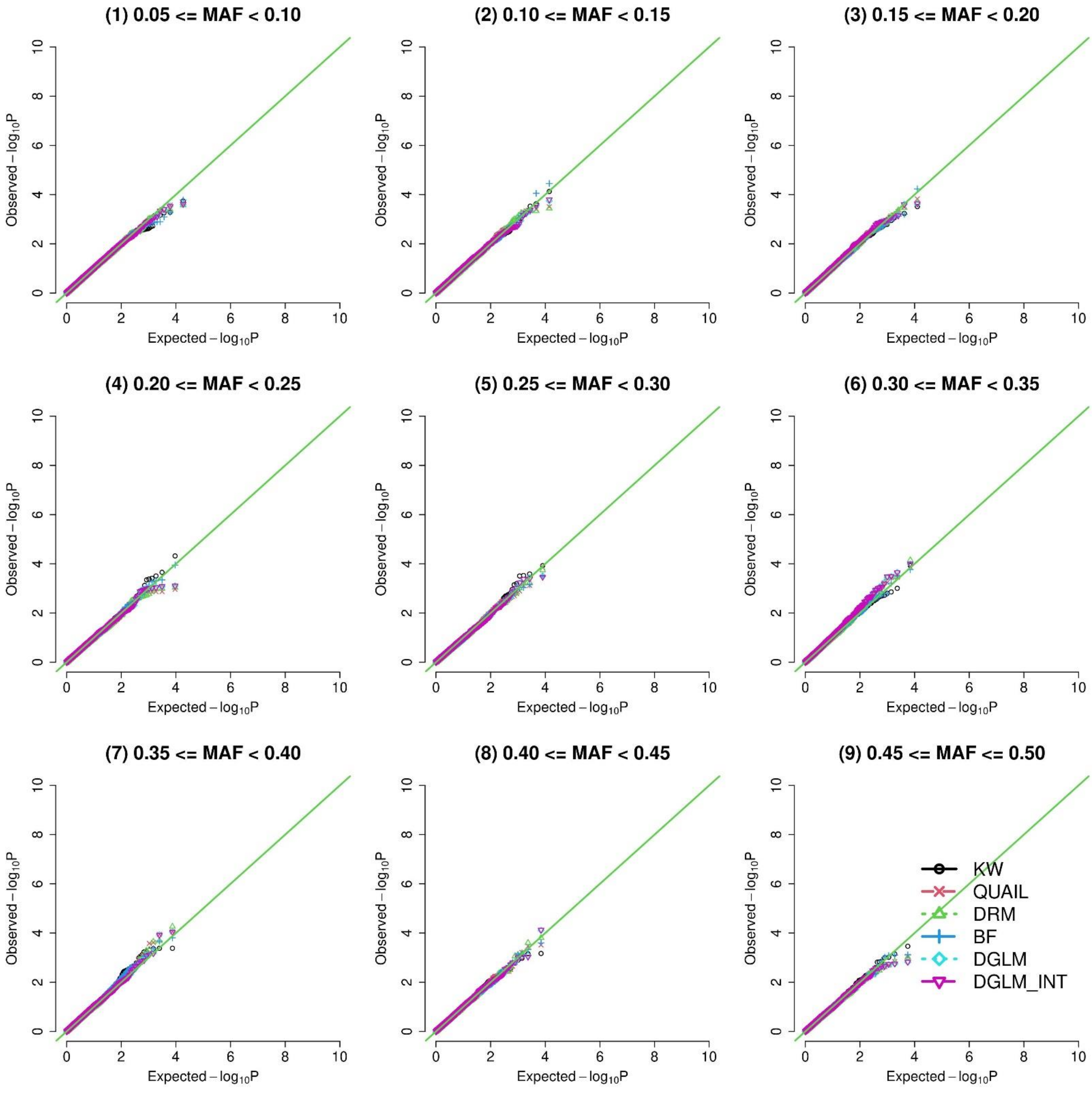


Figure S10. QQ plots when the error term follows a standard normal distribution (*N* = 147836; with SNP main effects)

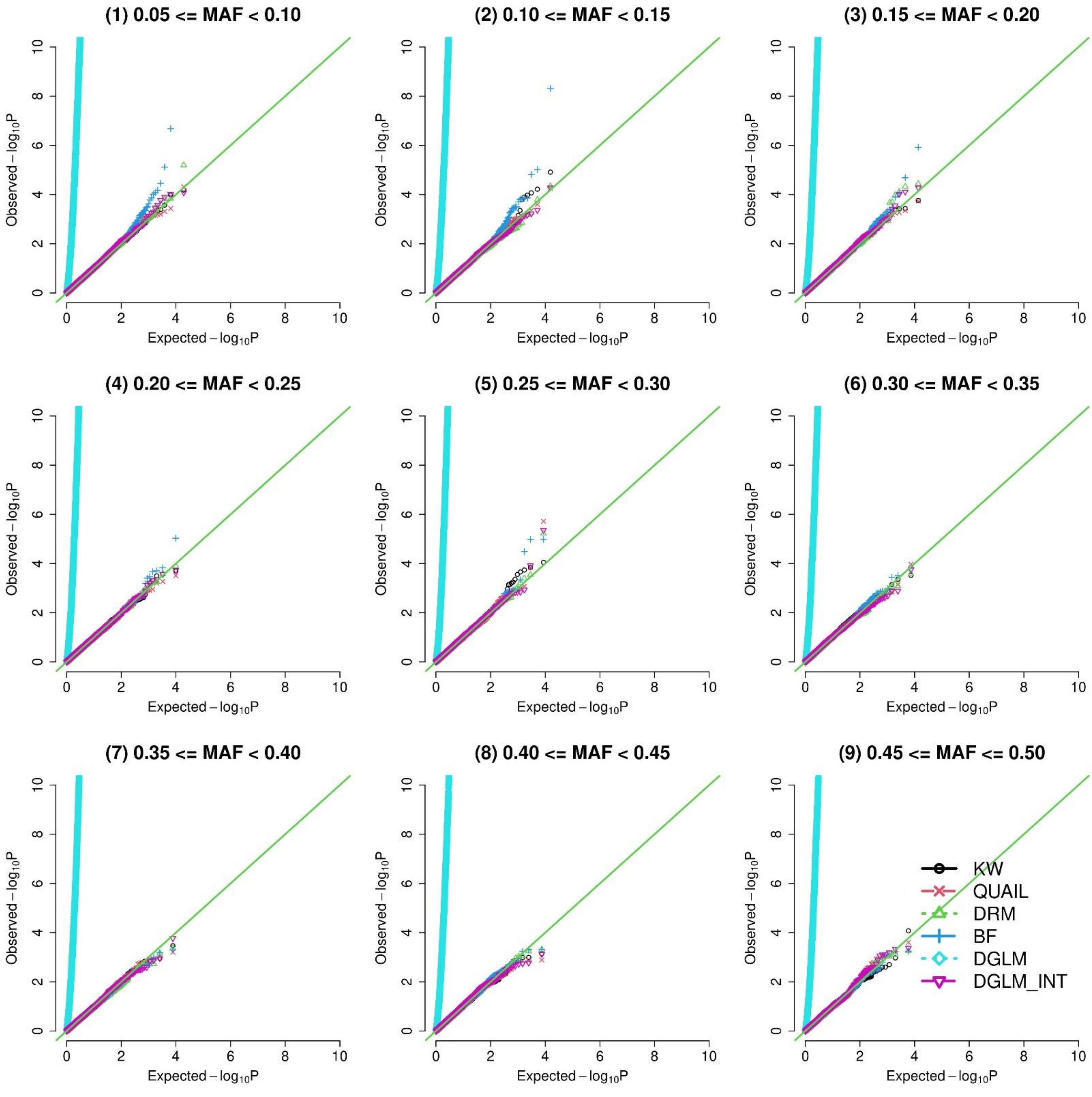


Figure S11. QQ plots when the error term follows a *t* distribution with the degrees of freedom 3 (*N* = 147836; with SNP main effects)

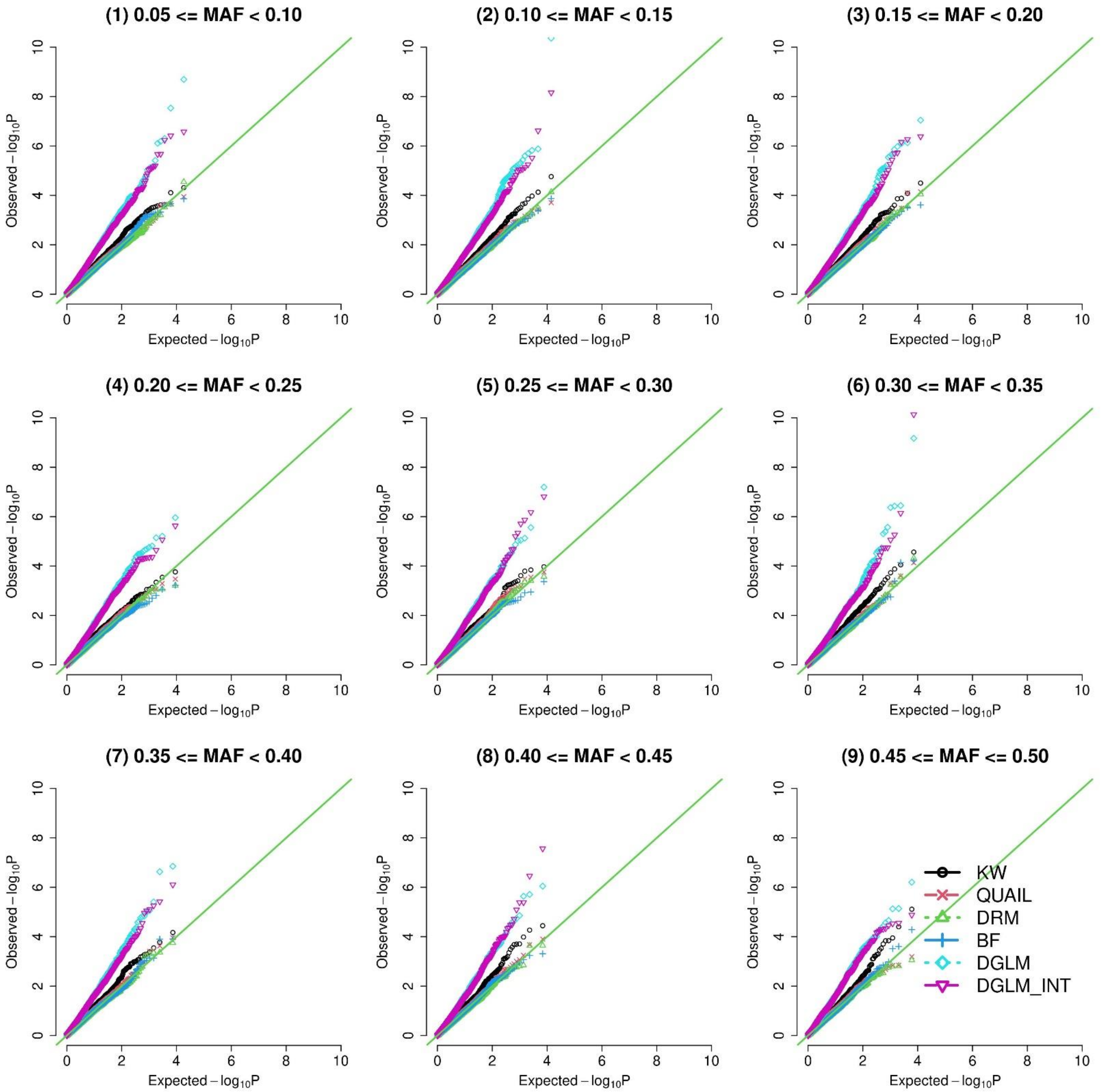


Figure S12. QQ plots when the error term follows a chi-square distribution with the degrees of freedom 6 (*N* = 147836; with SNP main effects)

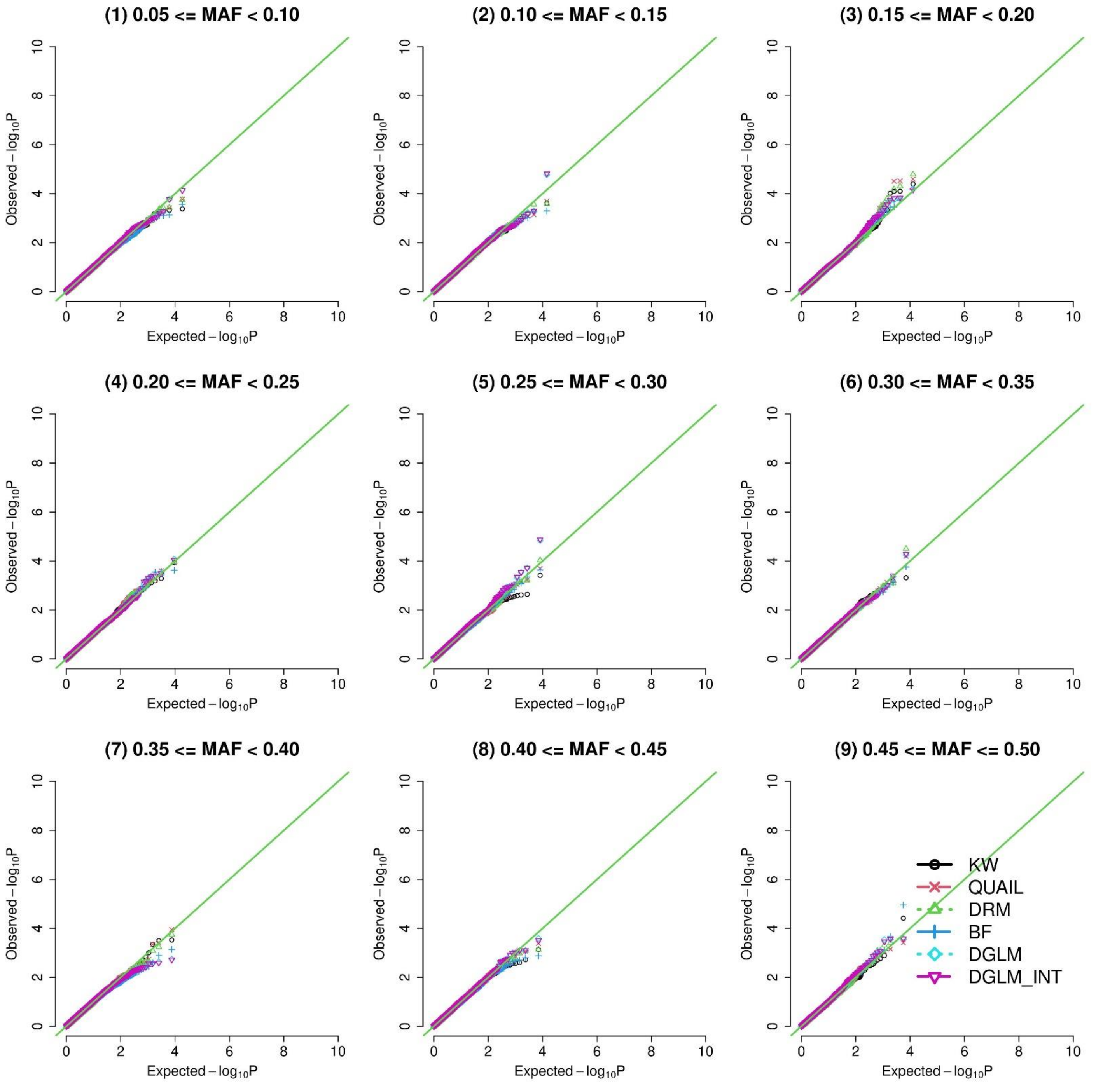


Figure S13. QQ plots when the error term follows a standard normal distribution (*N* = 147836; without SNP main effects)

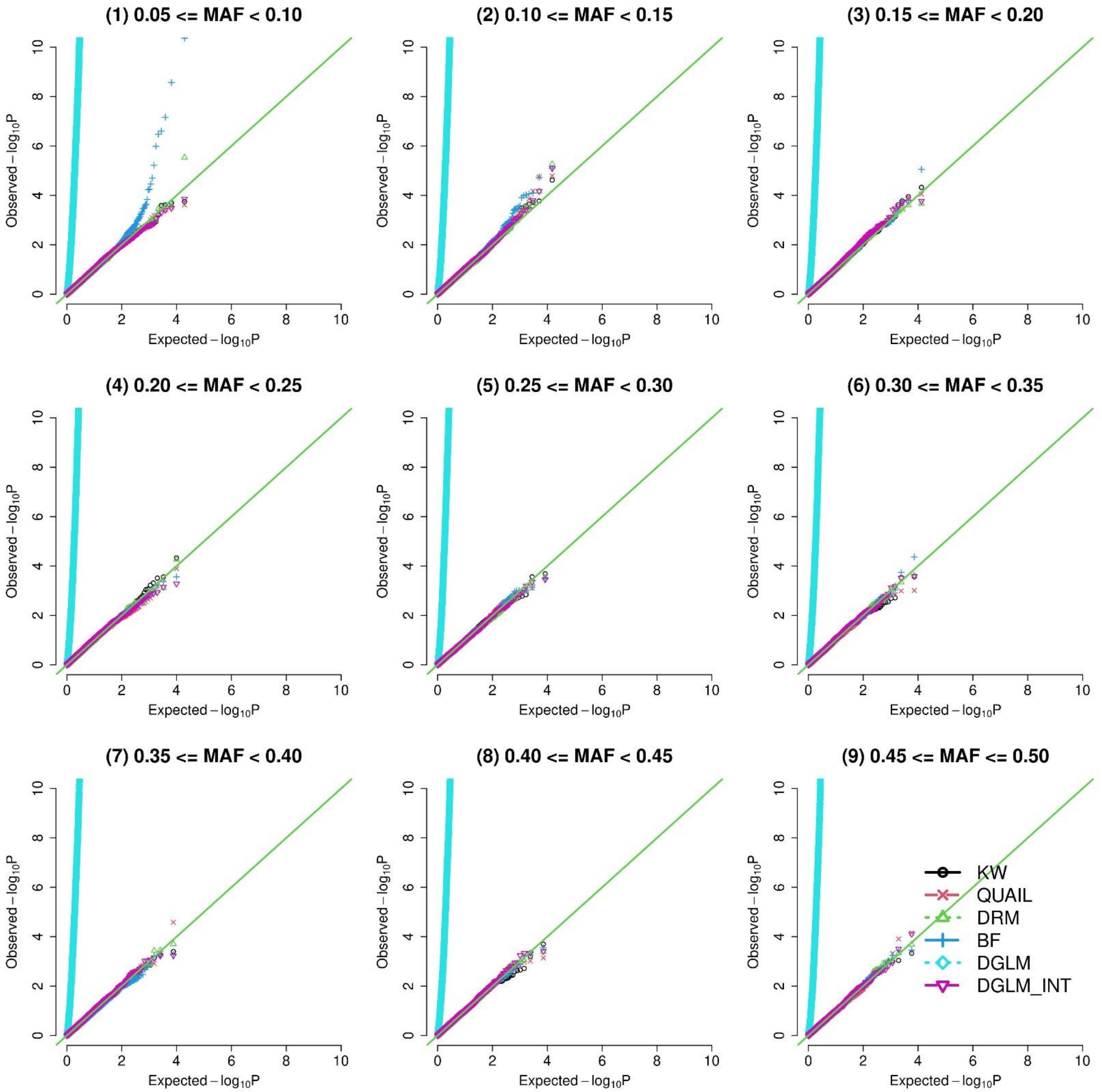


Figure S14. QQ plots when the error term follows a *t* distribution with the degrees of freedom 3 (*N* = 147836; without SNP main effects)

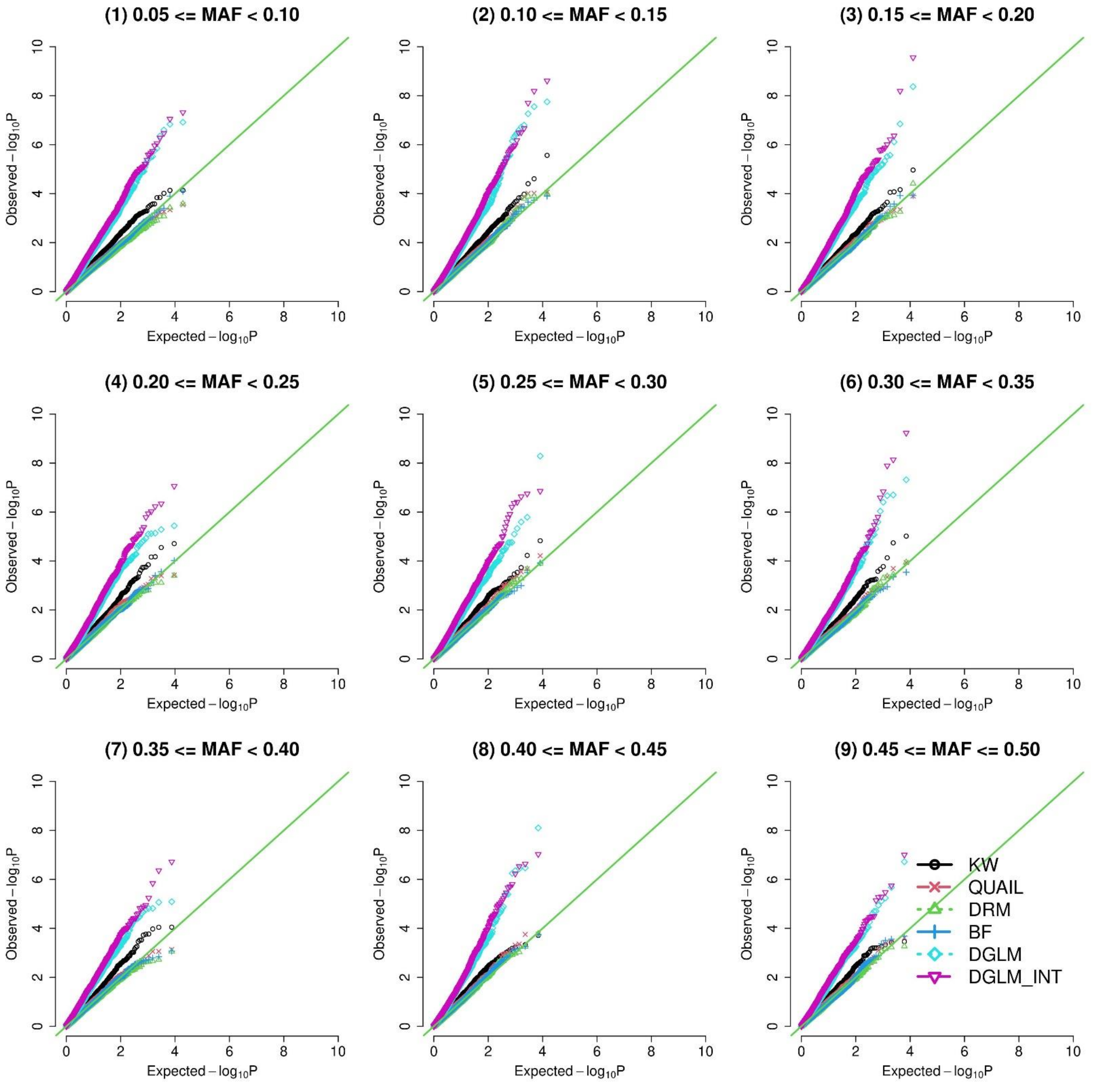


Figure S15. QQ plots when the error term follows a chi-square distribution with the degrees of freedom 6 (*N* = 147836; without SNP main effects)

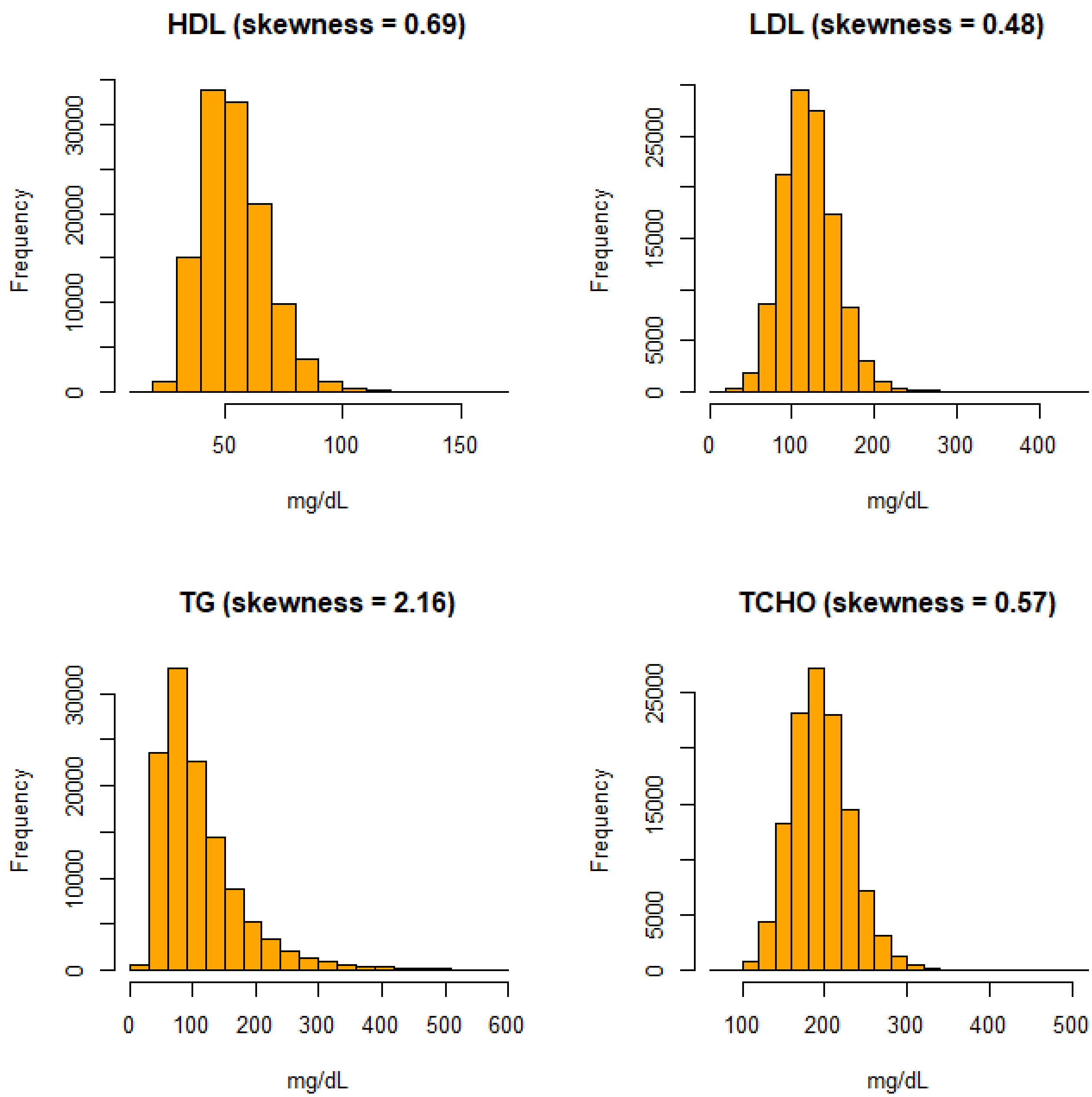


Figure S16. Histograms of the four lipid traits

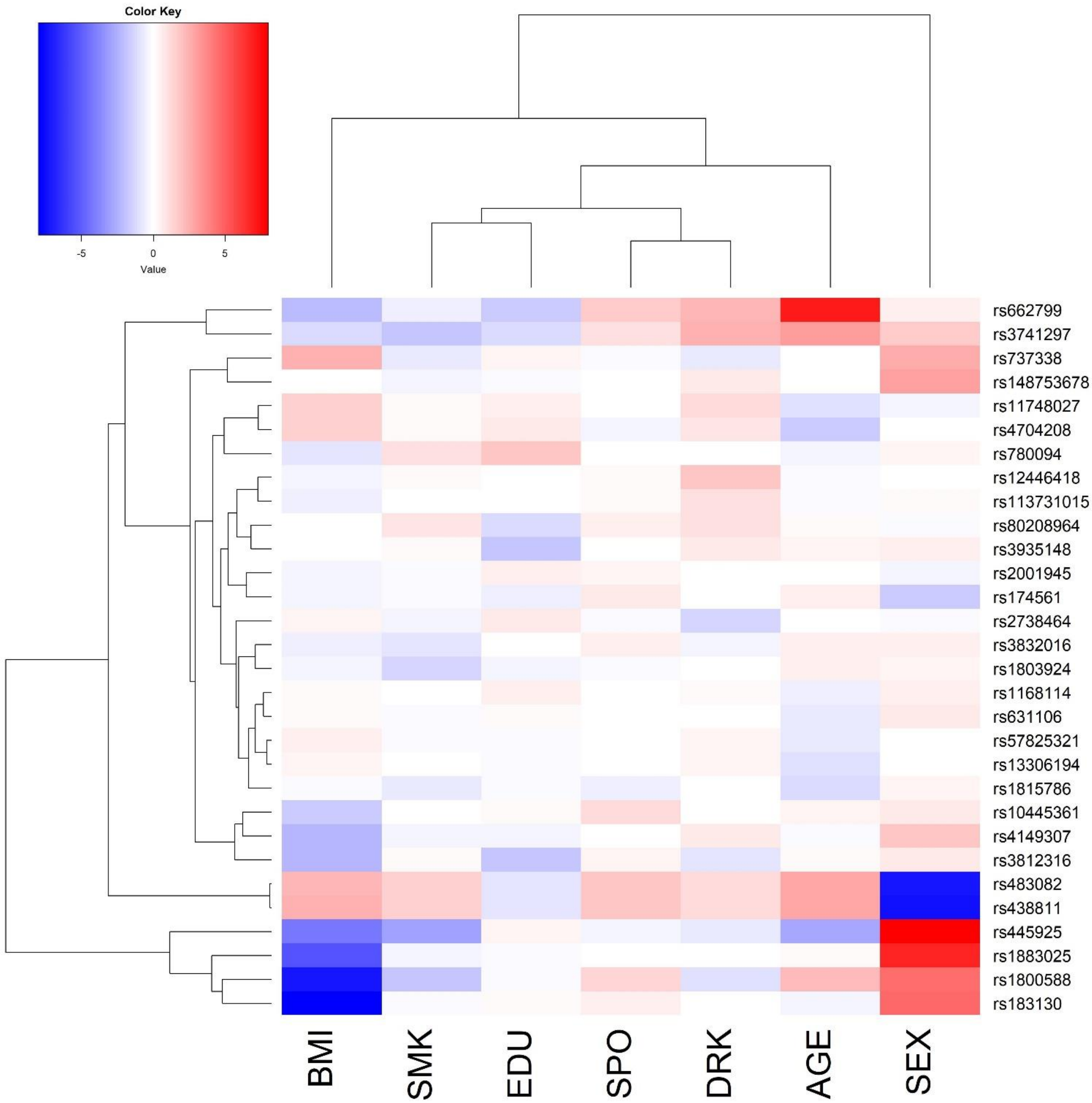
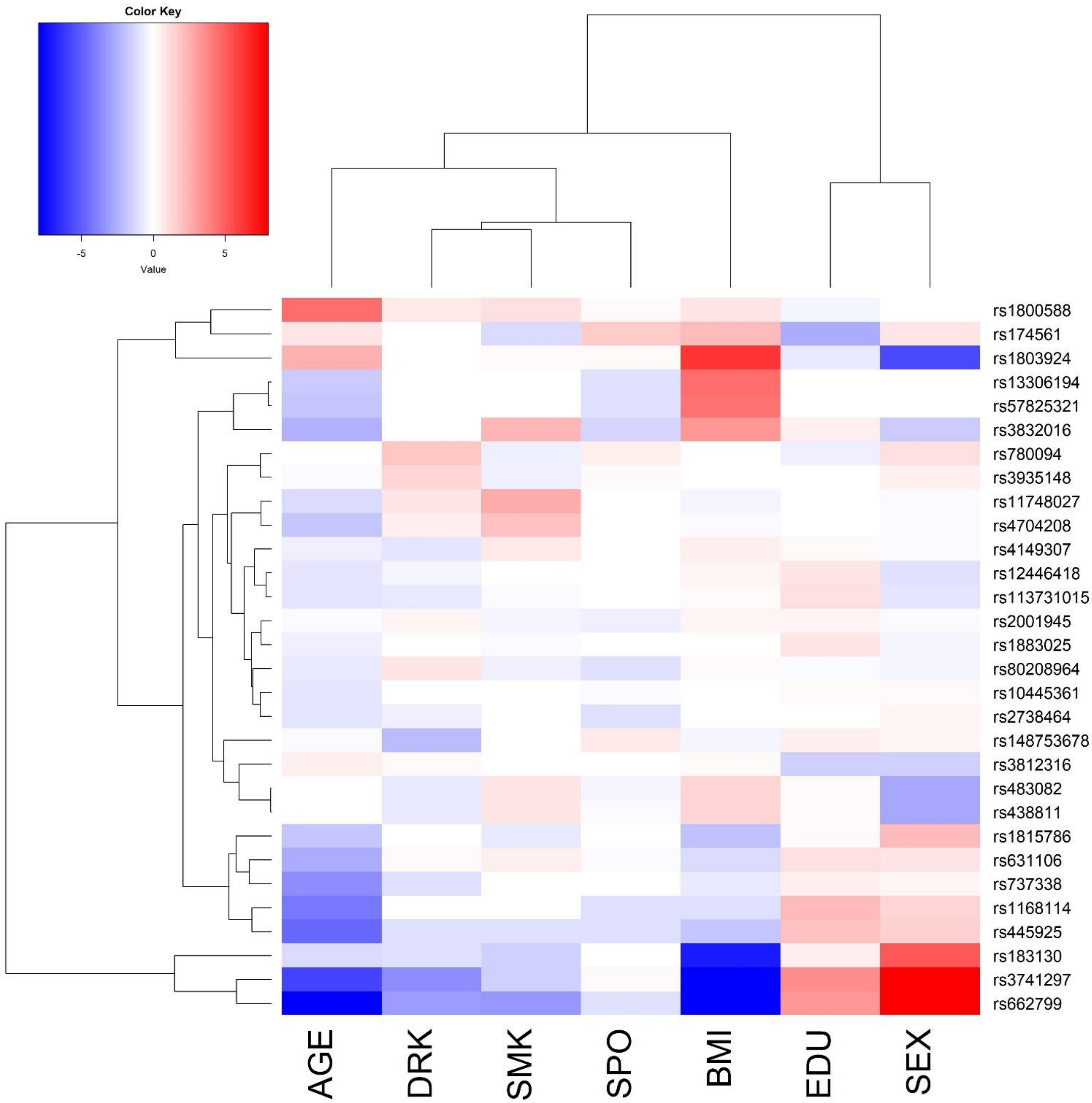


Figure S17. The phylogenetic heat map of the gene-environment interaction analysis for high-density lipoprotein cholesterol (HDL)



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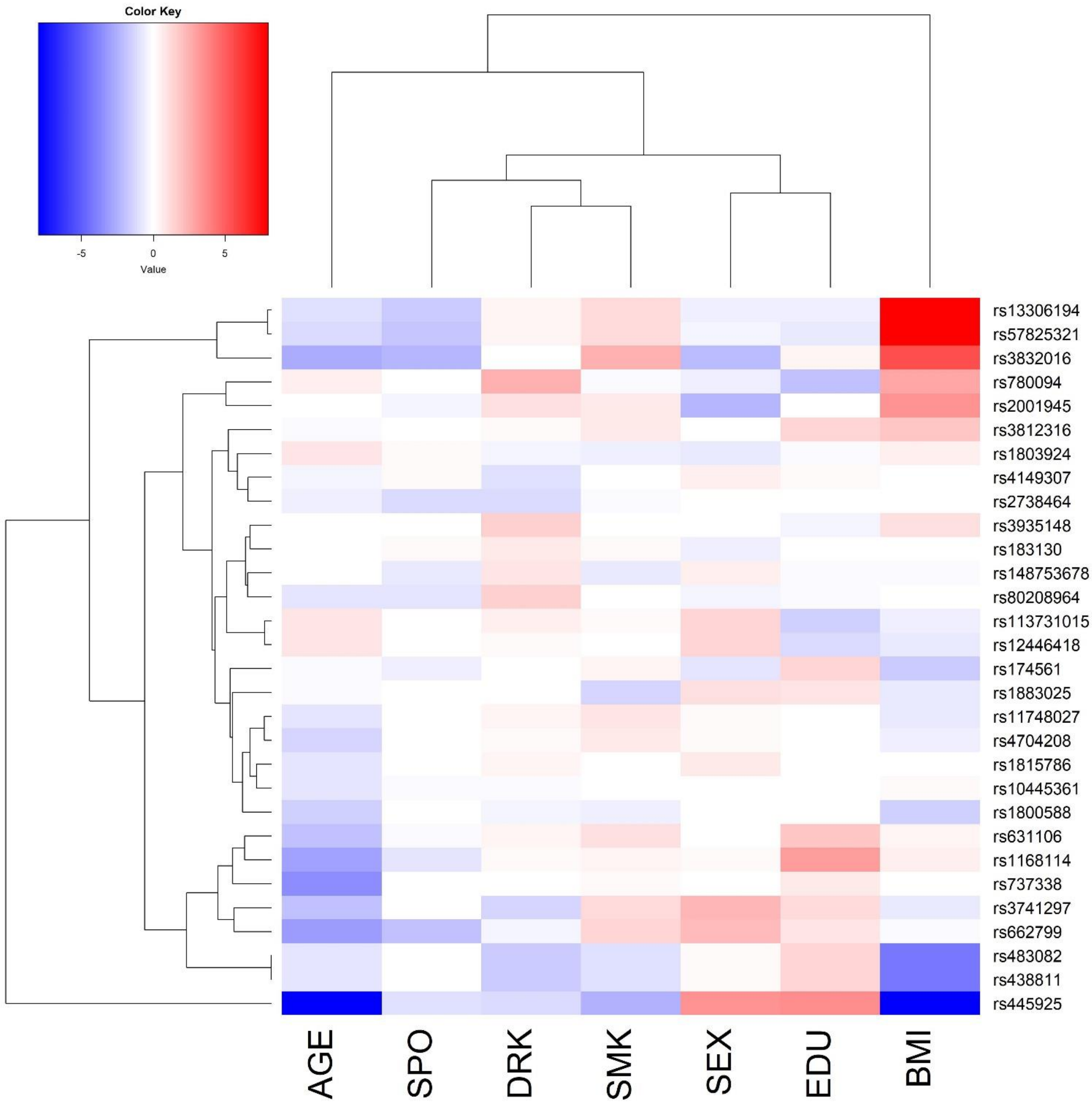

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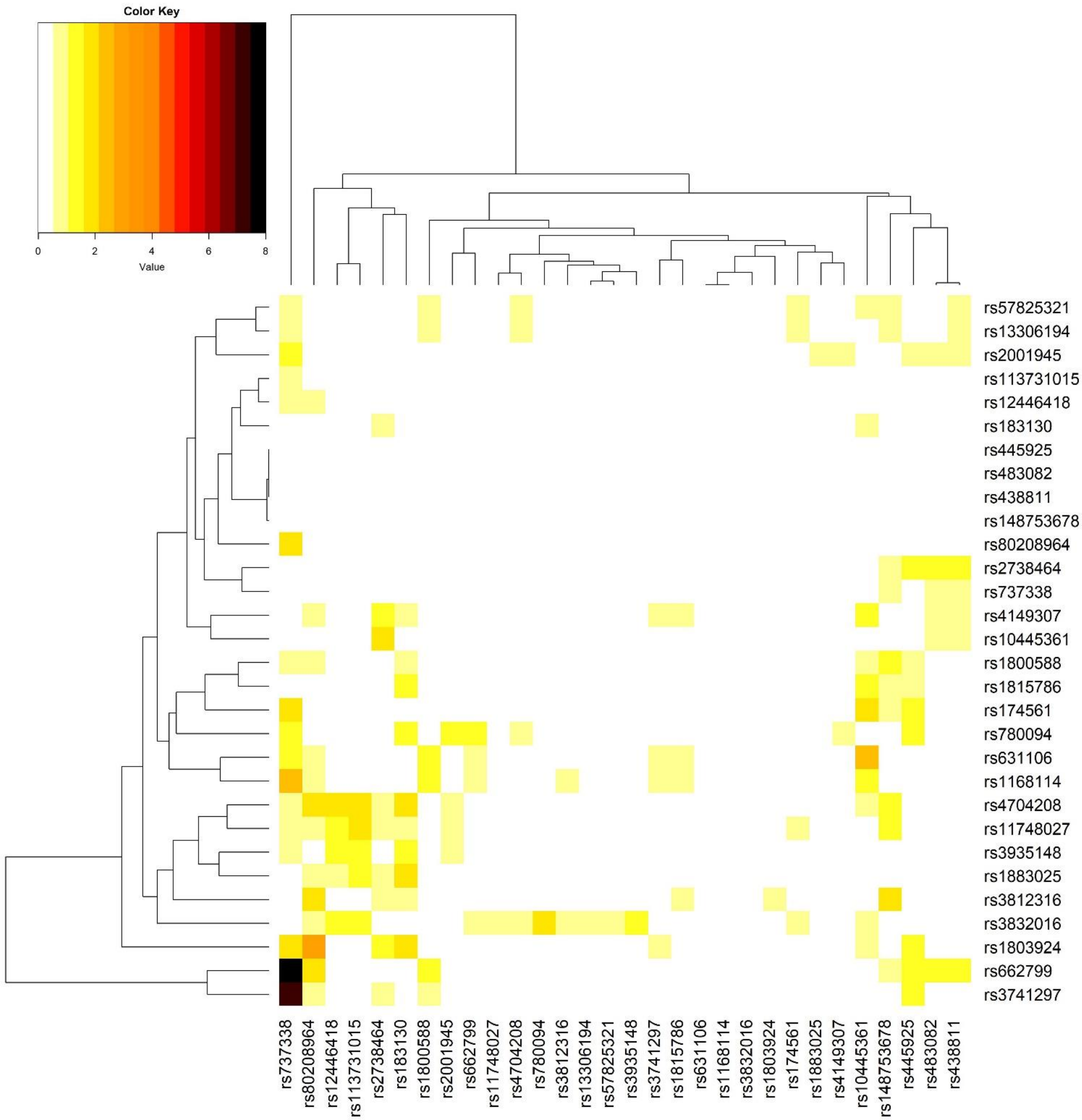

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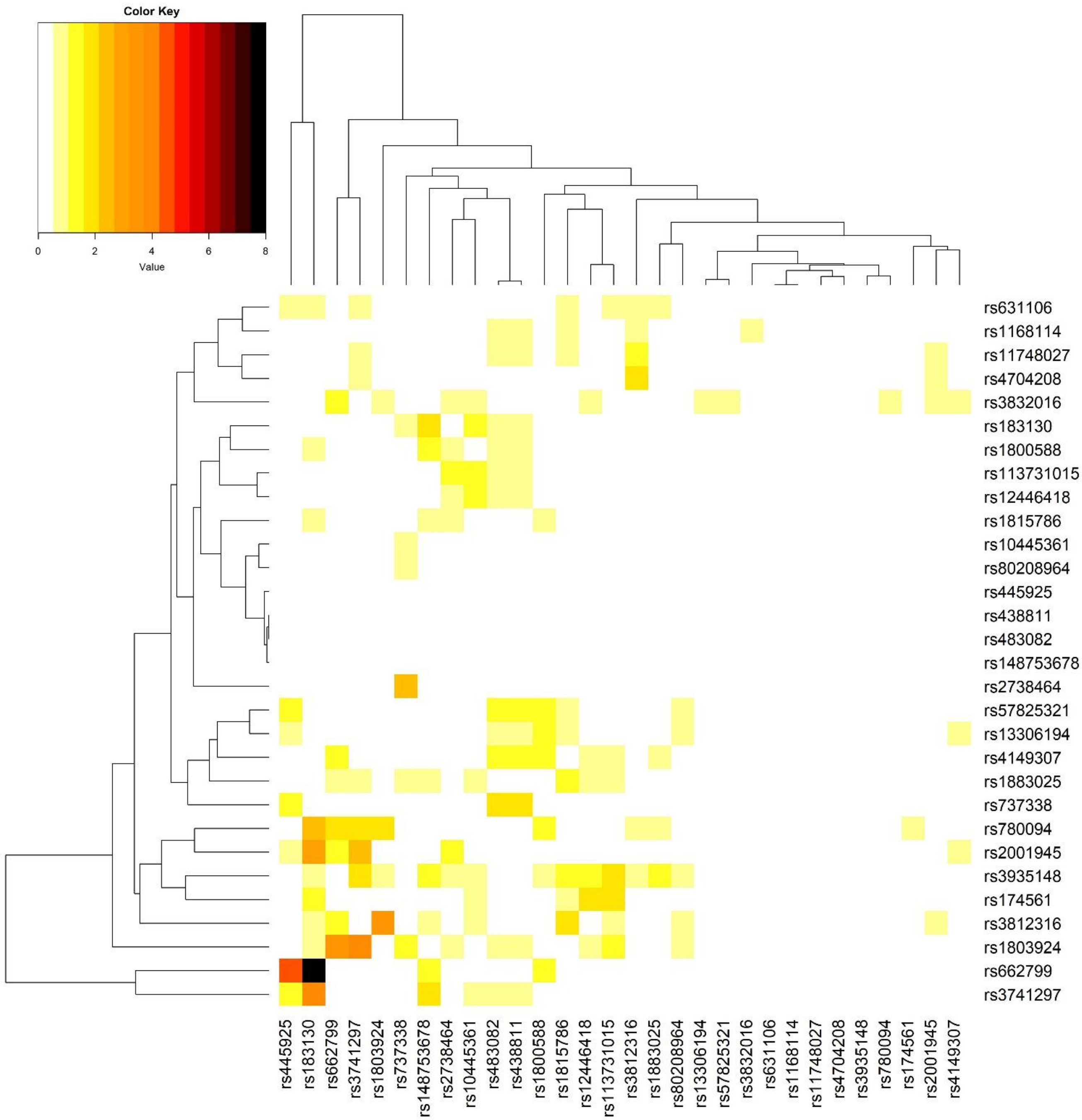

Figure S21. The phylogenetic heat map of the gene-gene interaction analysis for low-density lipoprotein cholesterol (LDL)

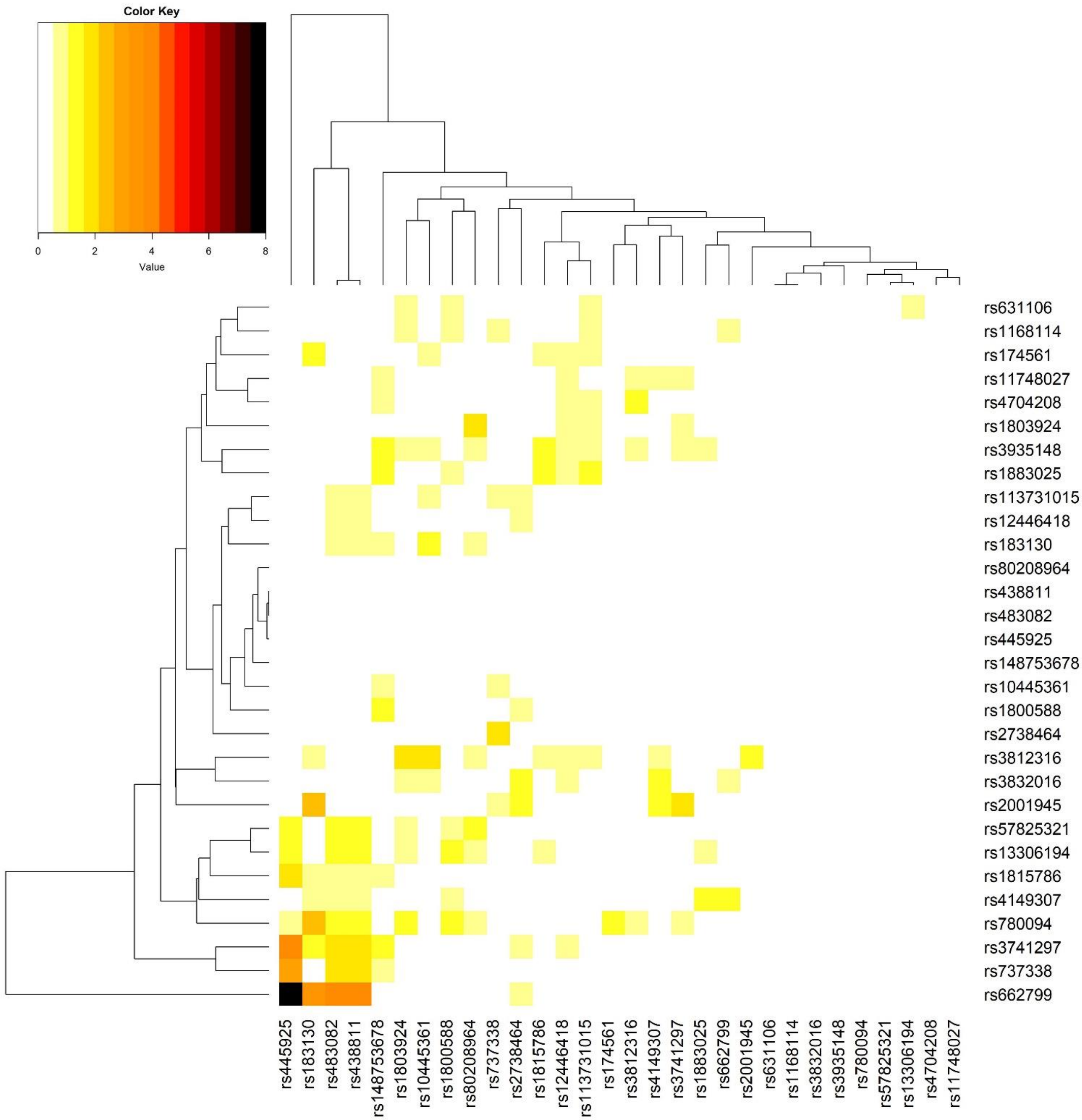

Figure S22. The phylogenetic heat map of the gene-gene interaction analysis for total cholesterol (TCHO)