

# Additional file 2

for  
*Assessing systematic measurement changes in single-wave study data:  
a simulation study*

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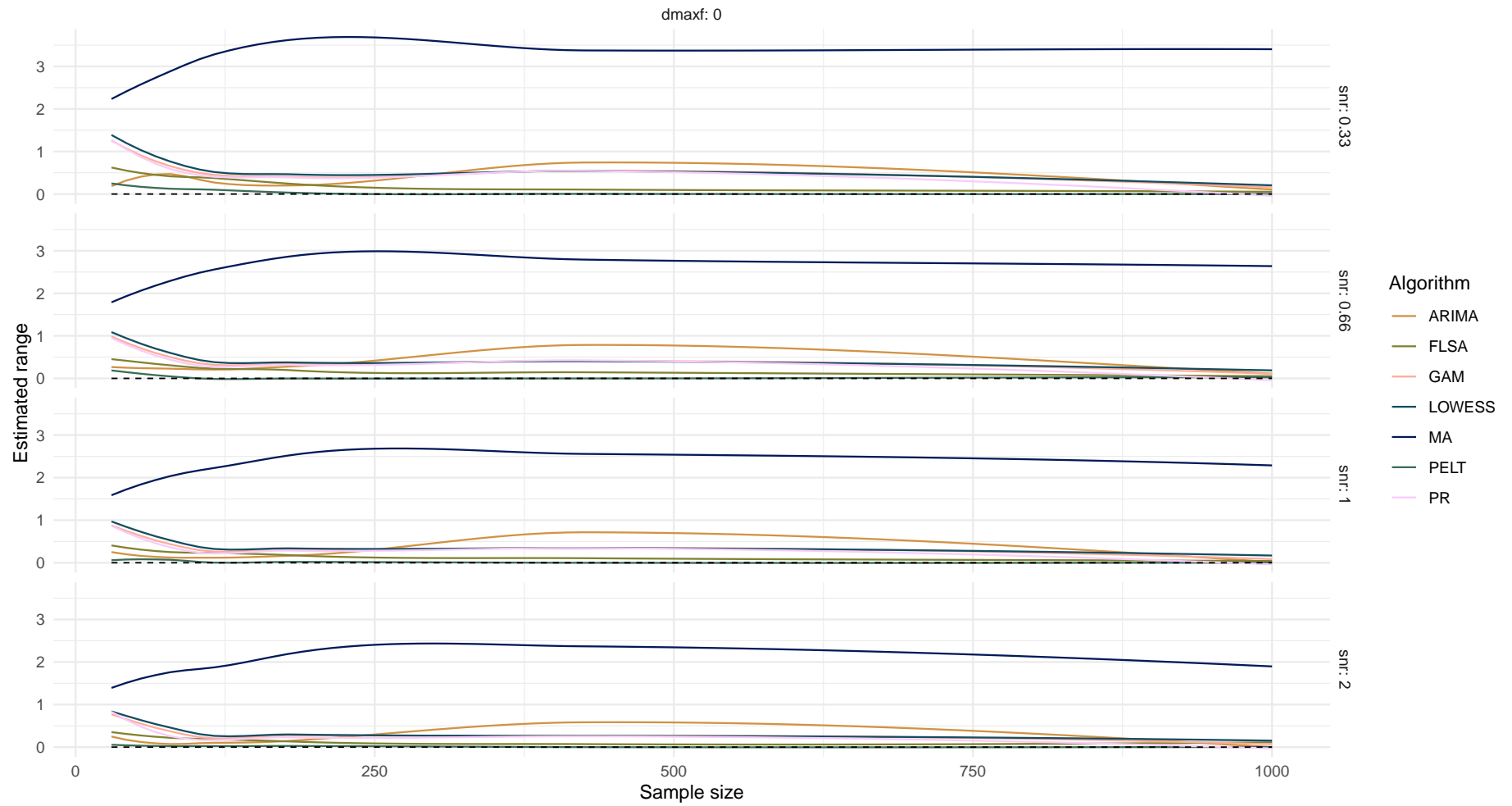
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# Normal distribution

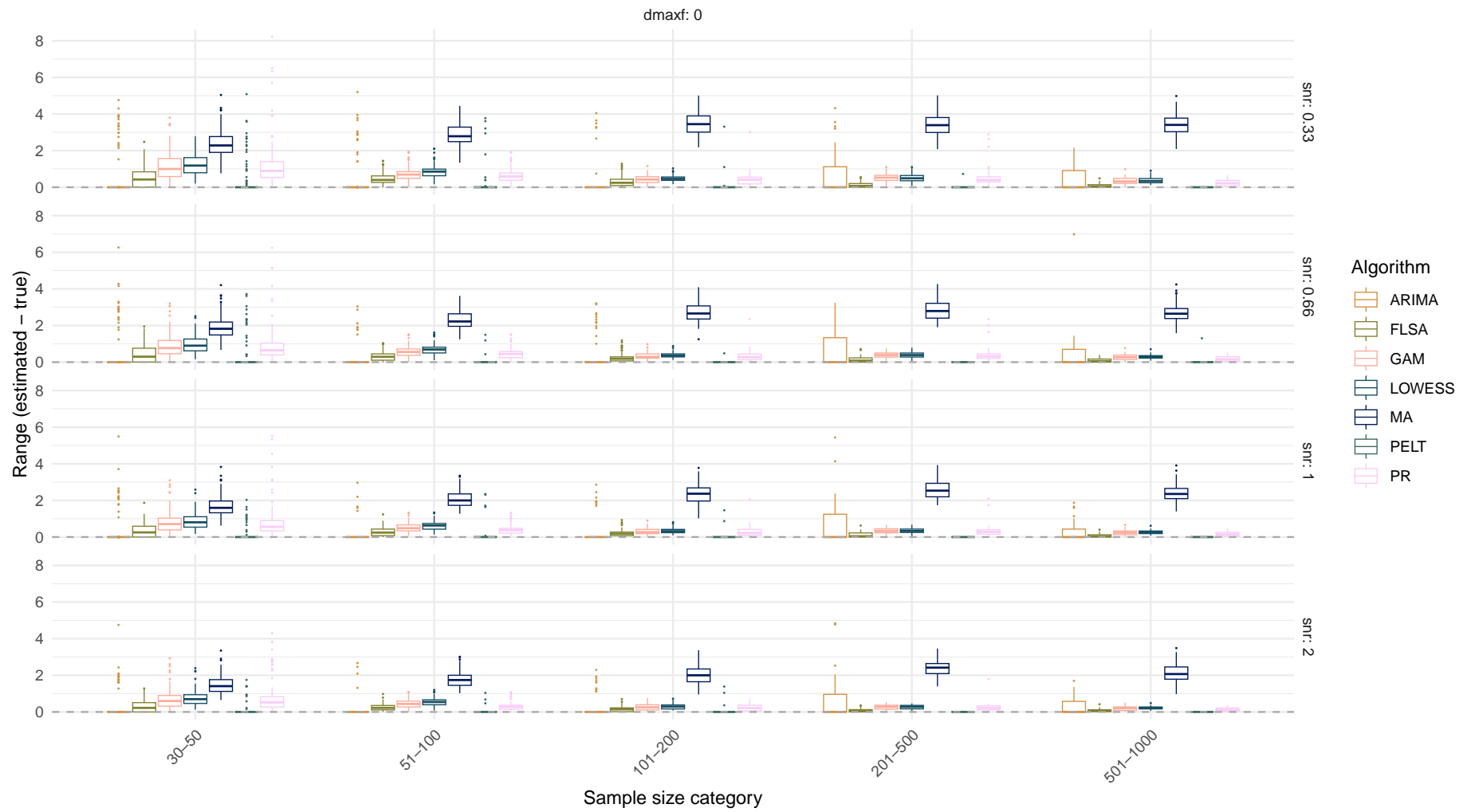
Estimand: Range

Systematic change pattern: No change

Estimated range over sample size  
(Dashed line indicates the true range)

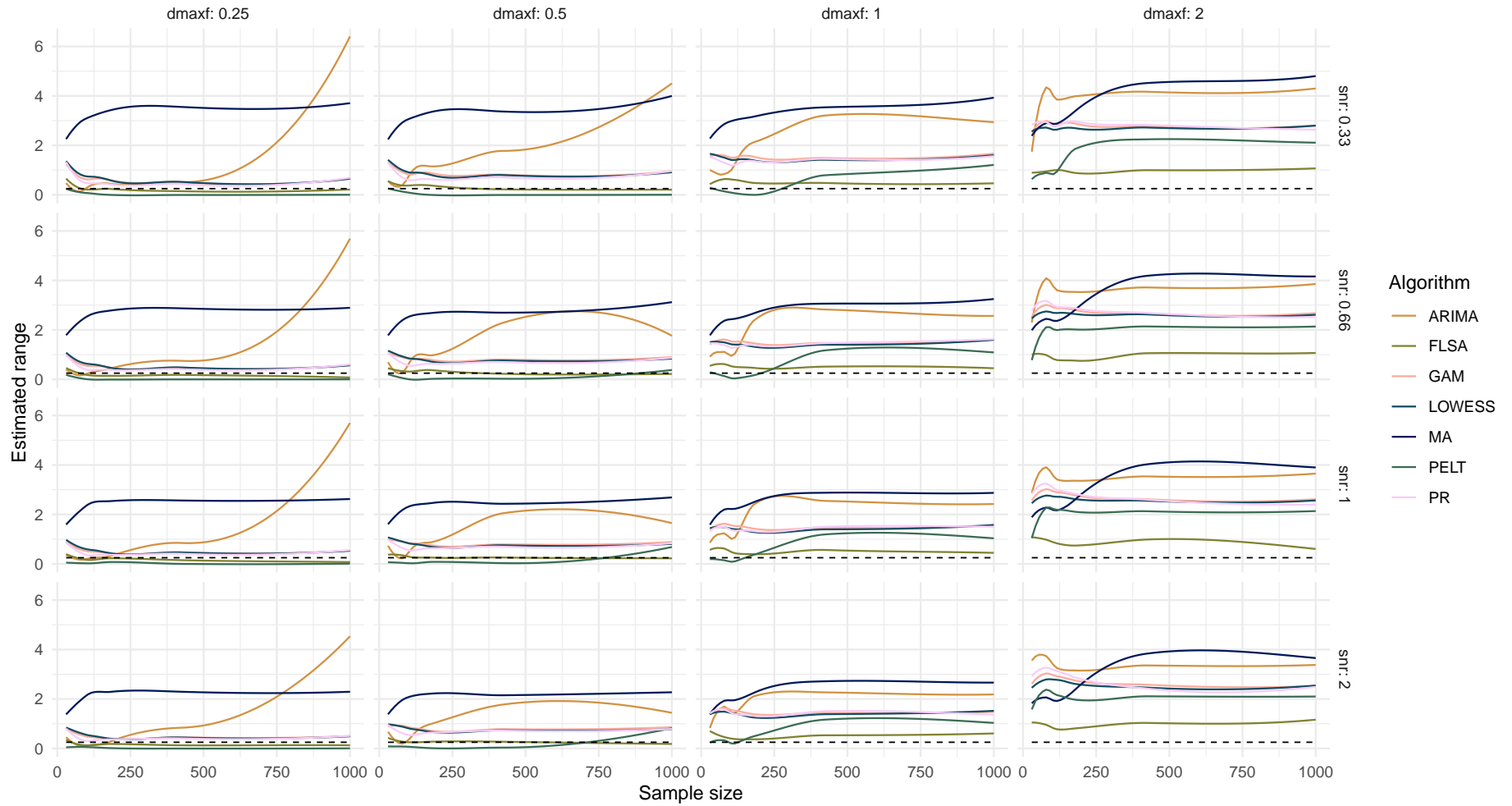


Boxplot of range difference over sample size

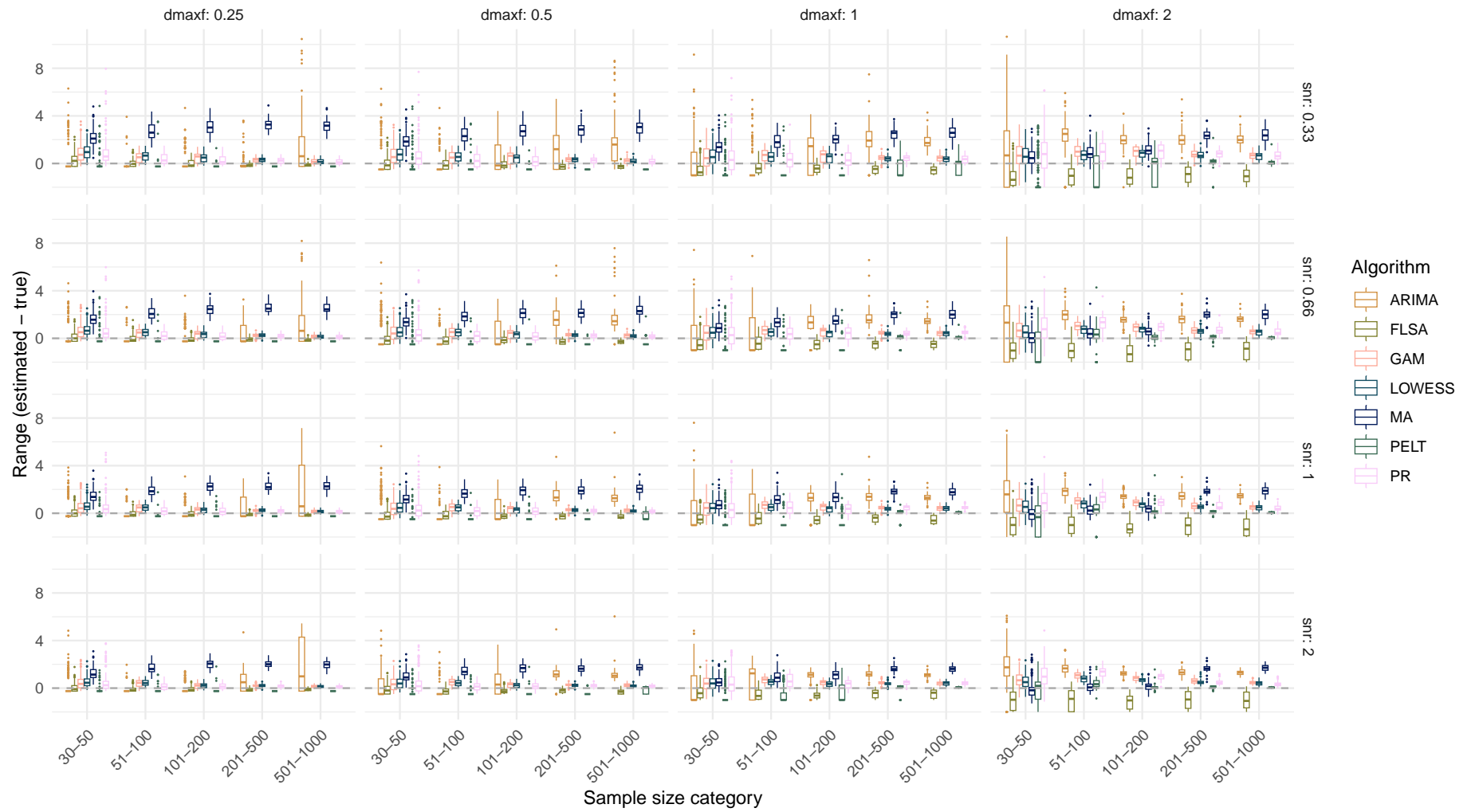


## Systematic change pattern: Jump

Estimated range over sample size  
(Dashed line indicates the true range)

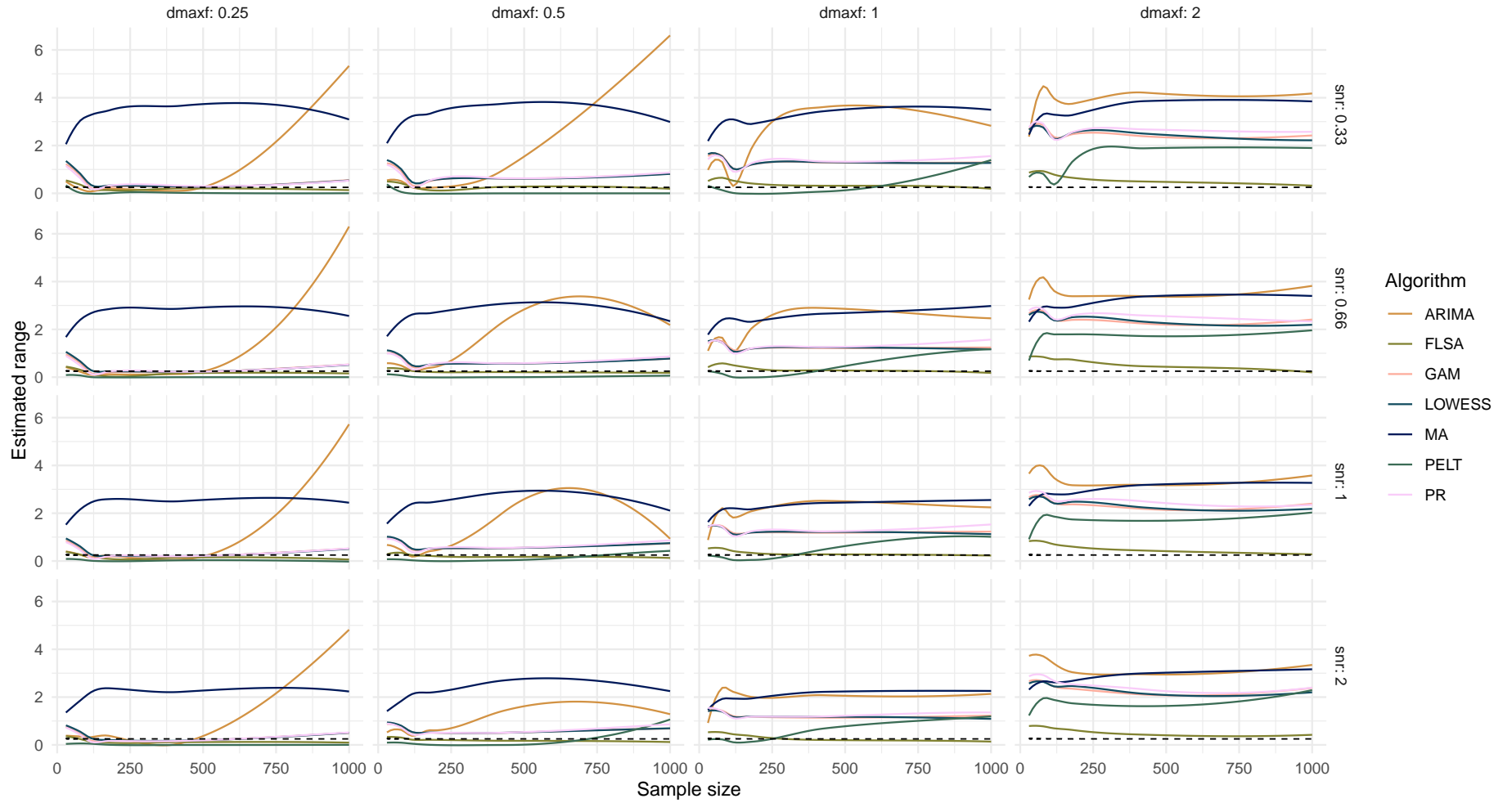


Boxplot of range difference over sample size

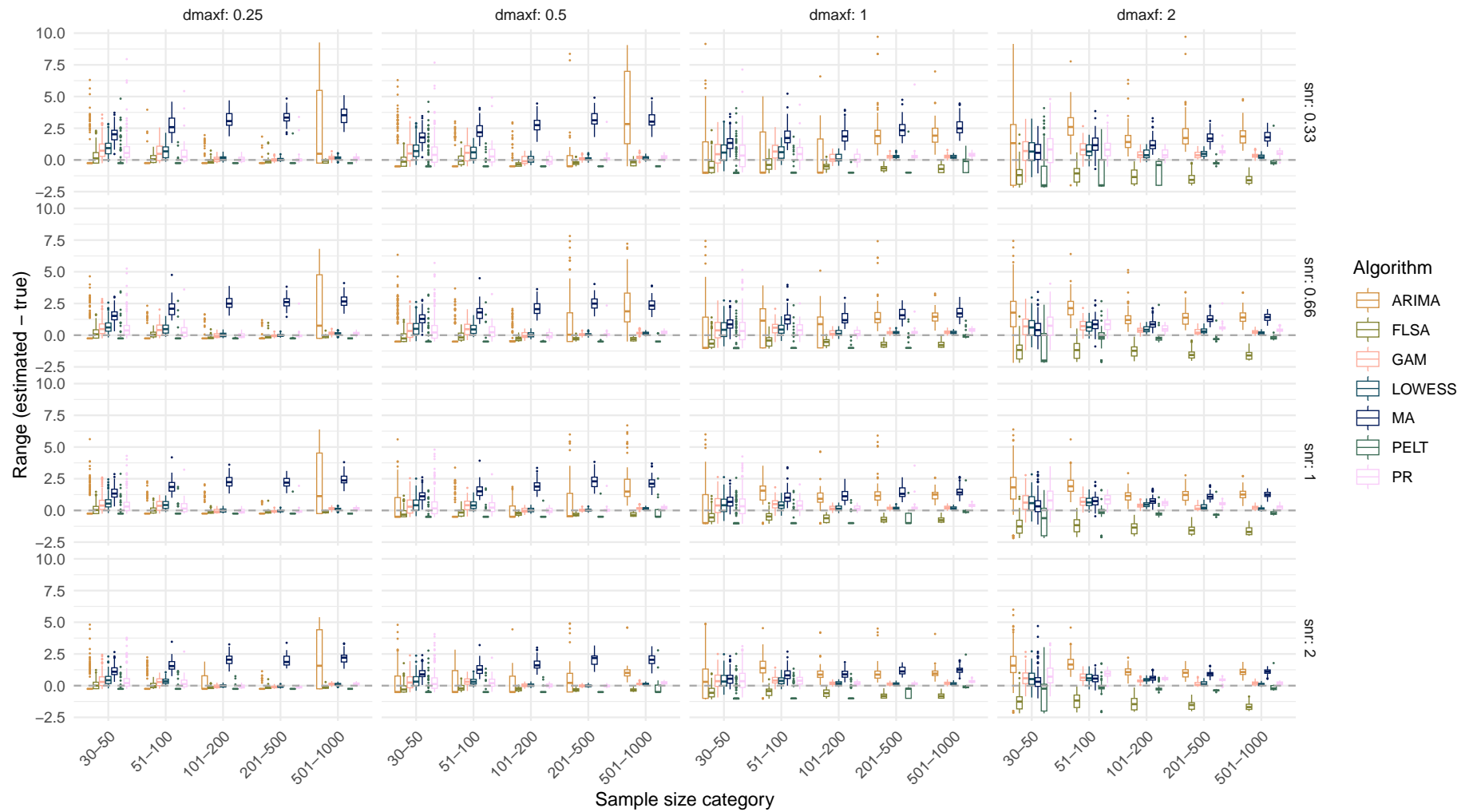


# Systematic change pattern: Linear

Estimated range over sample size  
(Dashed line indicates the true range)

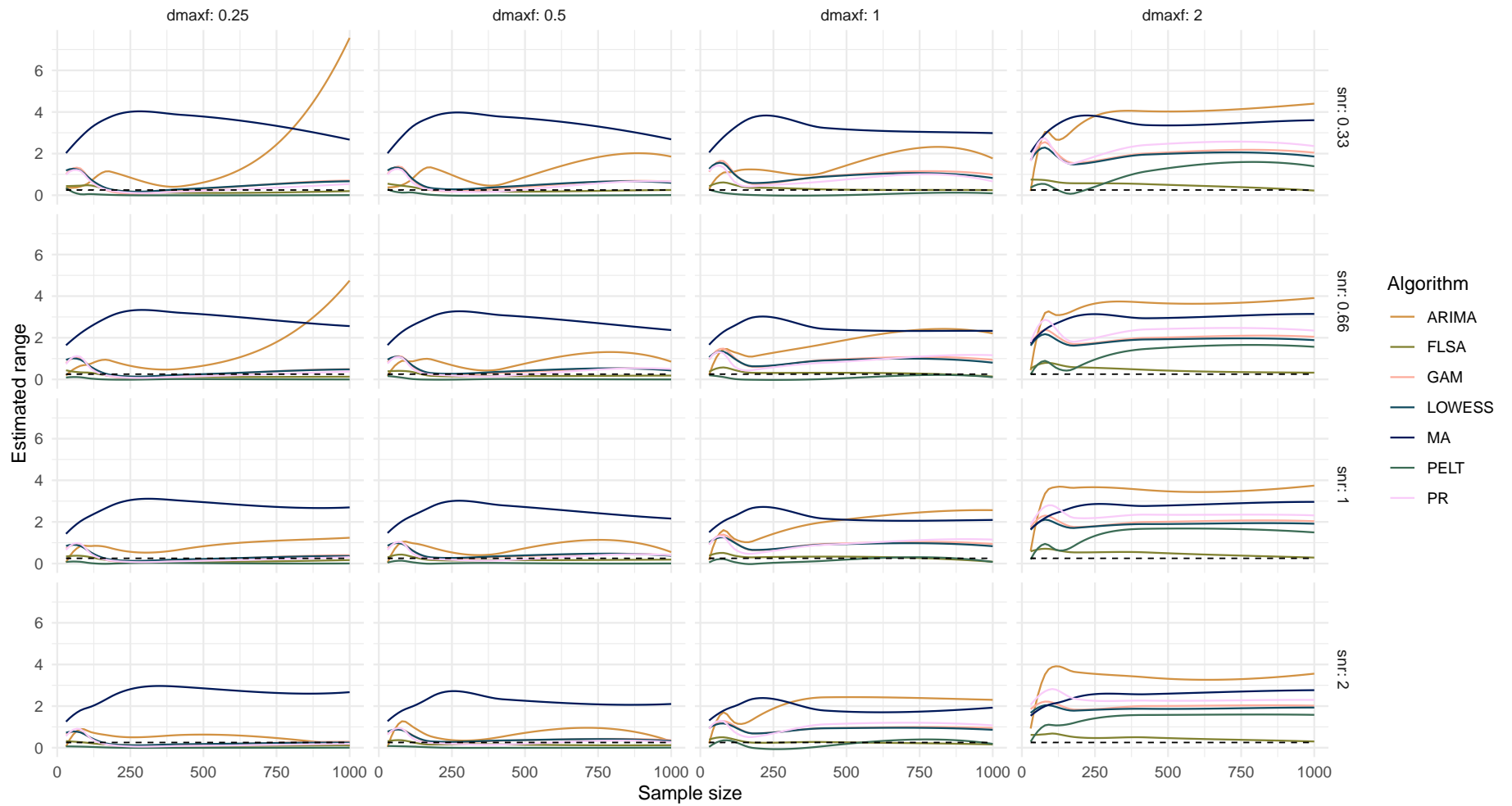


Boxplot of range difference over sample size

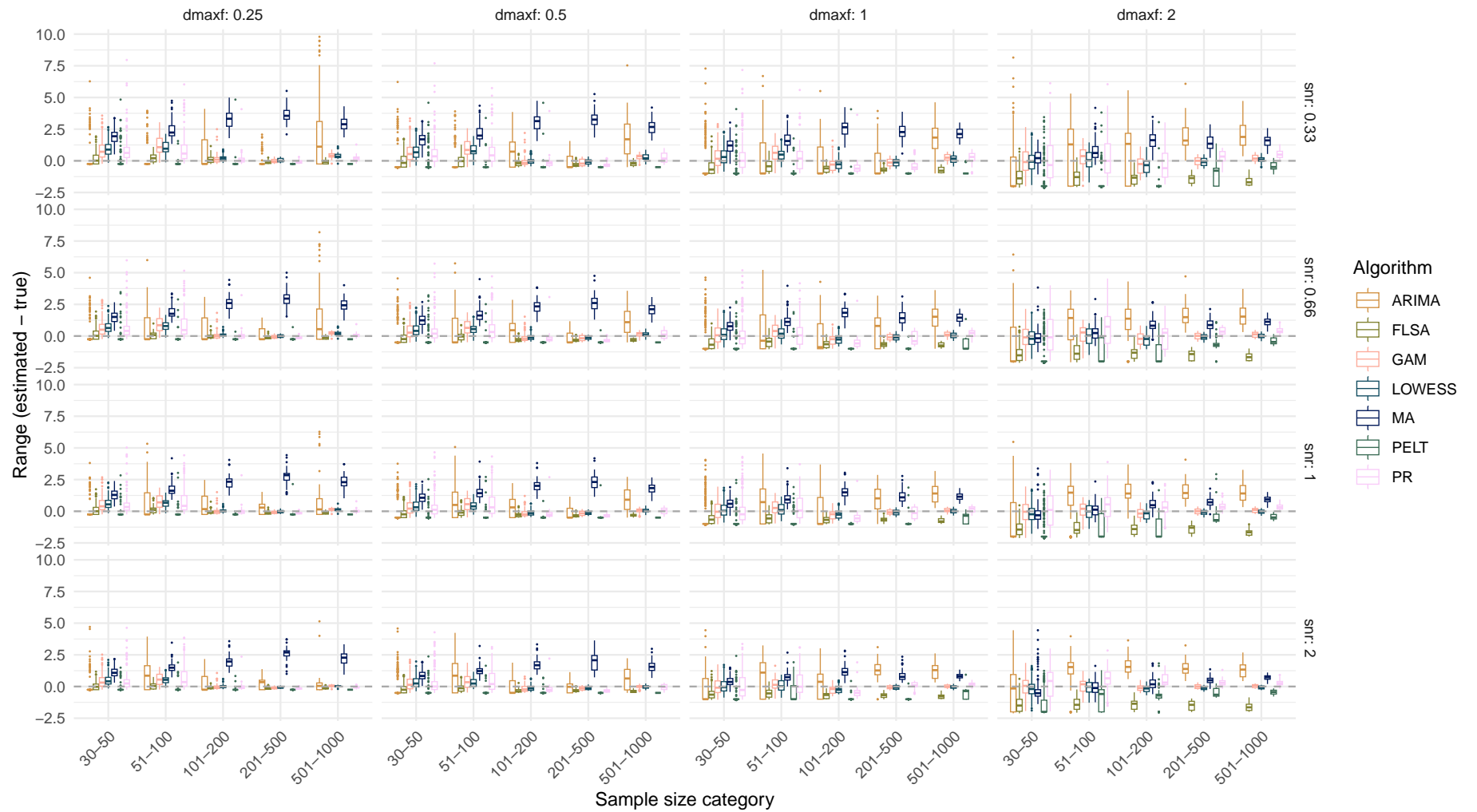


## Systematic change pattern: Quadratic

Estimated range over sample size  
(Dashed line indicates the true range)

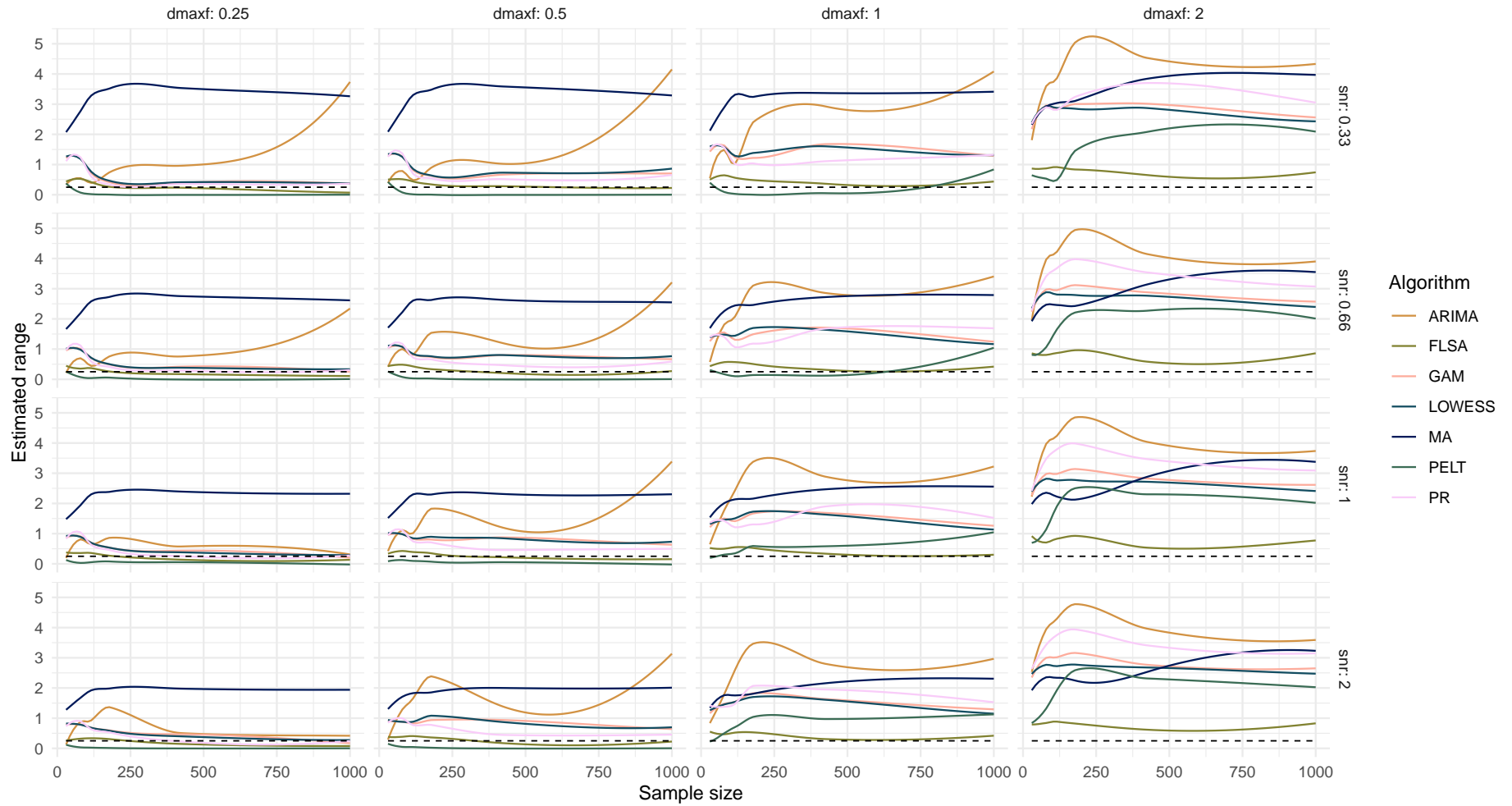


Boxplot of range difference over sample size

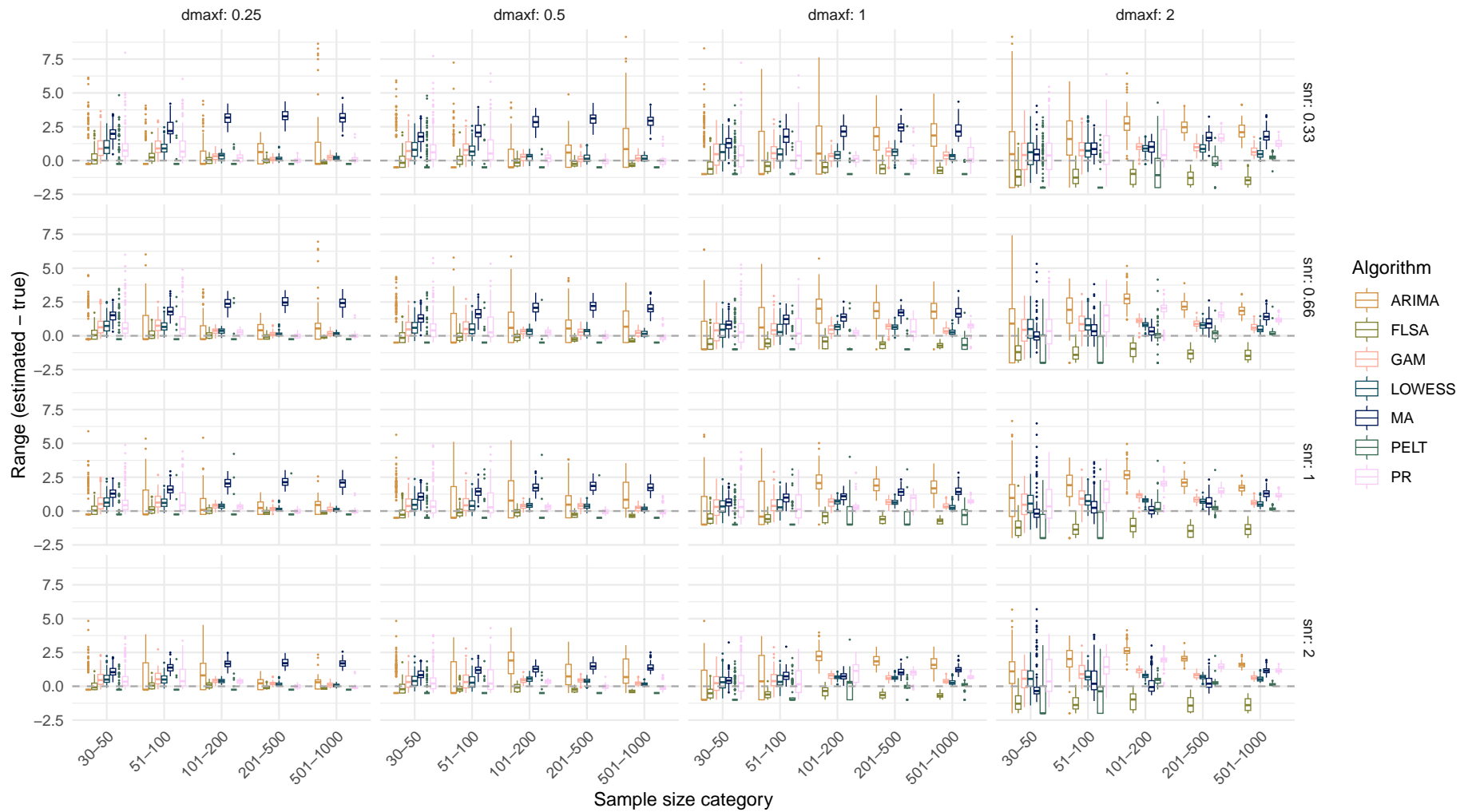


## Systematic change pattern: Recurrent

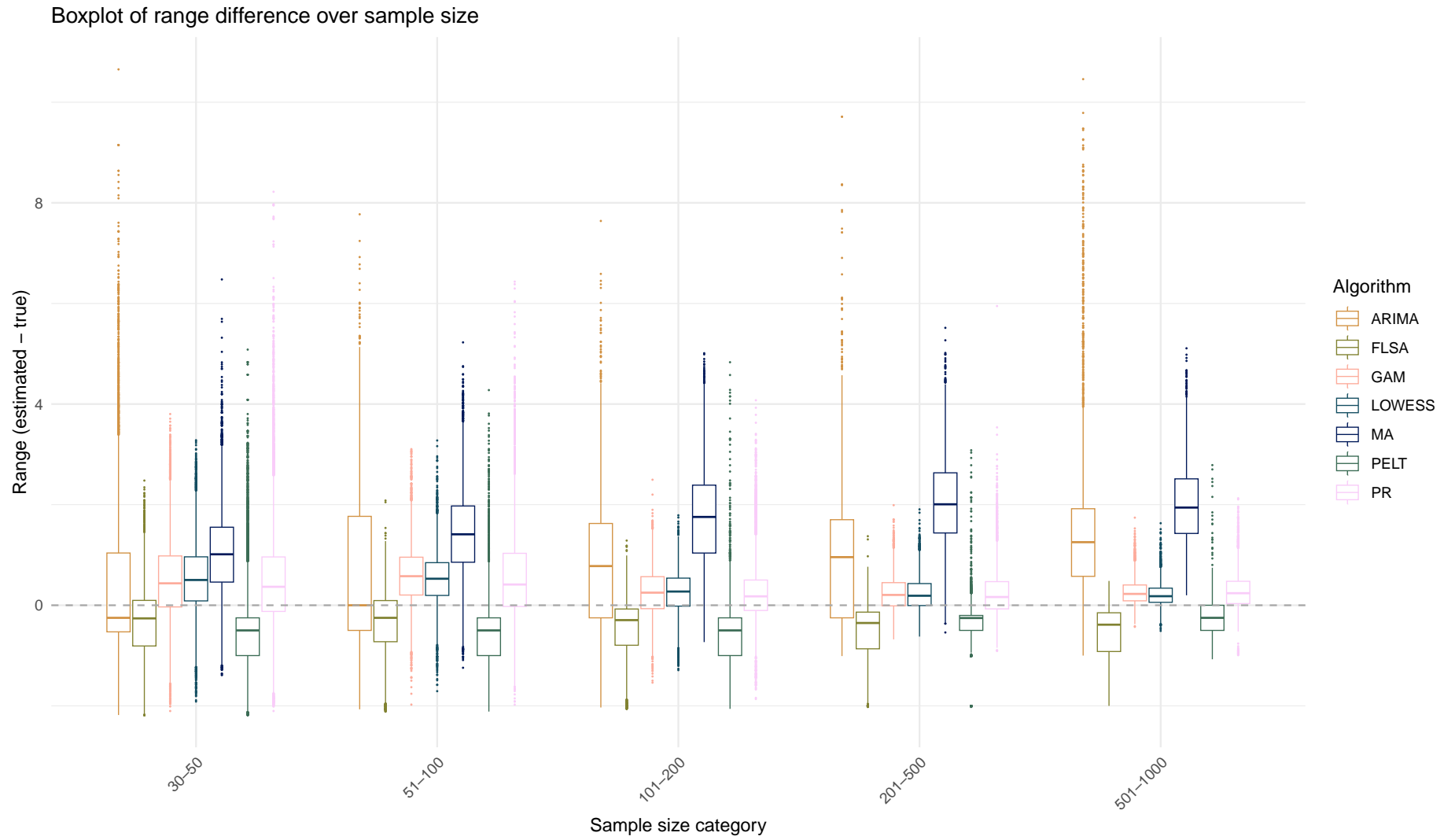
Estimated range over sample size  
(Dashed line indicates the true range)



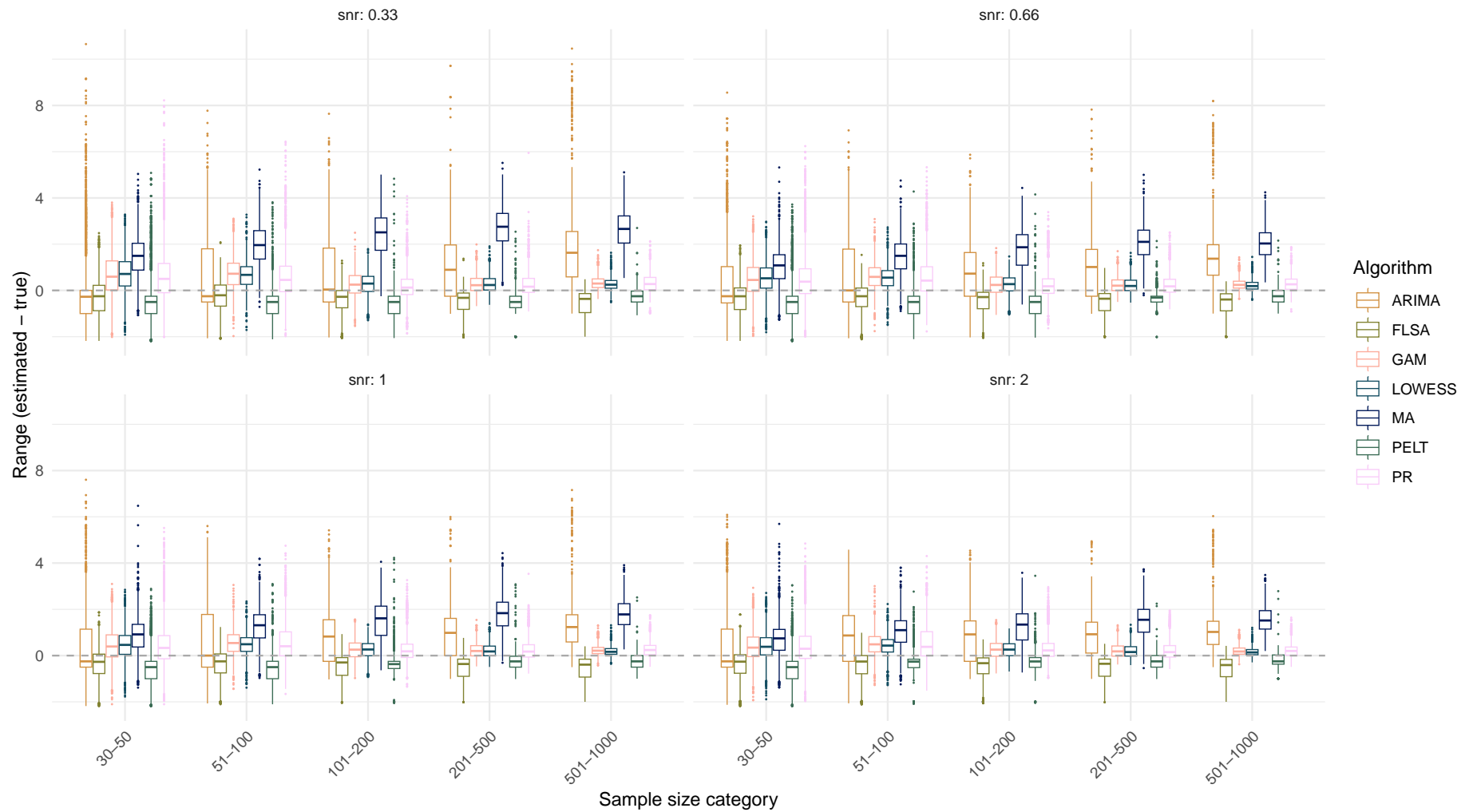
Boxplot of range difference over sample size



# Systematic change pattern: All patterns combined



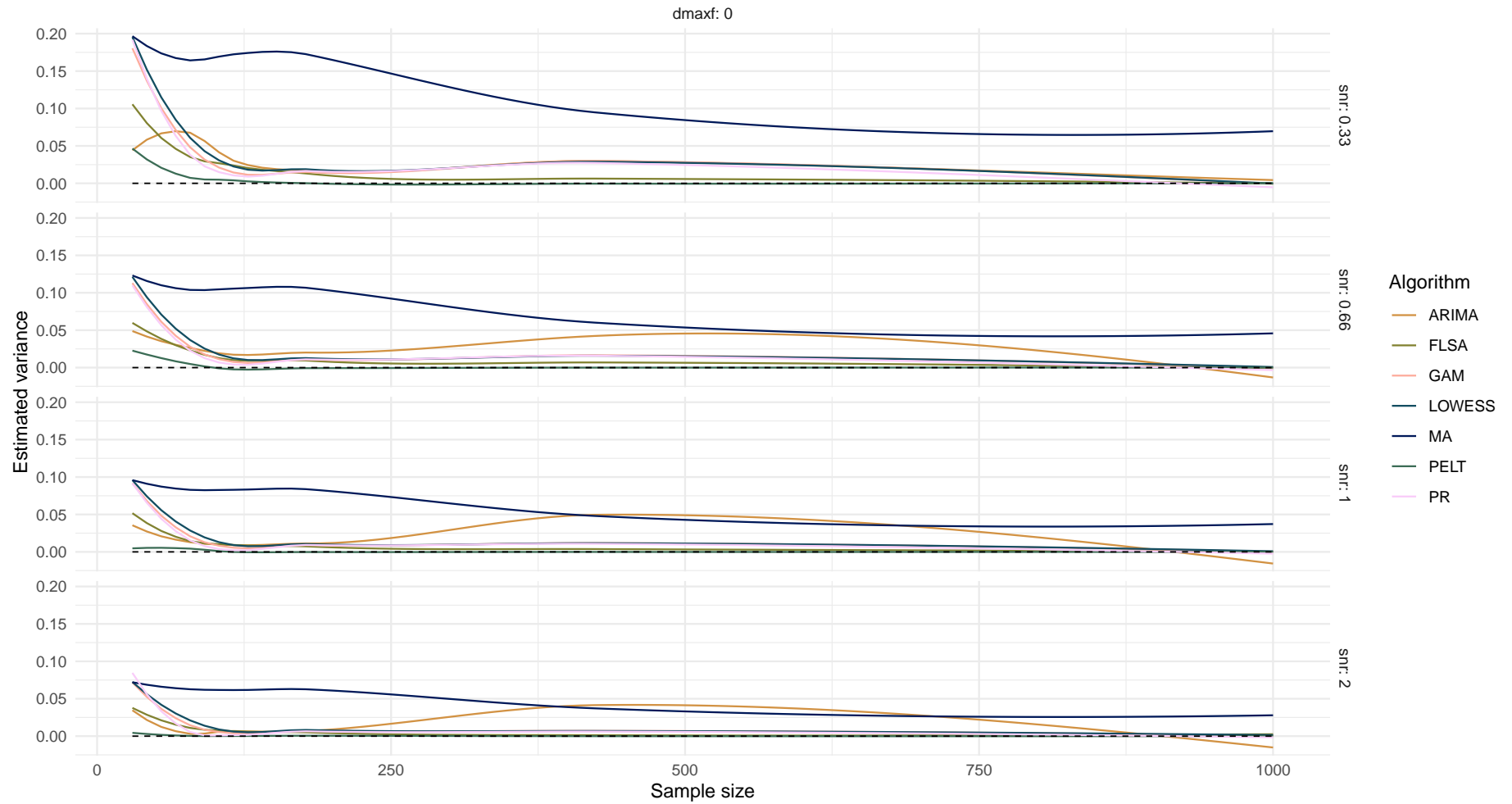
Boxplot of range difference over sample size



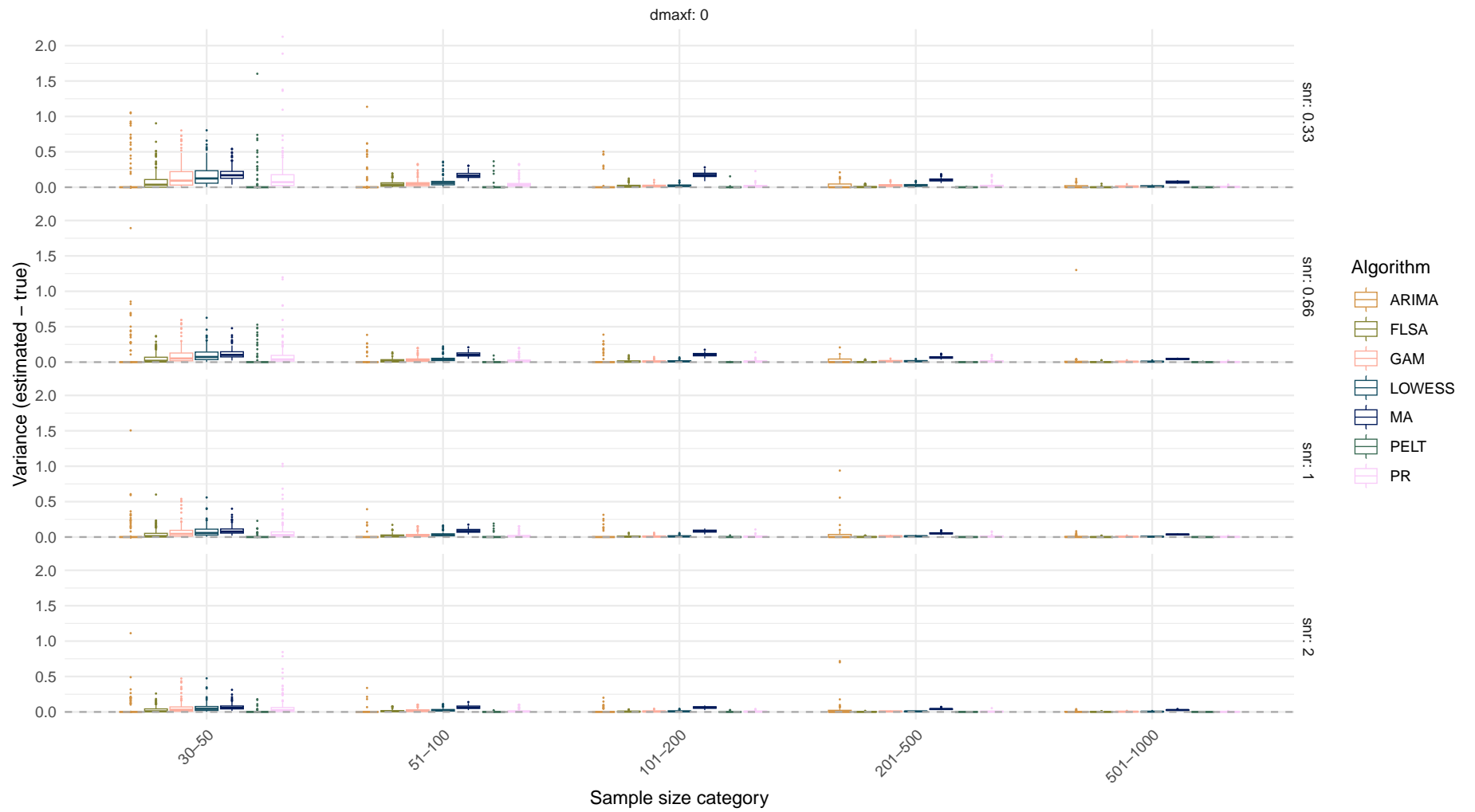
# Estimand: Variance

Systematic change pattern: No change

Estimated variance over sample size  
(Dashed line indicates the true variance)

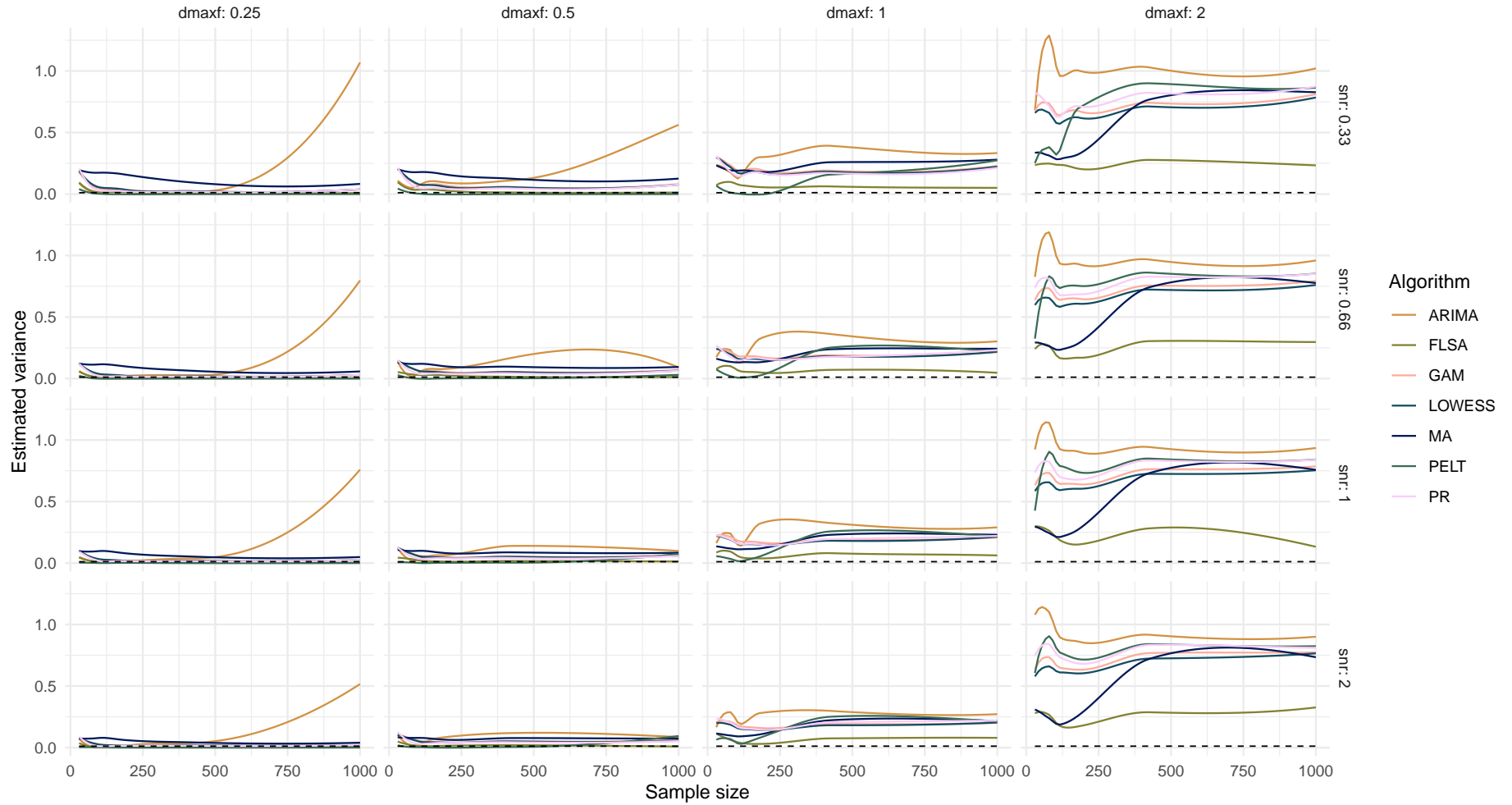


Boxplot of variance difference over sample size

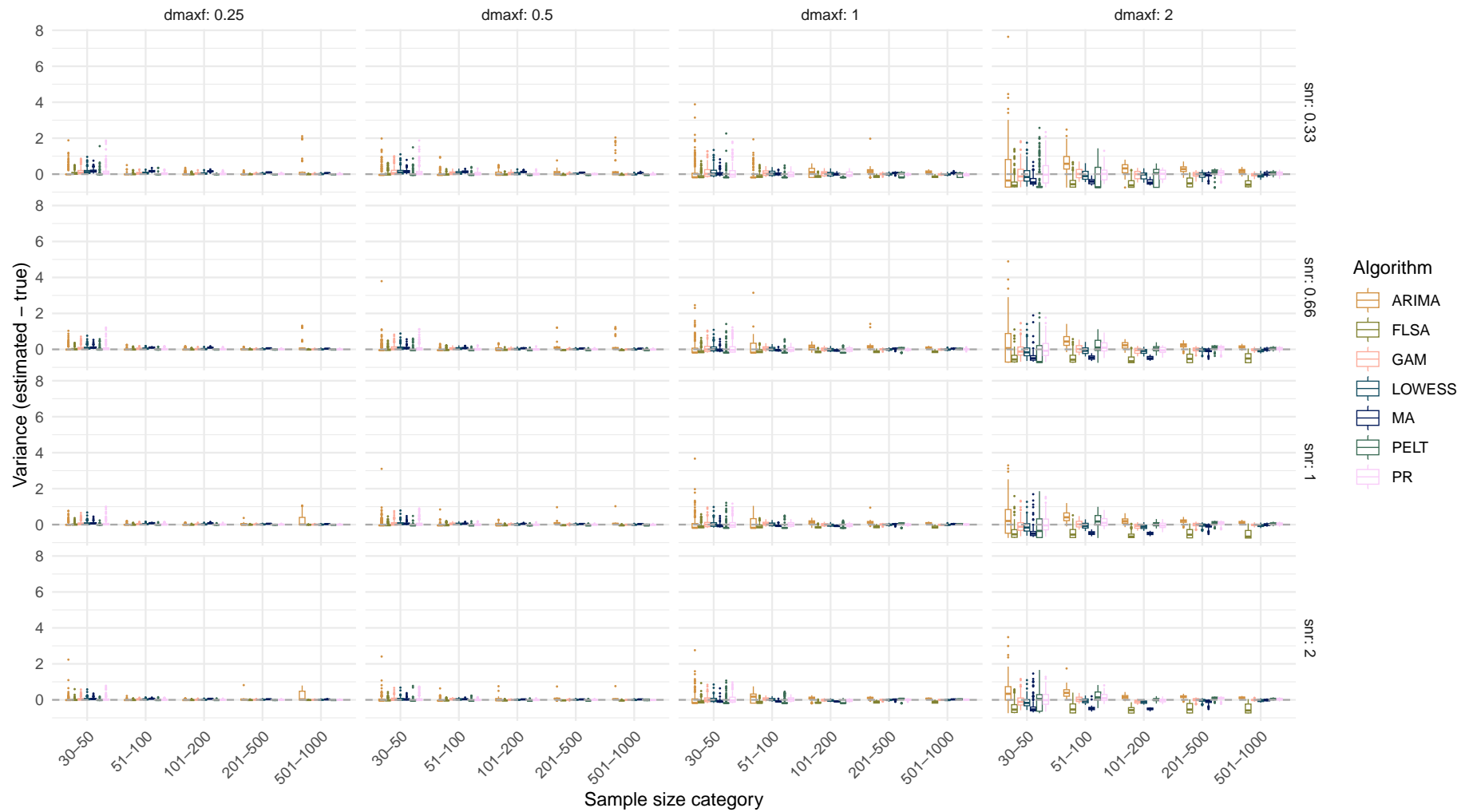


## Systematic change pattern: Jump

Estimated variance over sample size  
(Dashed line indicates the true variance)

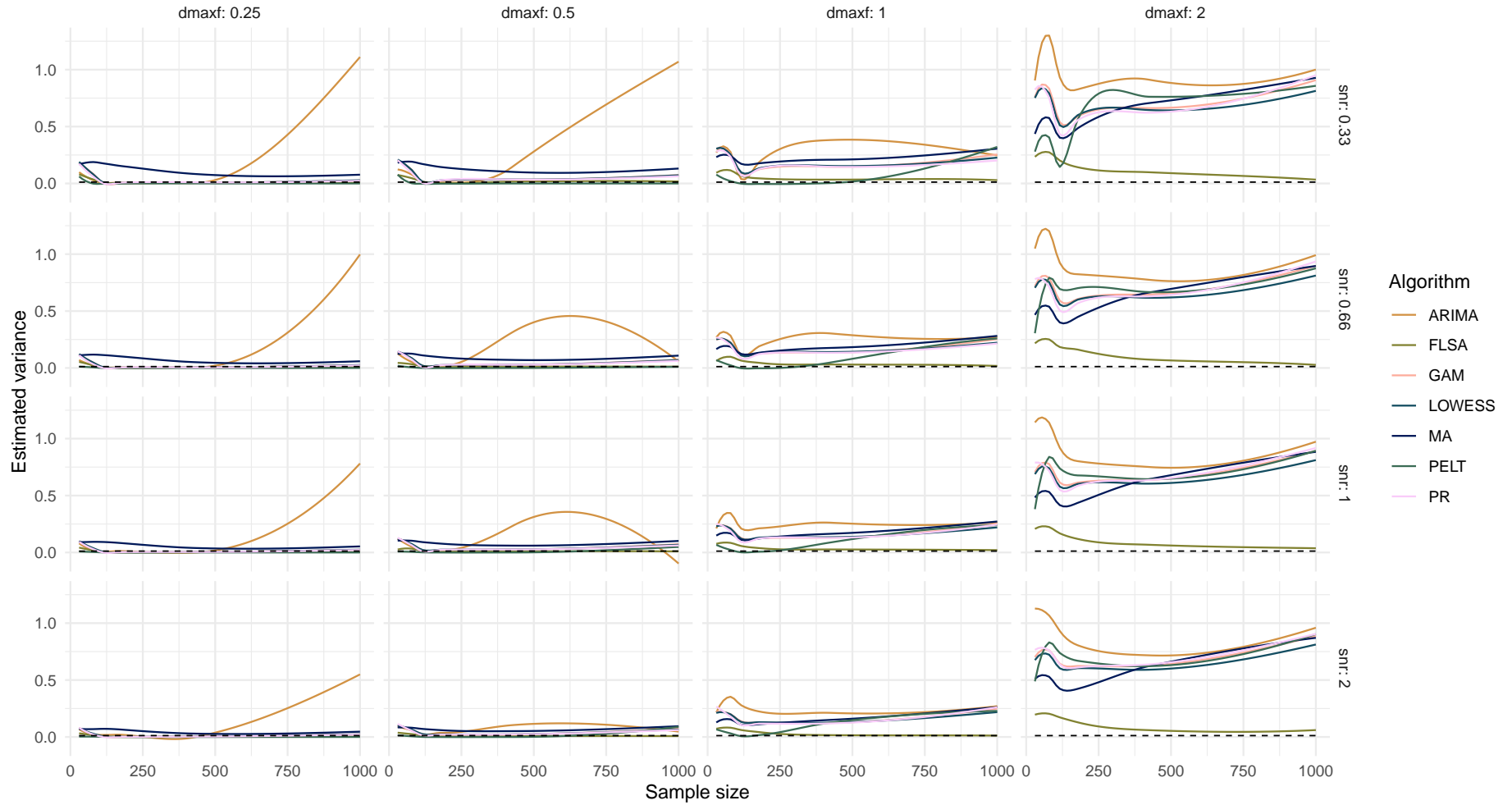


Boxplot of variance difference over sample size

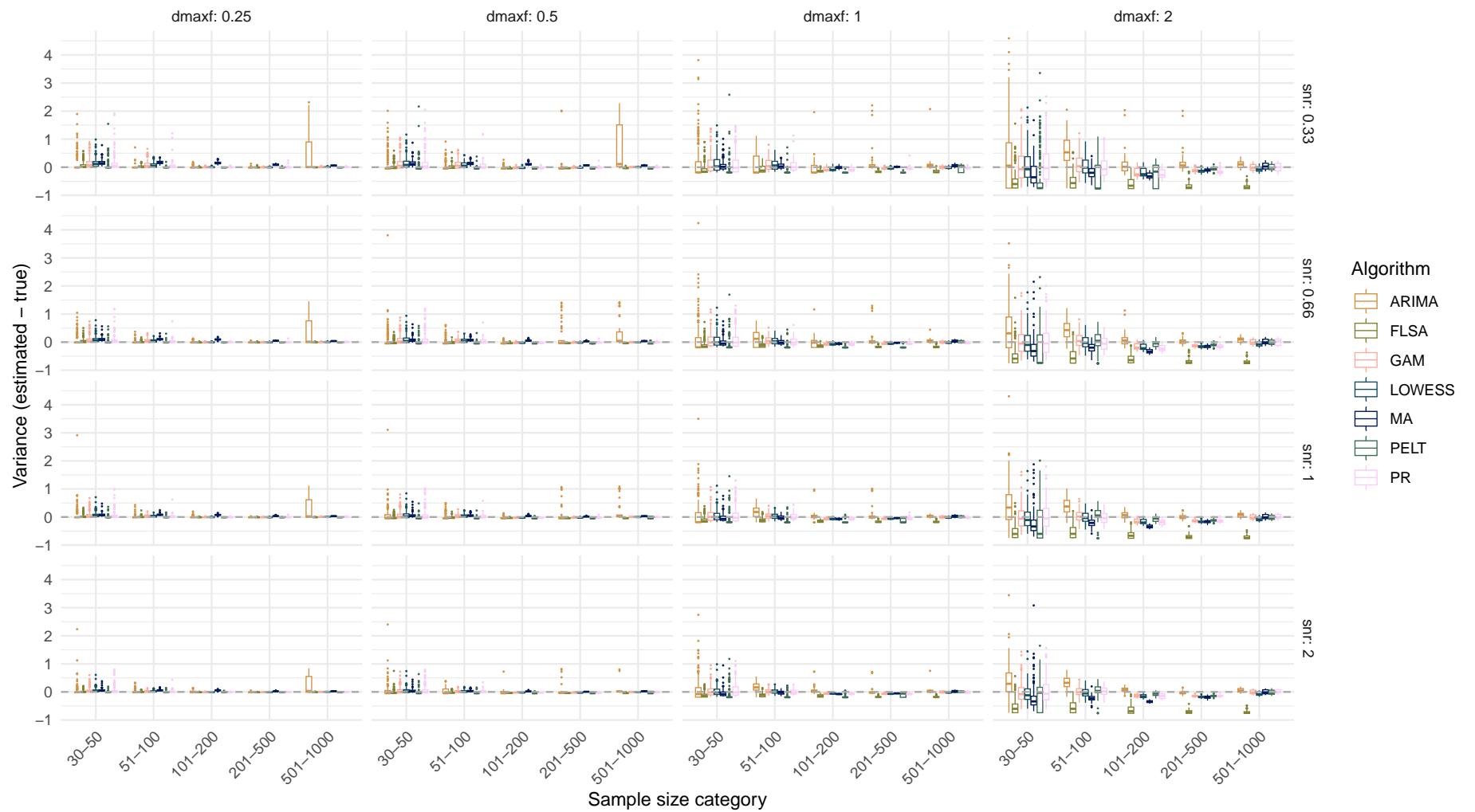


## Systematic change pattern: Linear

Estimated variance over sample size  
(Dashed line indicates the true variance)

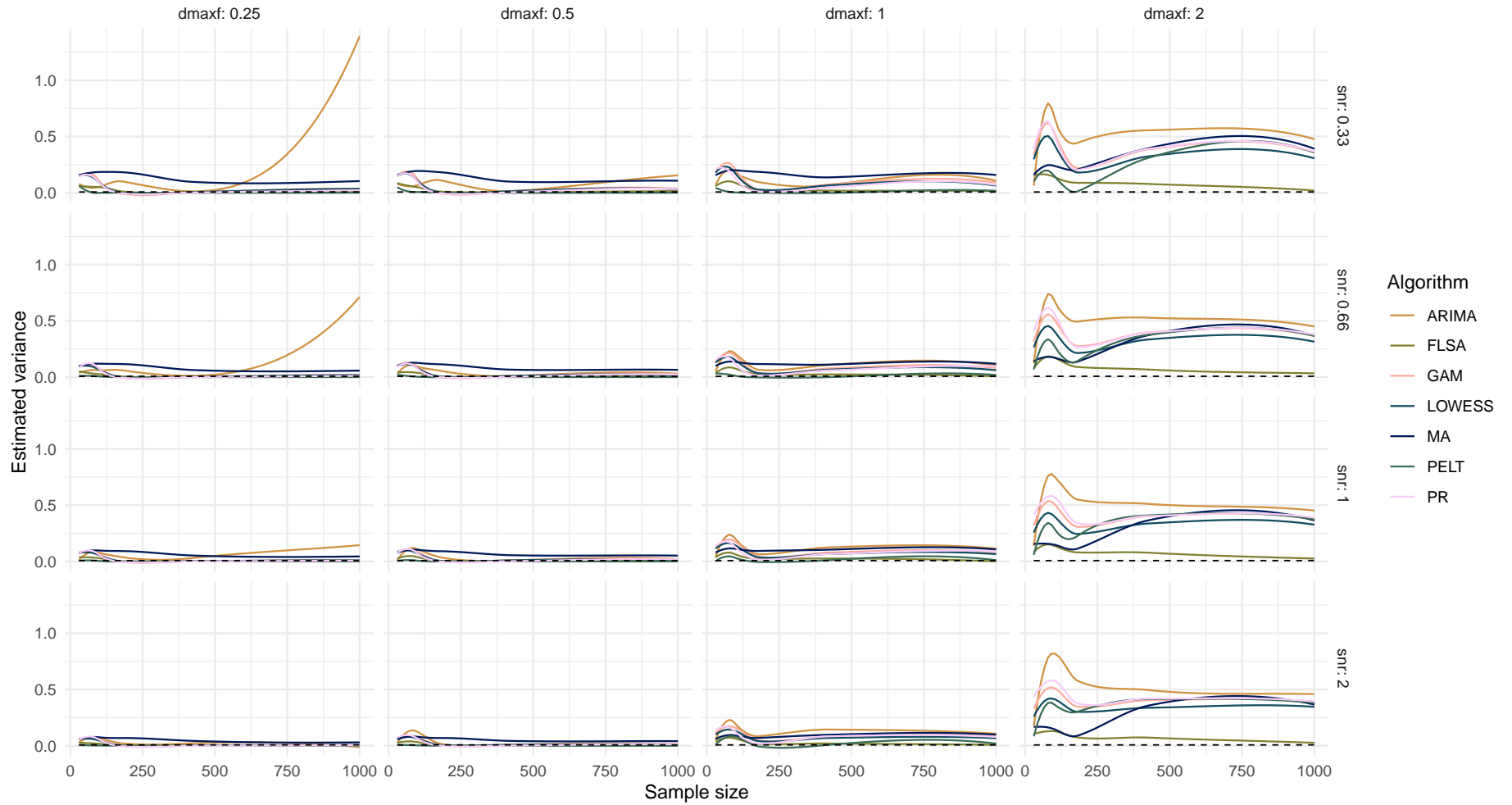


Boxplot of variance difference over sample size

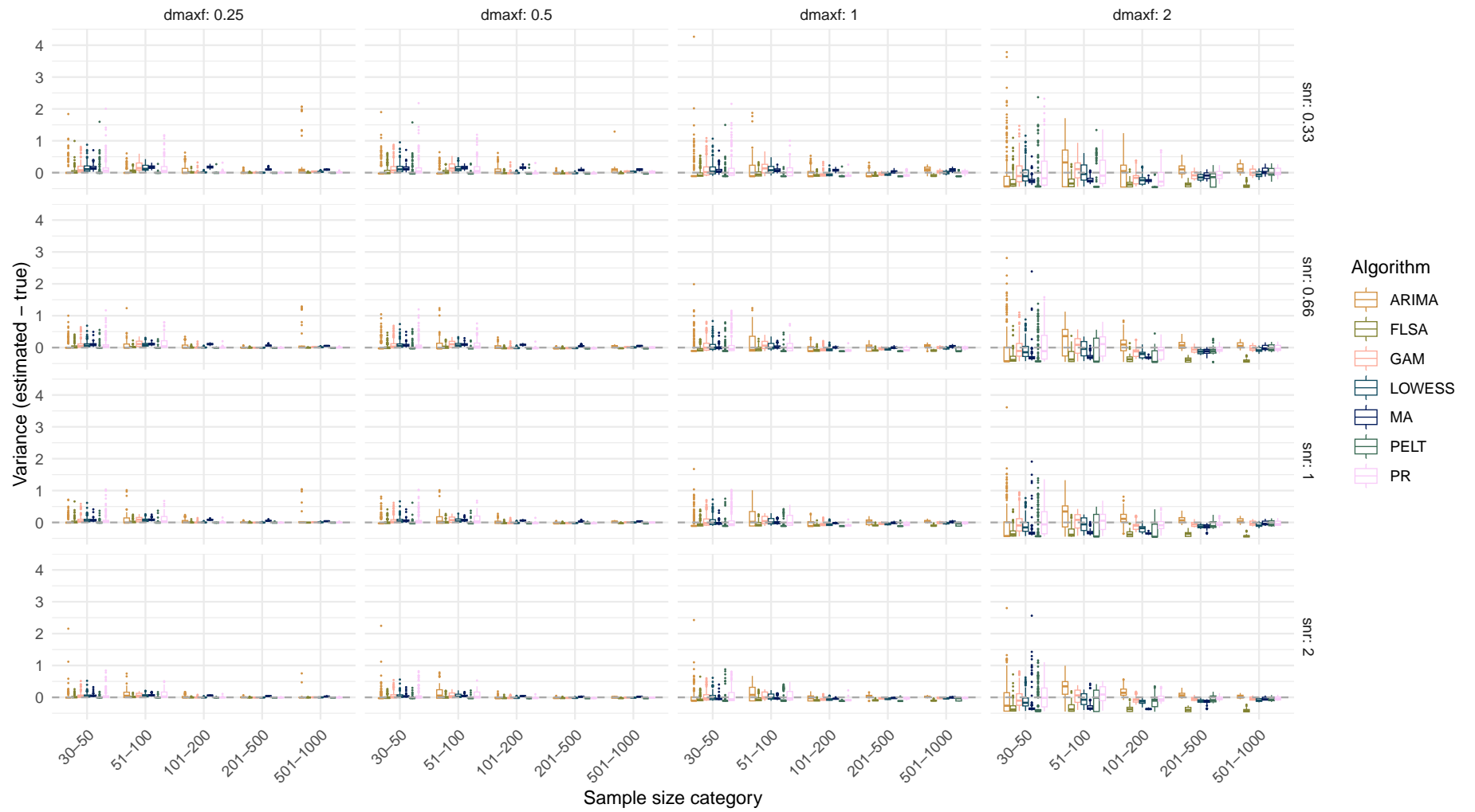


## Systematic change pattern: Quadratic

Estimated variance over sample size  
(Dashed line indicates the true variance)

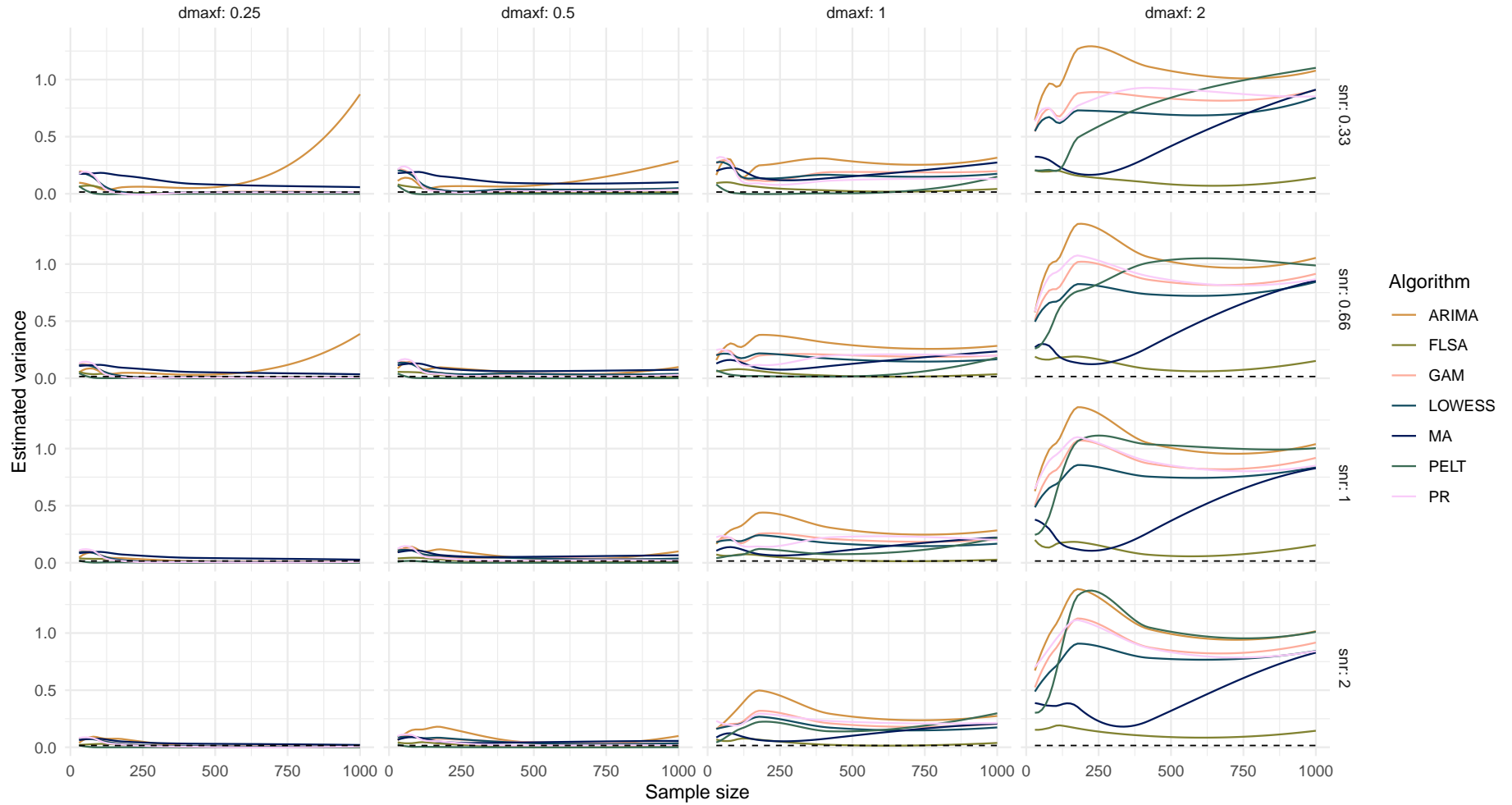


Boxplot of variance difference over sample size

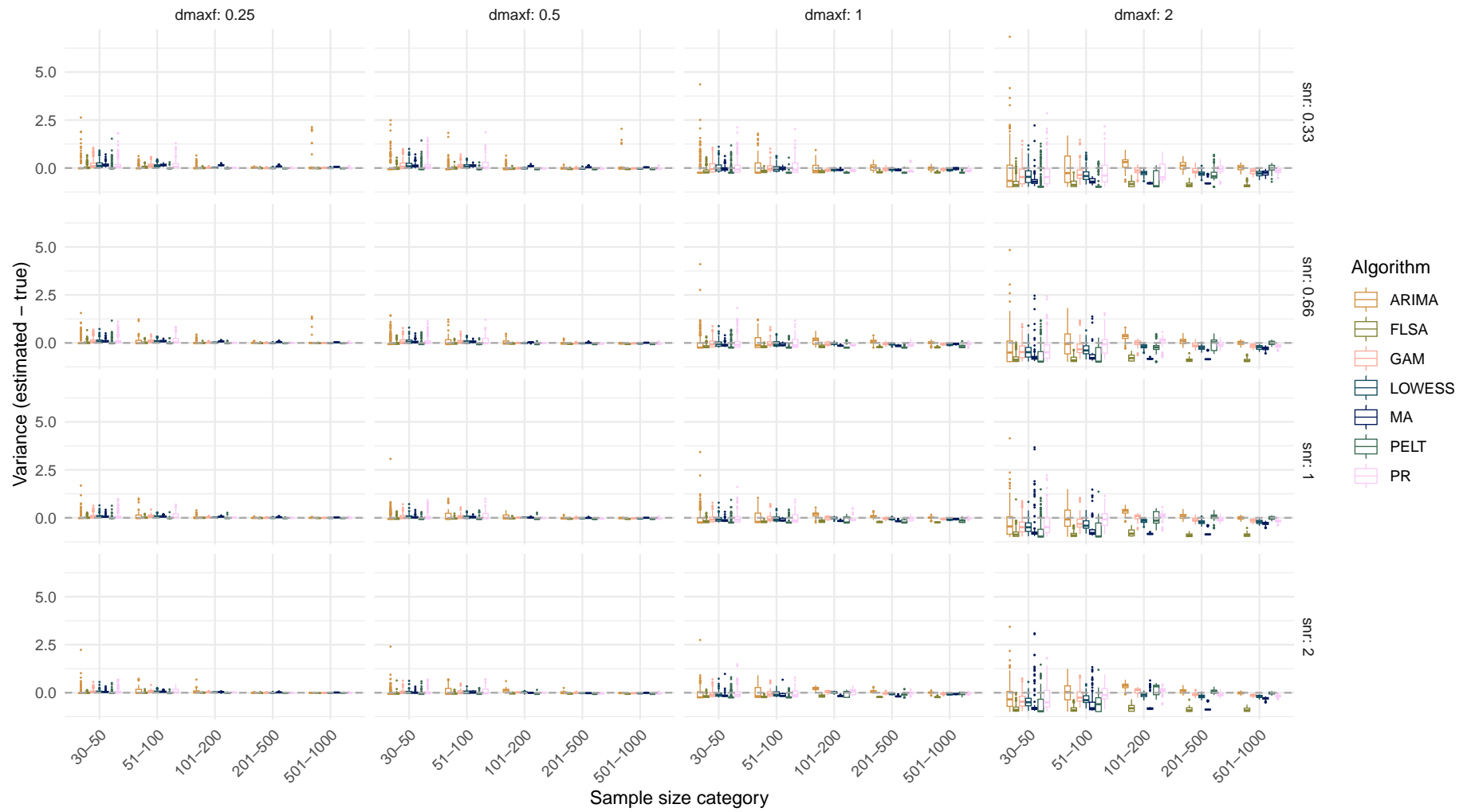


## Systematic change pattern: Recurrent

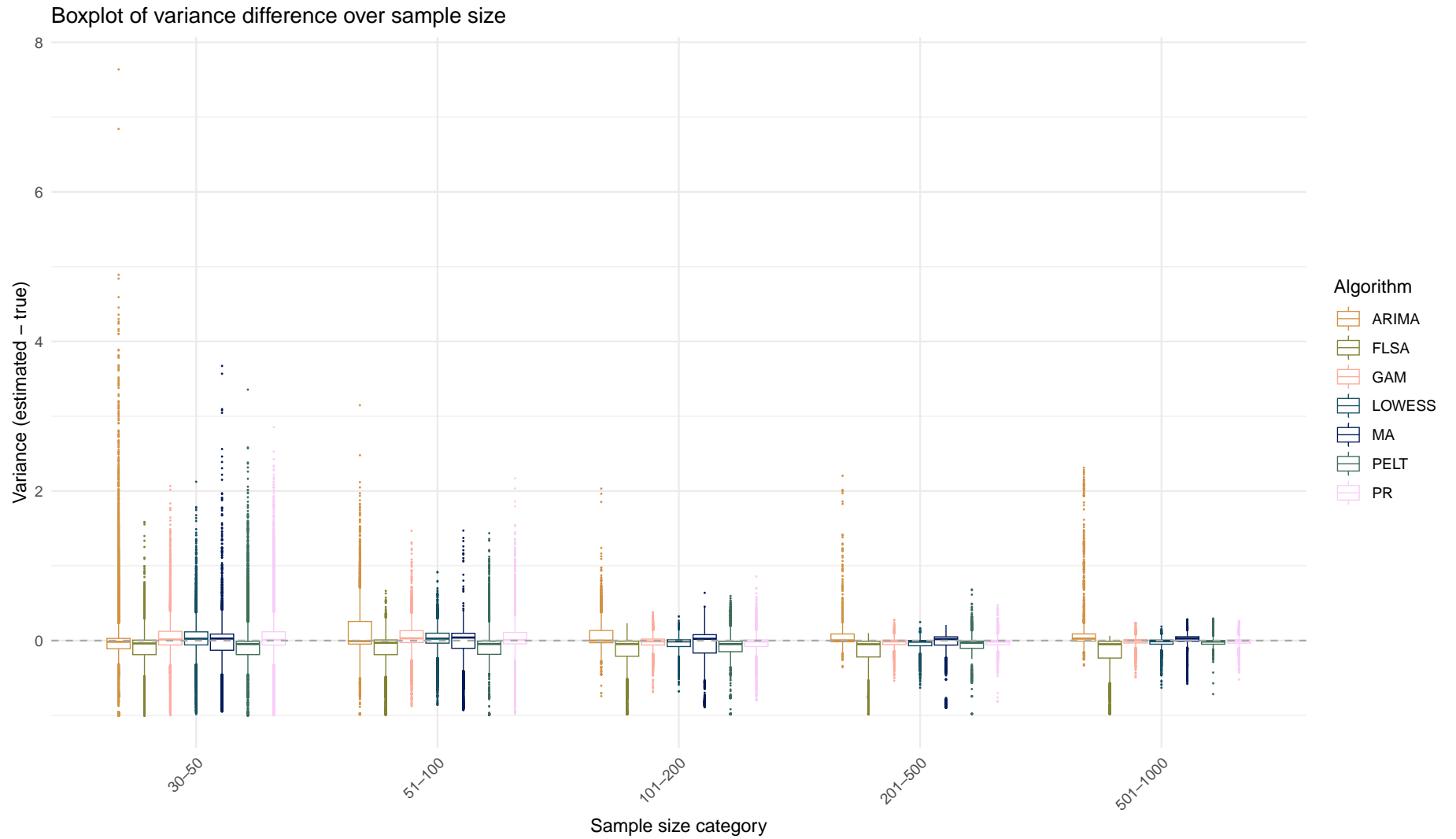
Estimated variance over sample size  
(Dashed line indicates the true variance)



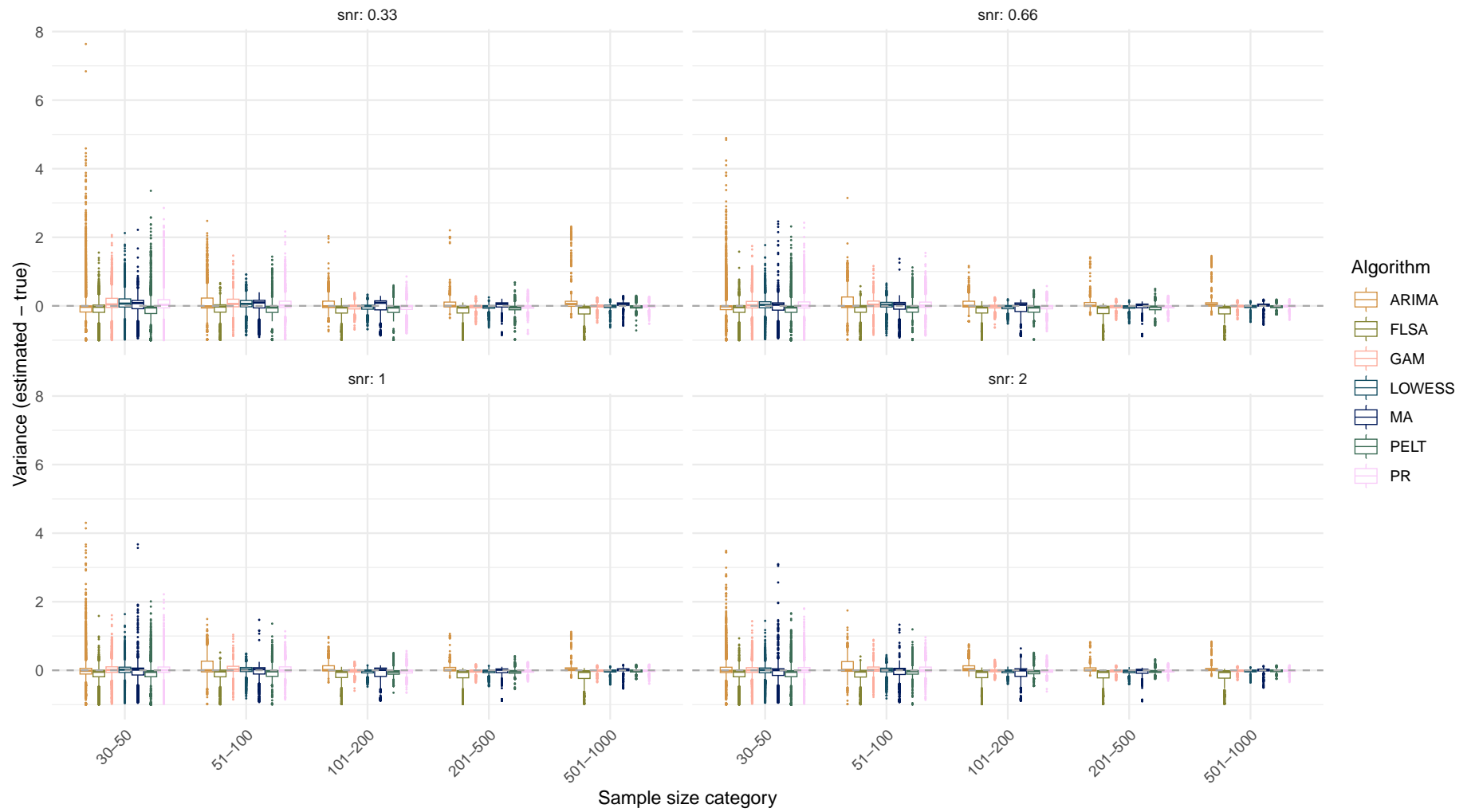
Boxplot of variance difference over sample size



### Systematic change pattern: All patterns combined



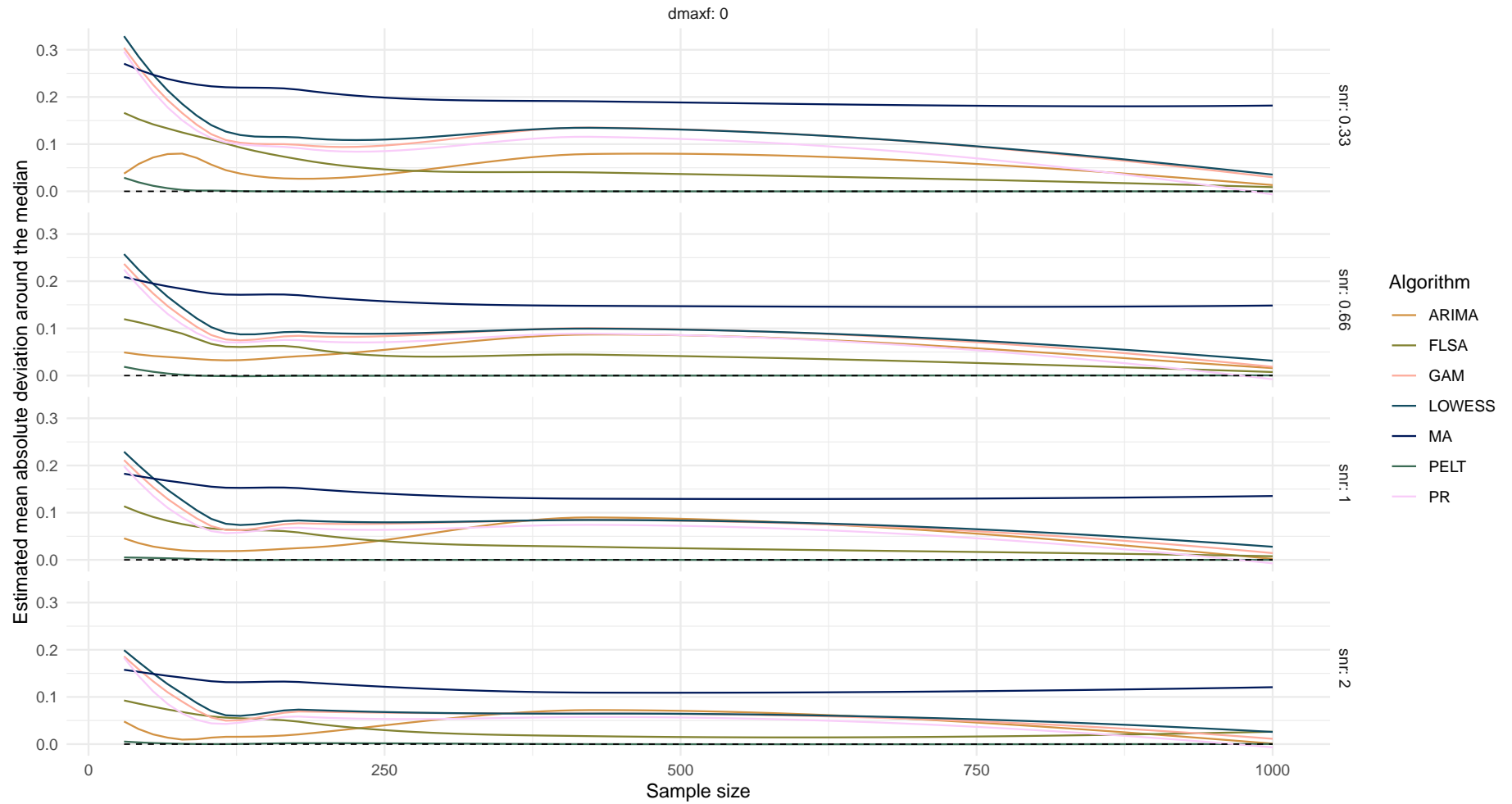
Boxplot of variance difference over sample size



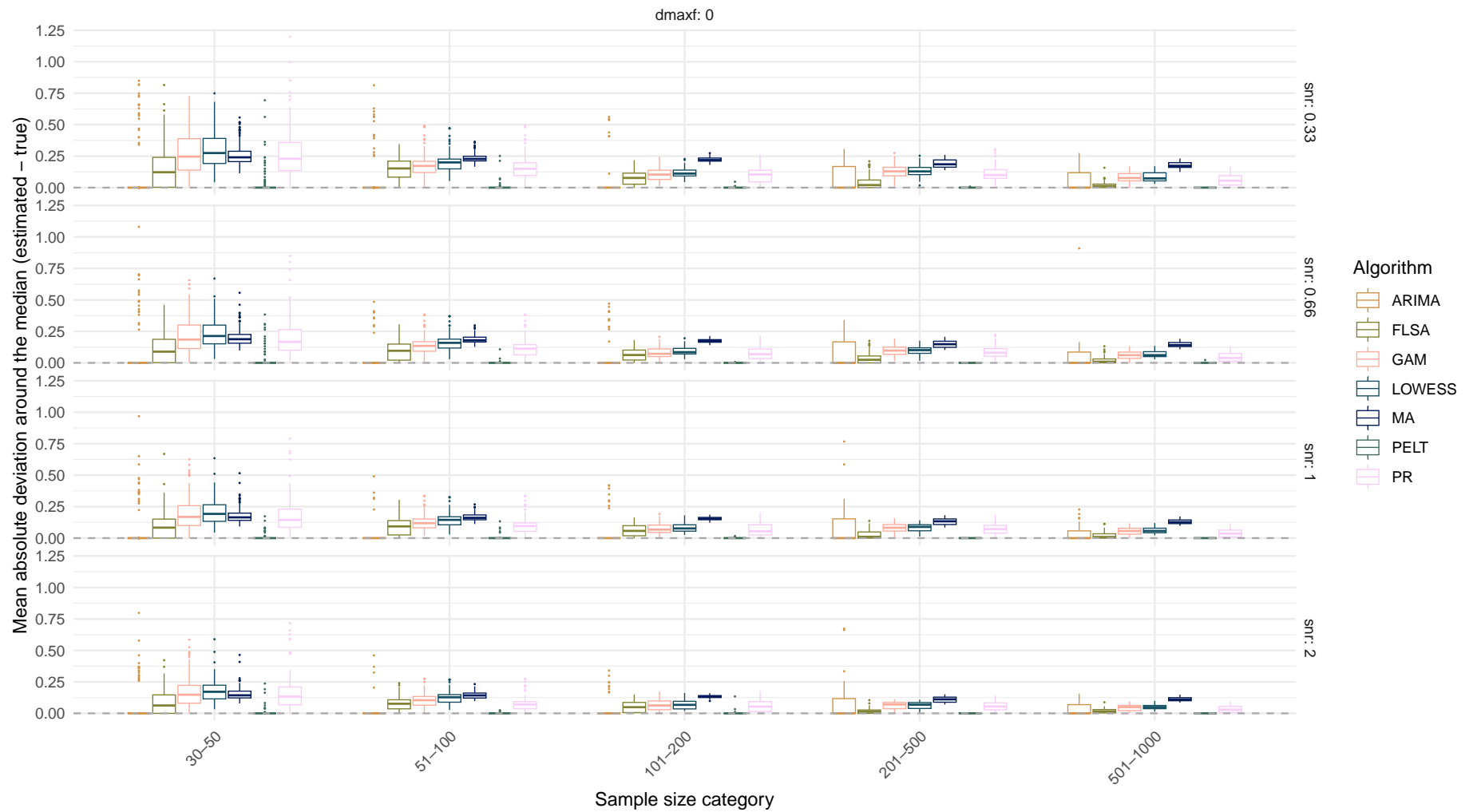
# Estimand: Mean absolute deviation around the median

Systematic change pattern: No change

Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)

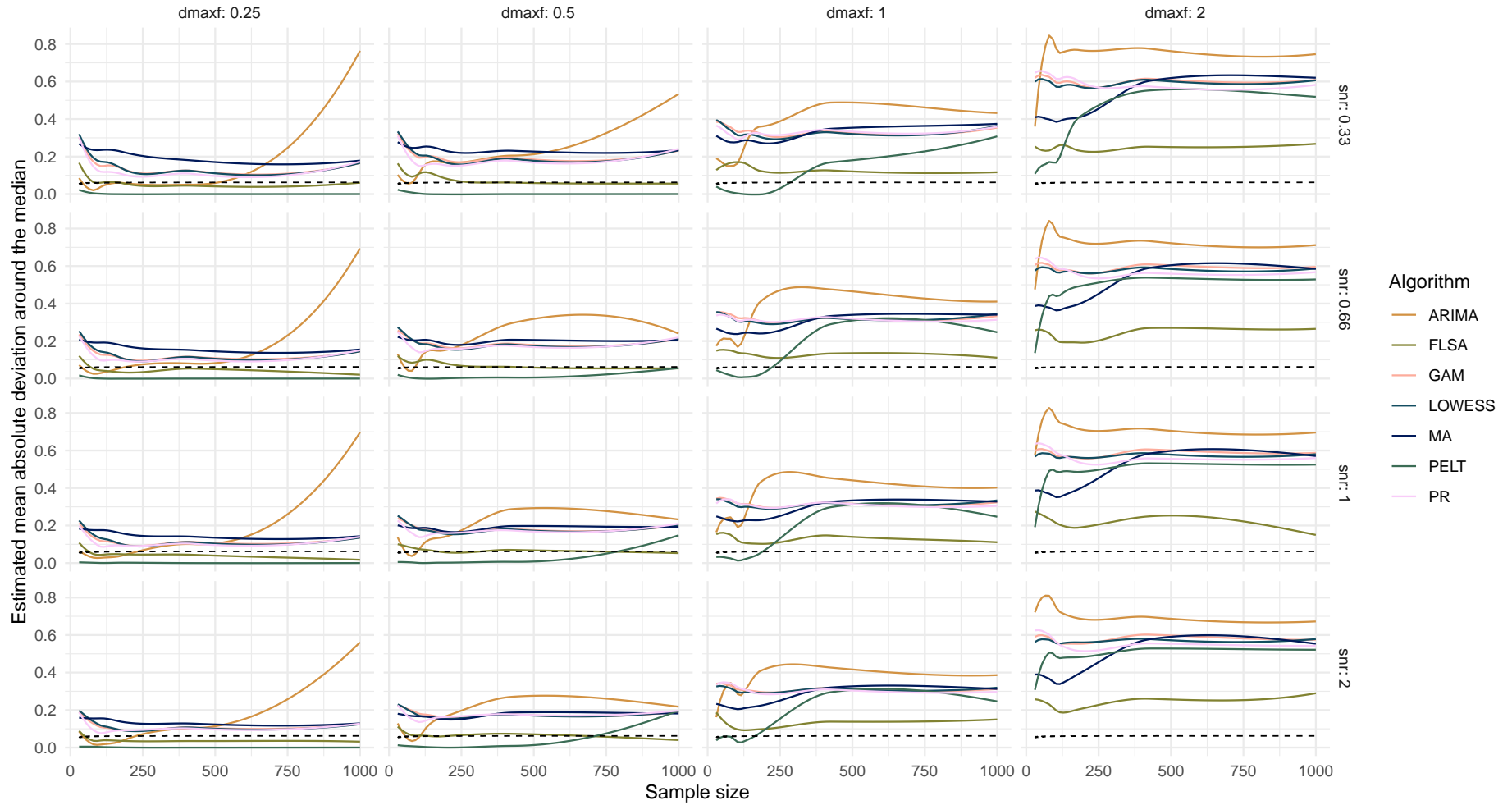


Boxplot of mean absolute deviation around the median difference over sample size

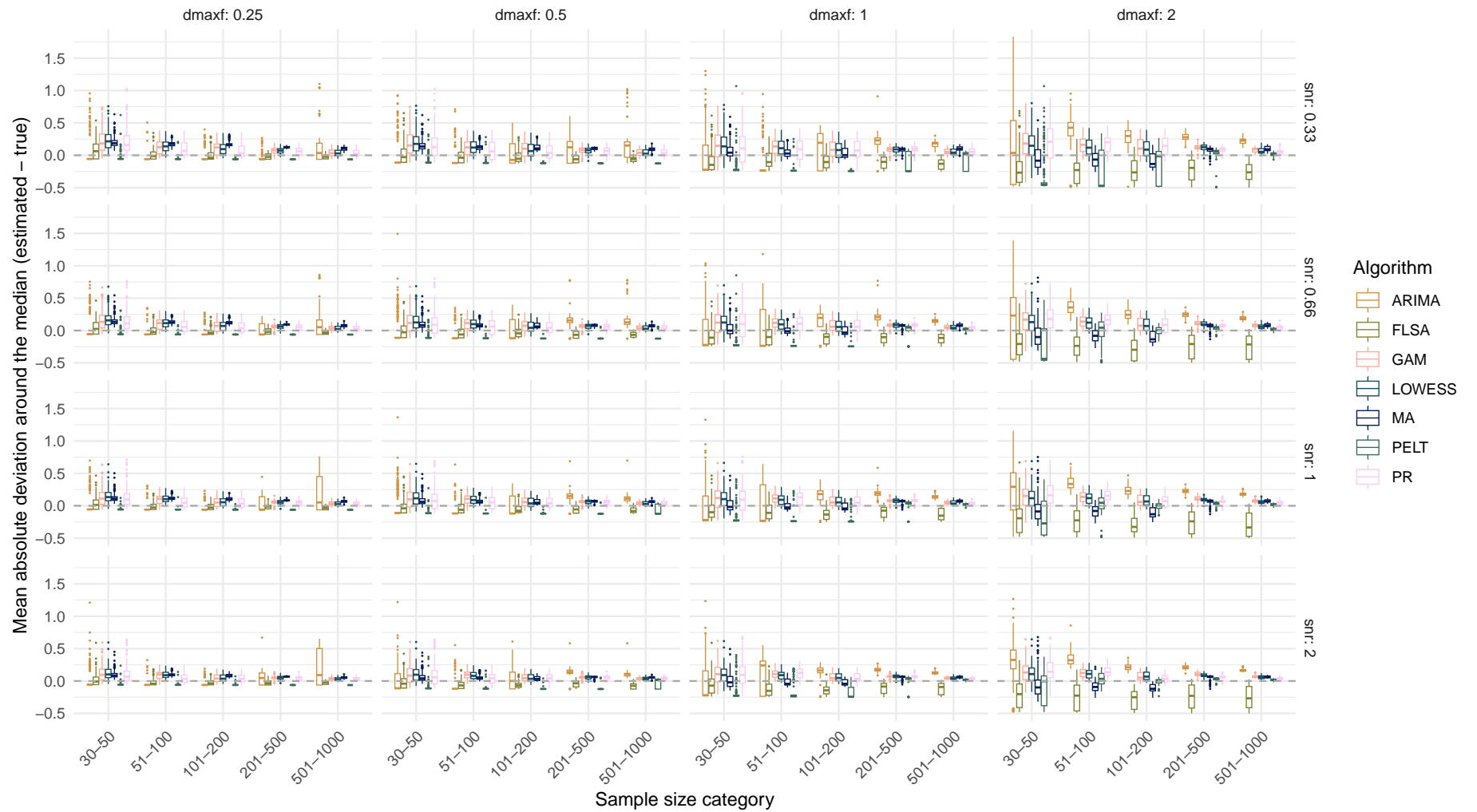


## Systematic change pattern: Jump

Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)

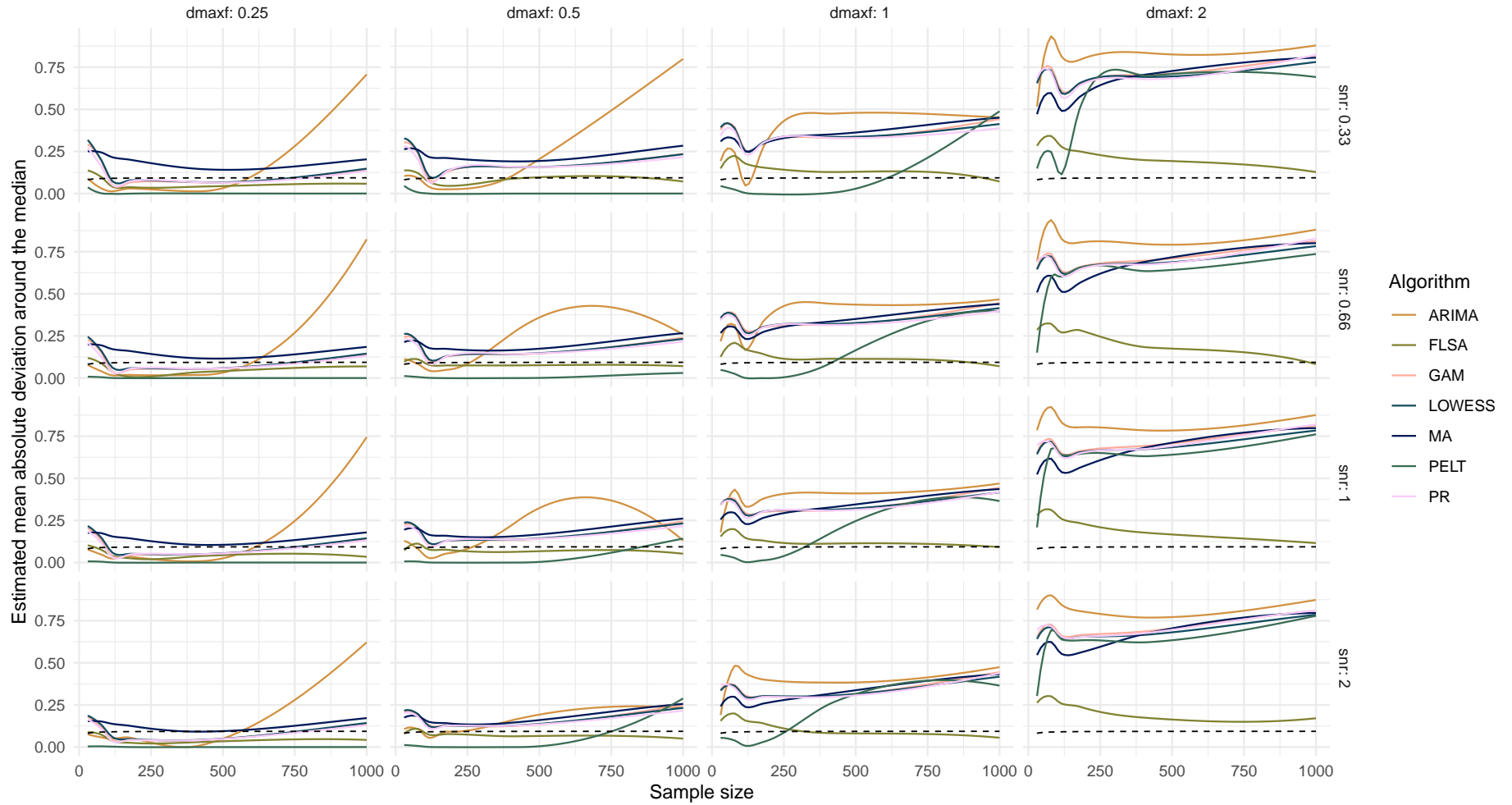


Boxplot of mean absolute deviation around the median difference over sample size

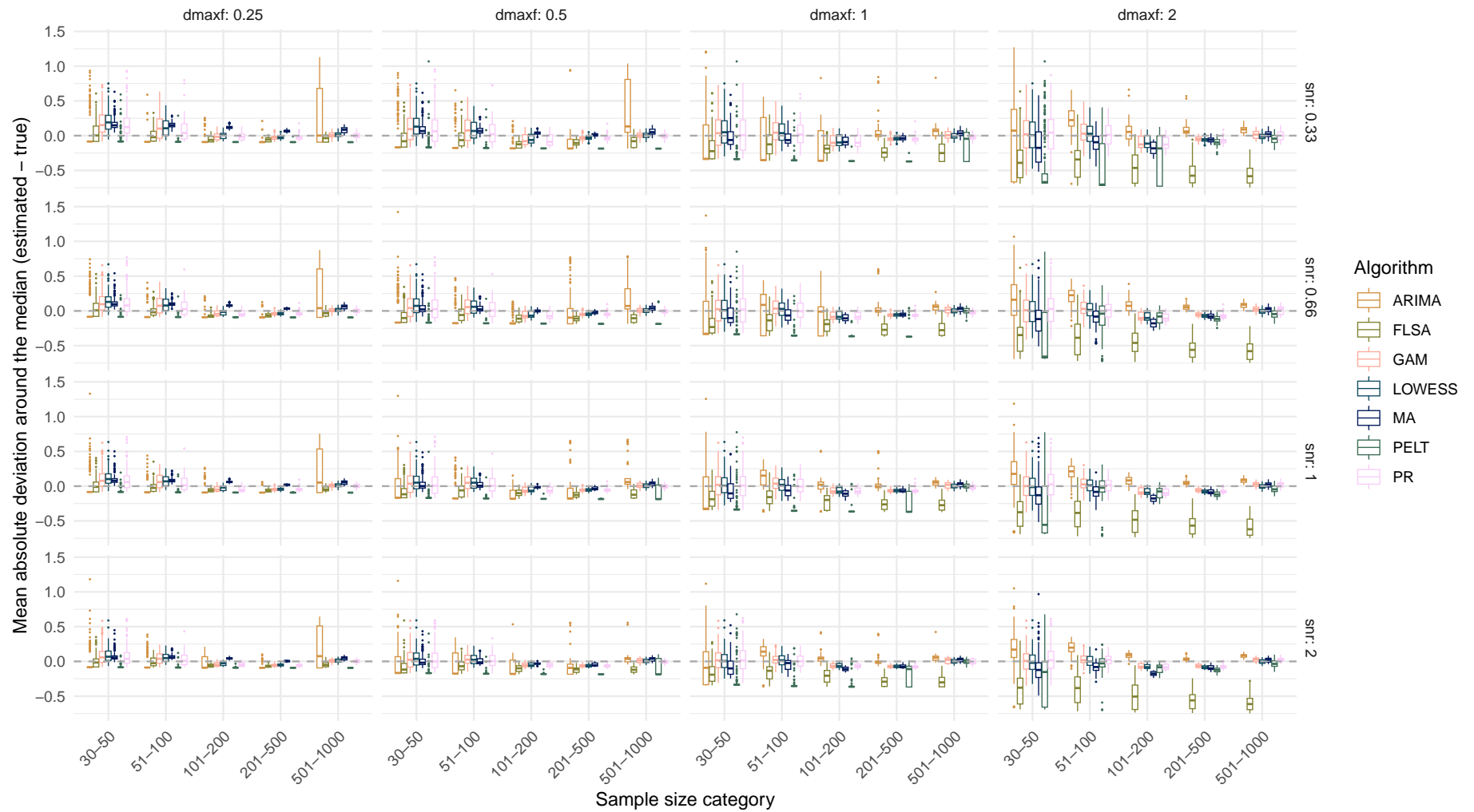


## Systematic change pattern: Linear

Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)

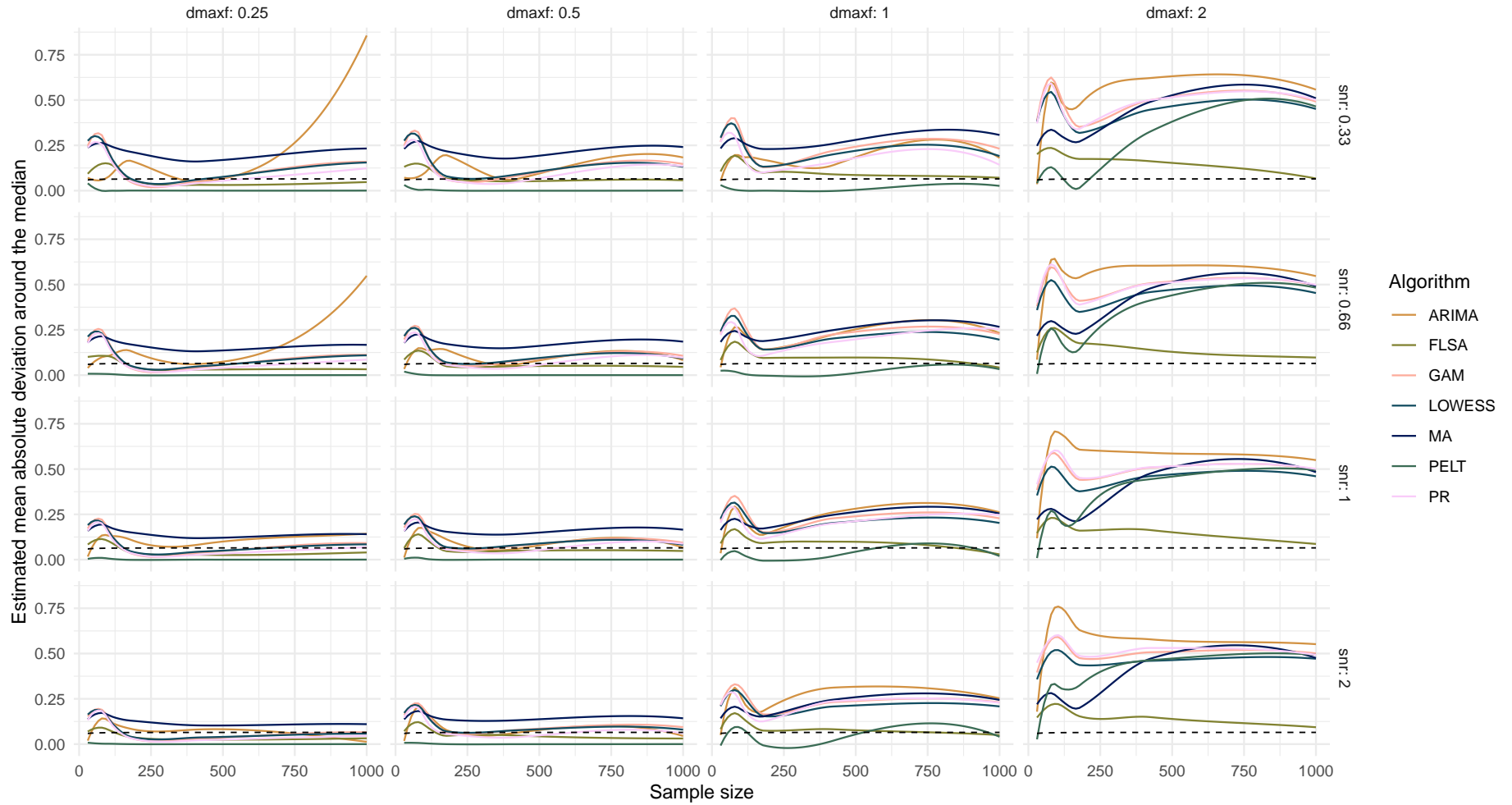


Boxplot of mean absolute deviation around the median difference over sample size

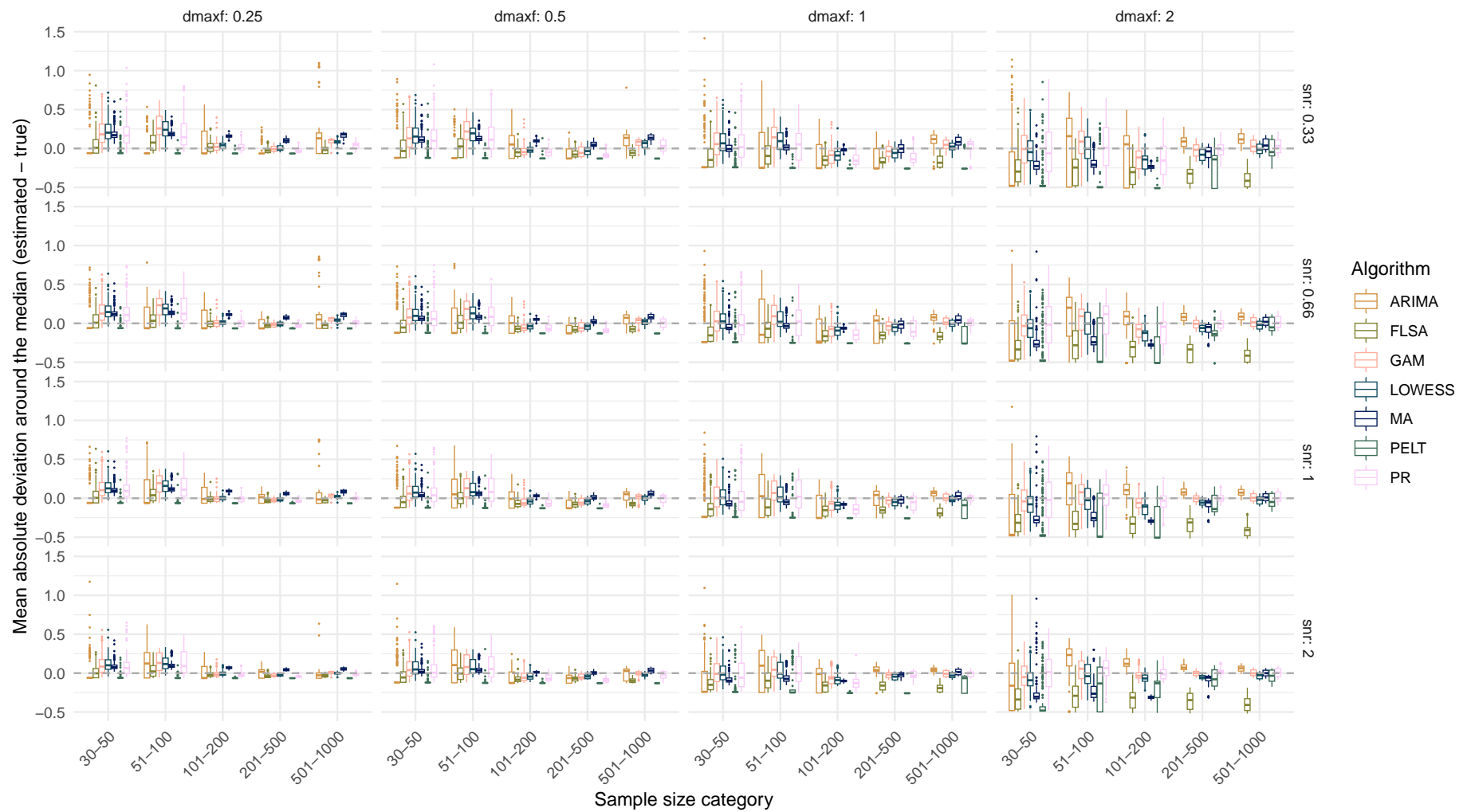


## Systematic change pattern: Quadratic

Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)

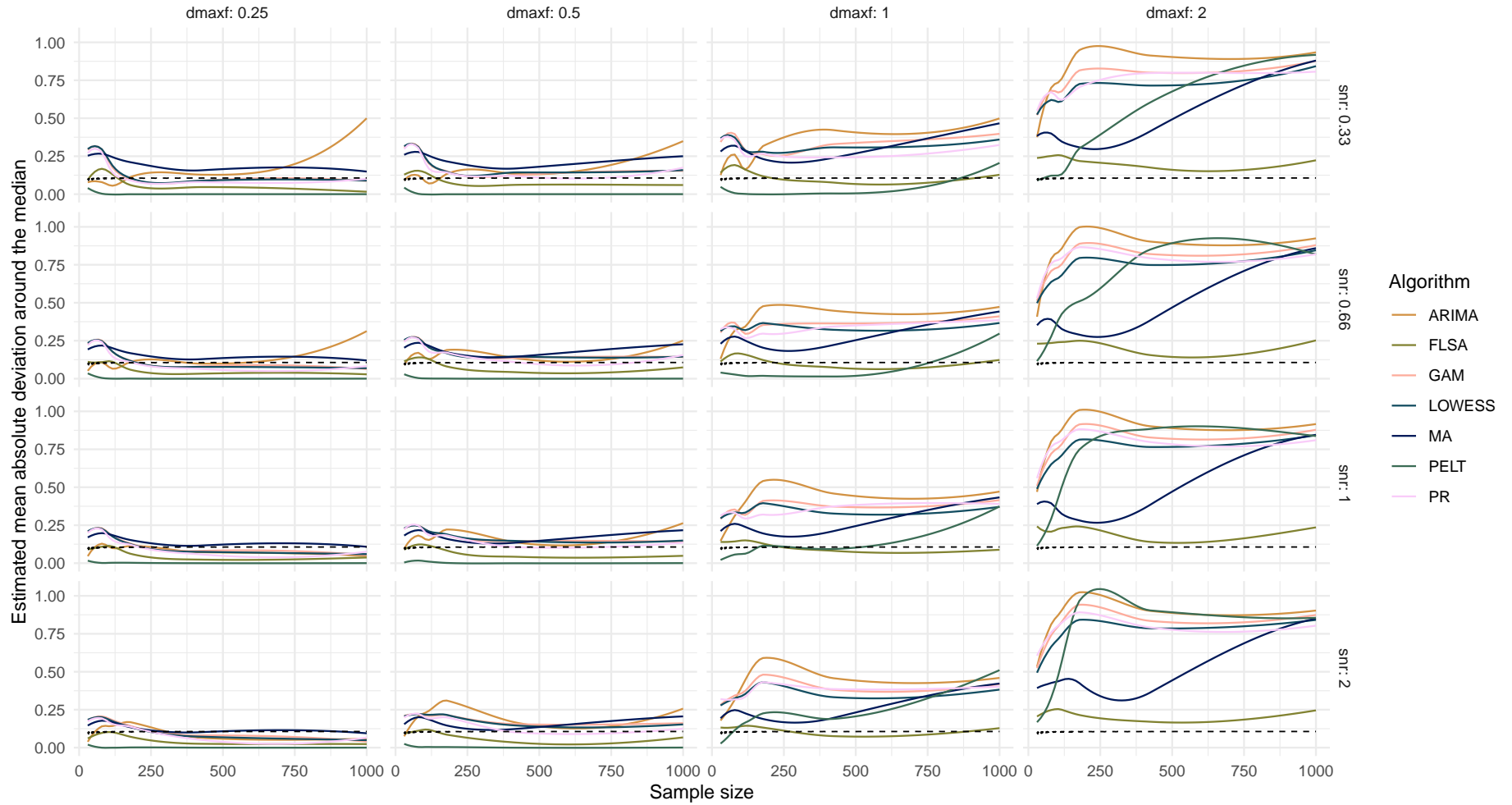


Boxplot of mean absolute deviation around the median difference over sample size

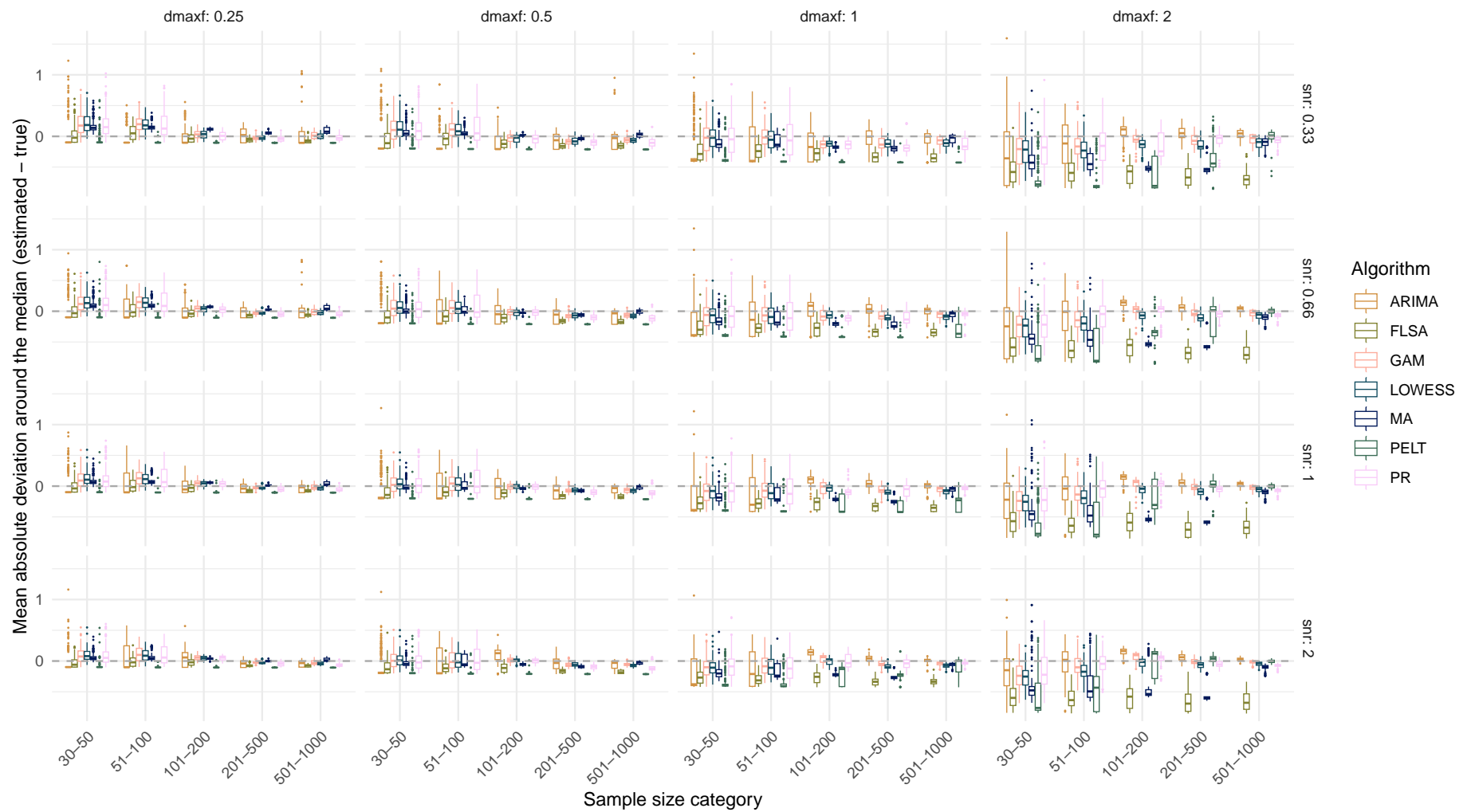


## Systematic change pattern: Recurrent

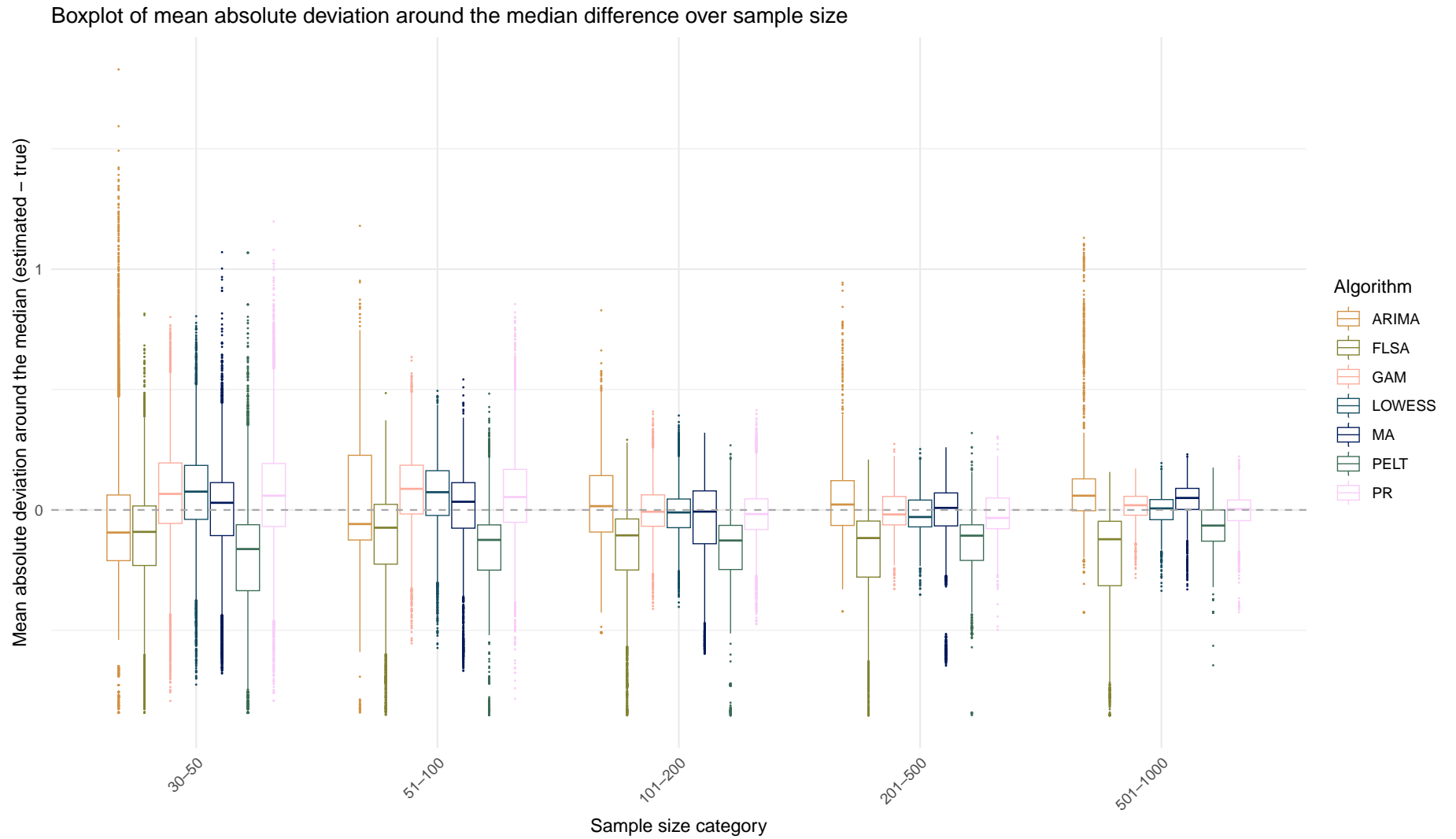
Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)



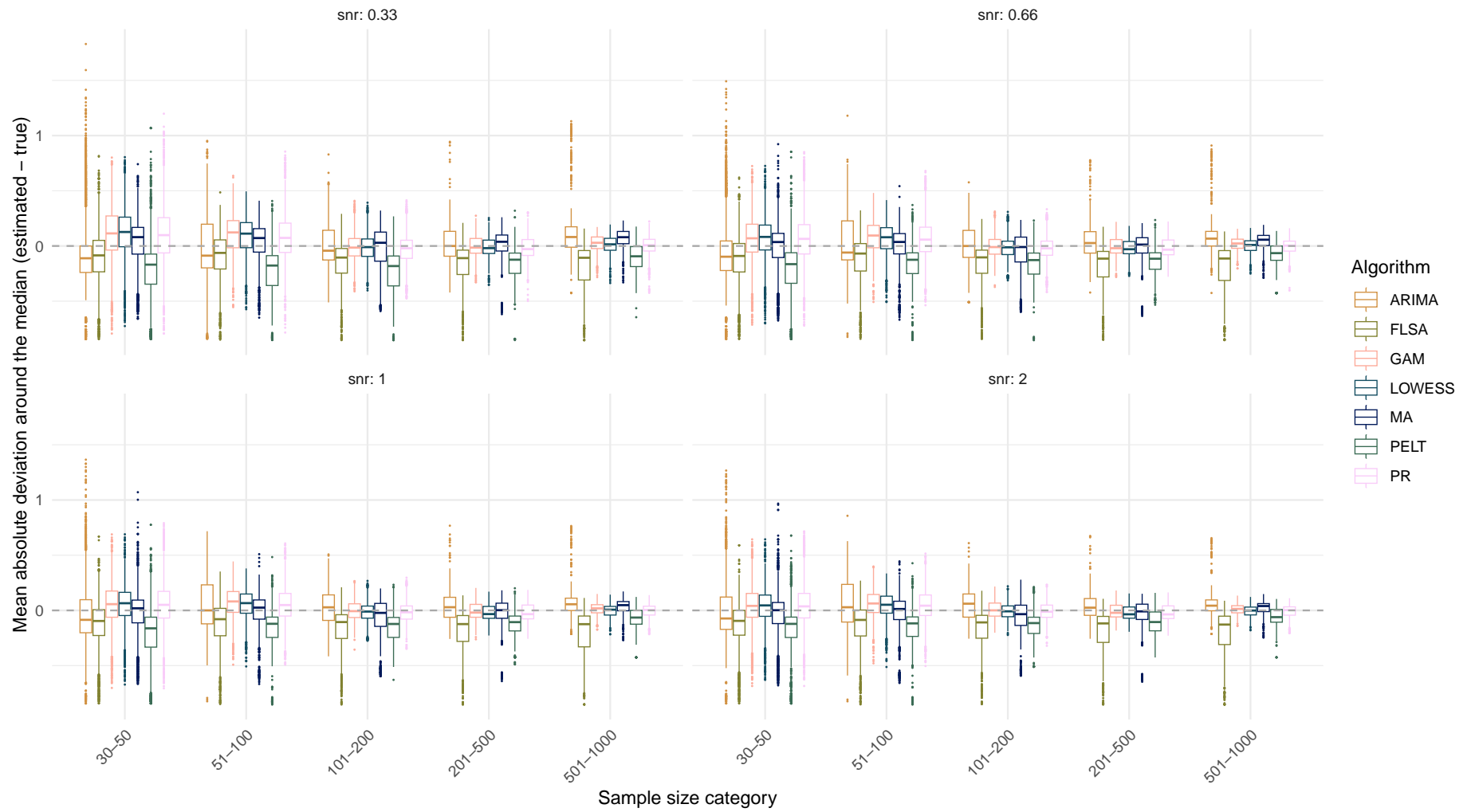
Boxplot of mean absolute deviation around the median difference over sample size



## Systematic change pattern: All patterns combined



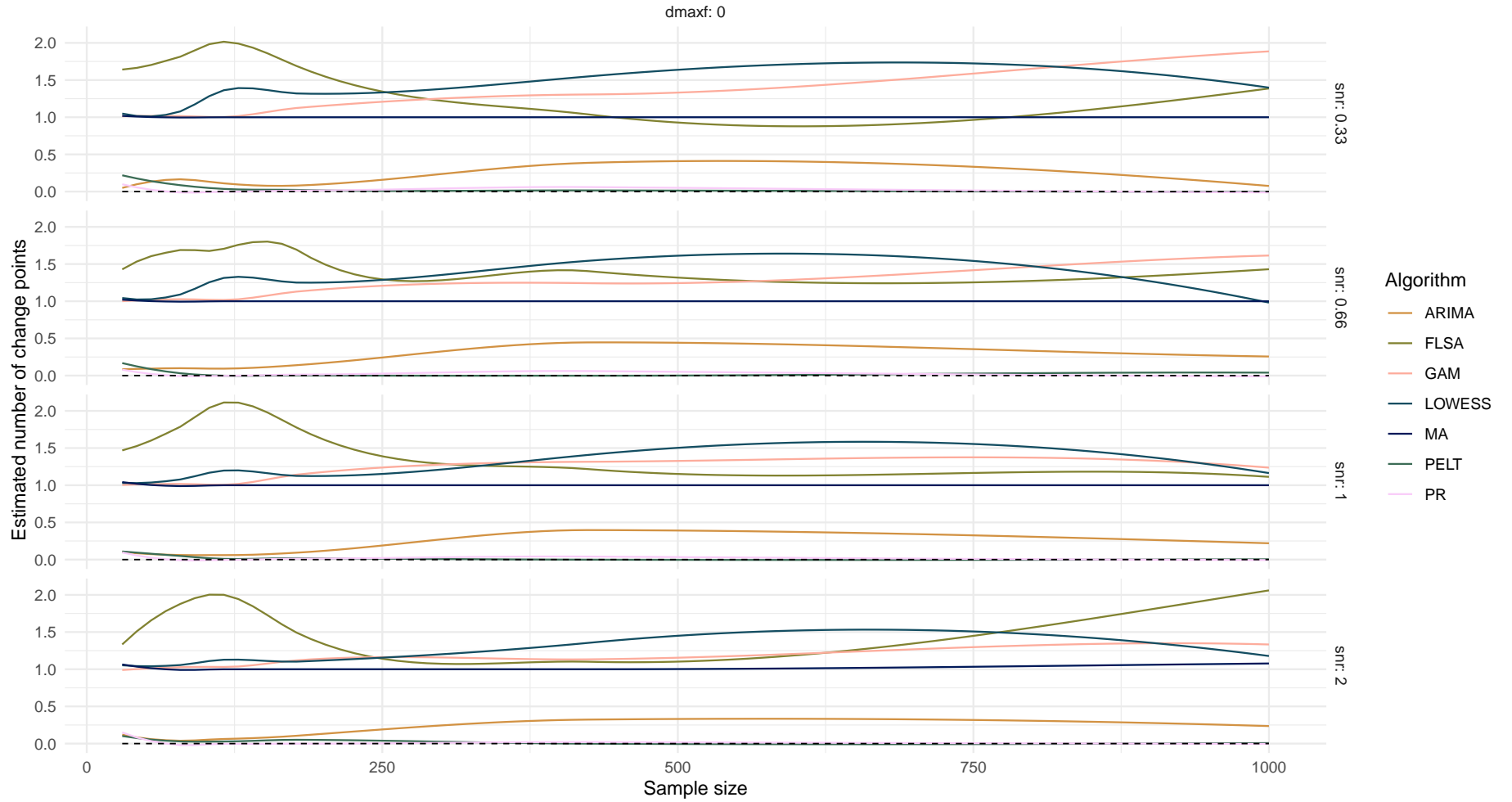
Boxplot of mean absolute deviation around the median difference over sample size



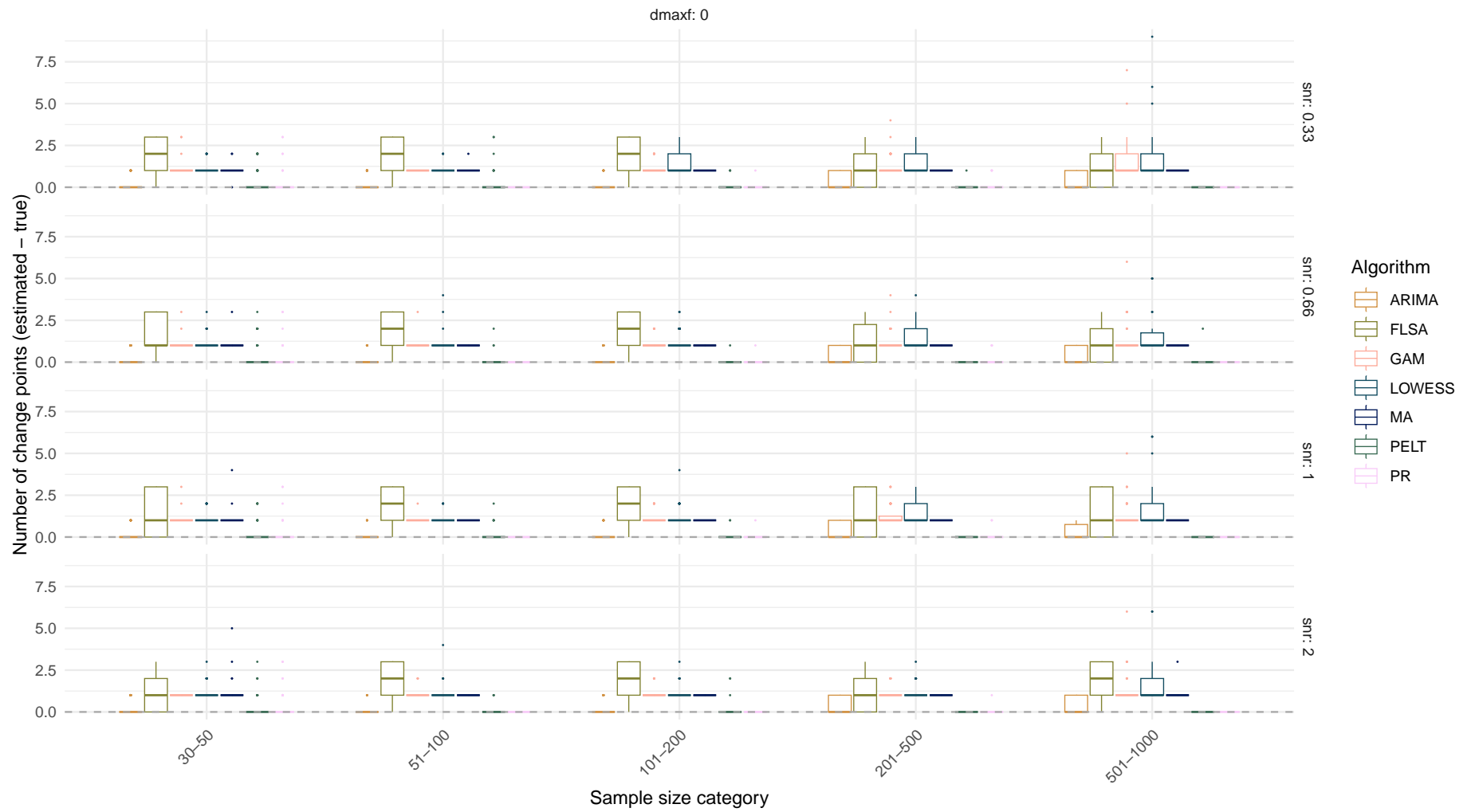
# Estimand: Number of change points

Systematic change pattern: No change

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

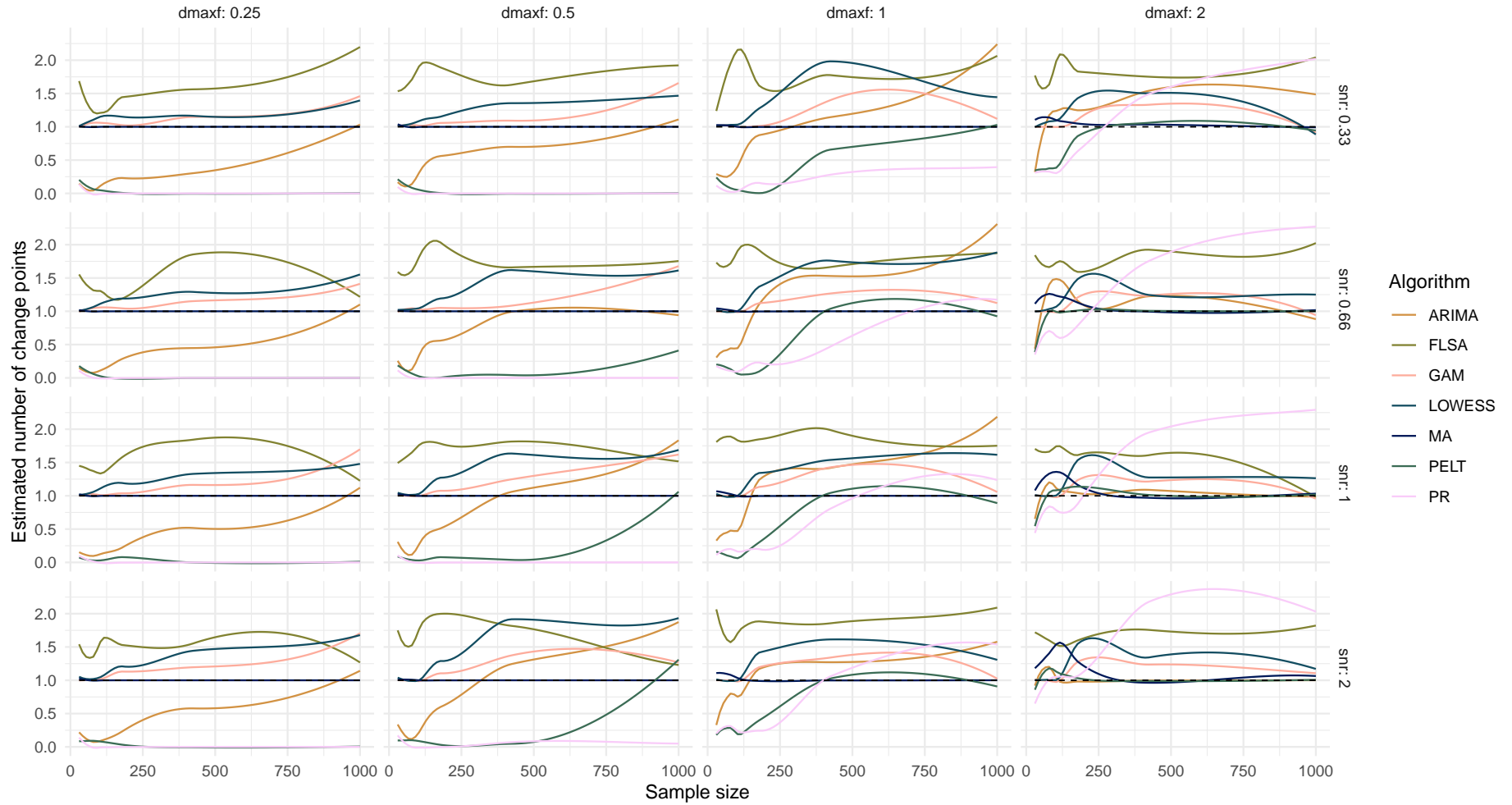


Boxplot of number of change points difference over sample size

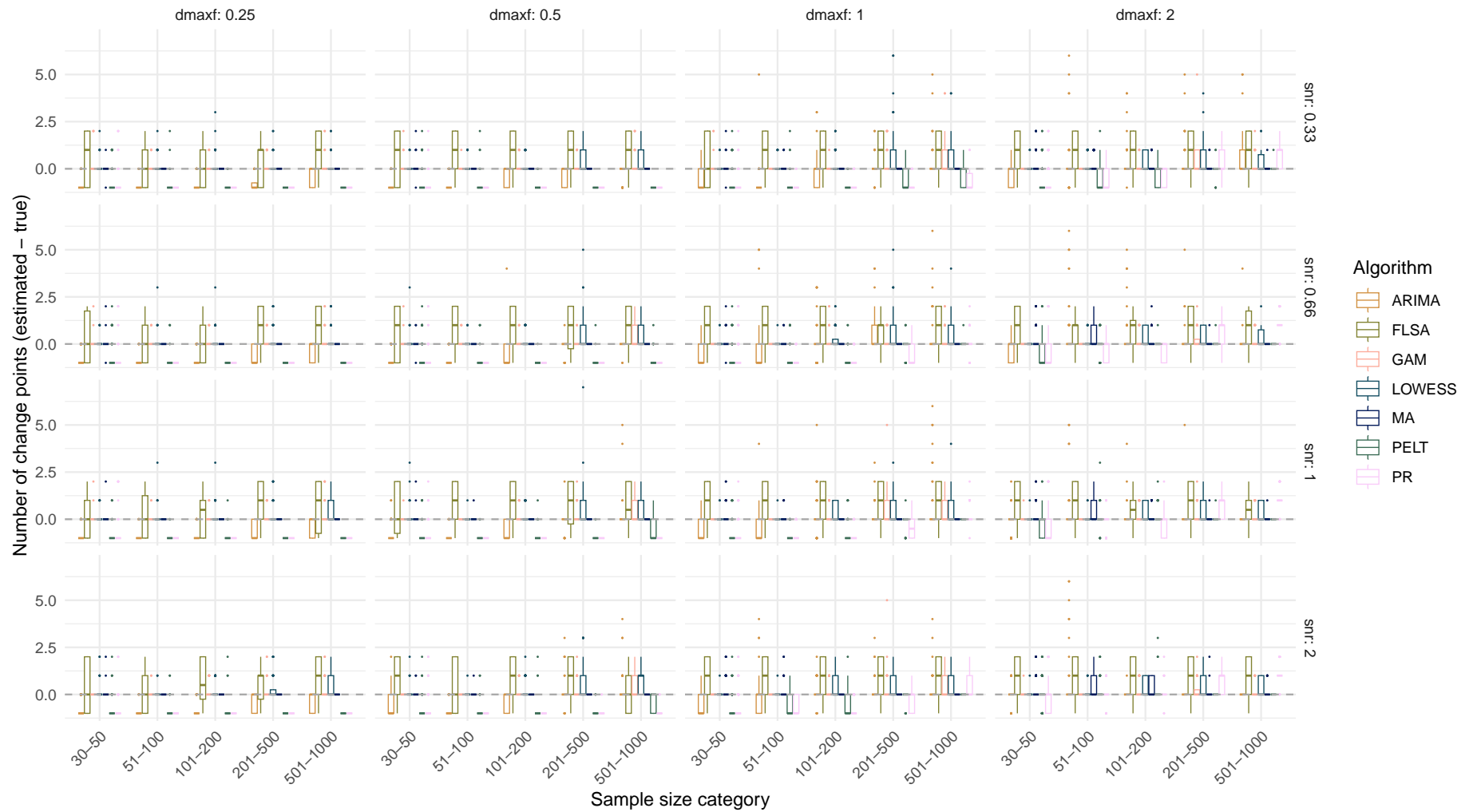


## Systematic change pattern: Jump

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

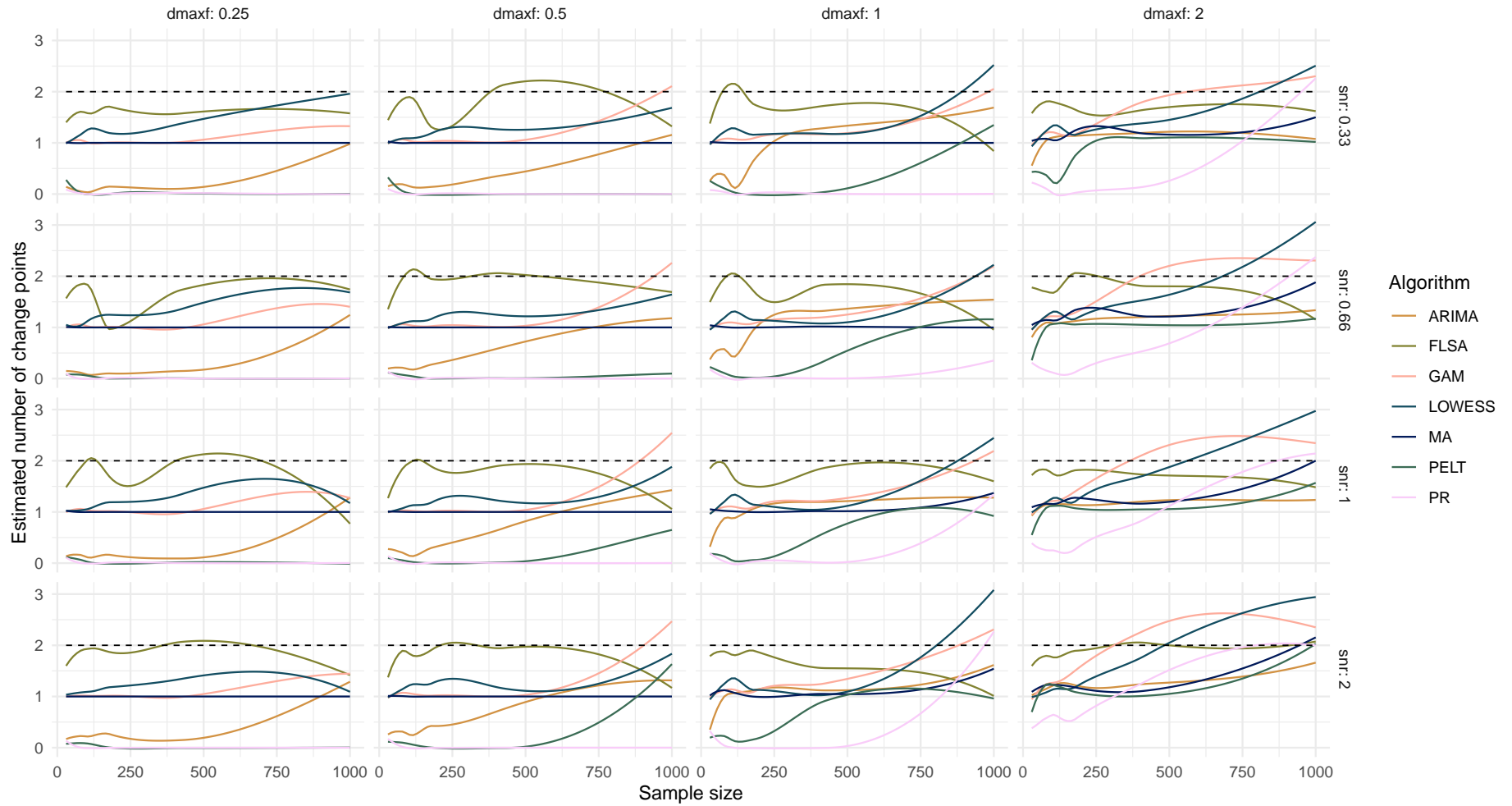


Boxplot of number of change points difference over sample size

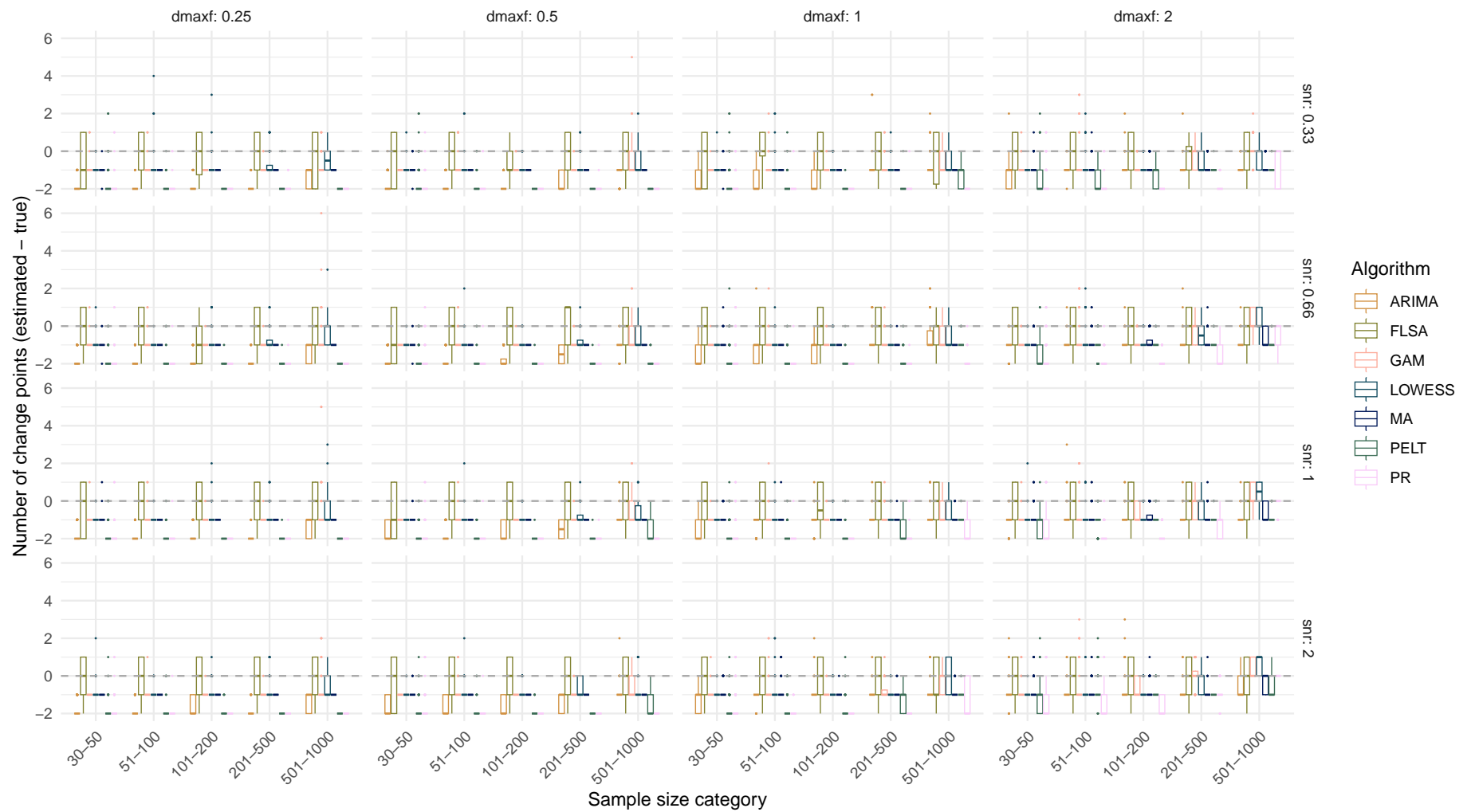


## Systematic change pattern: Linear

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

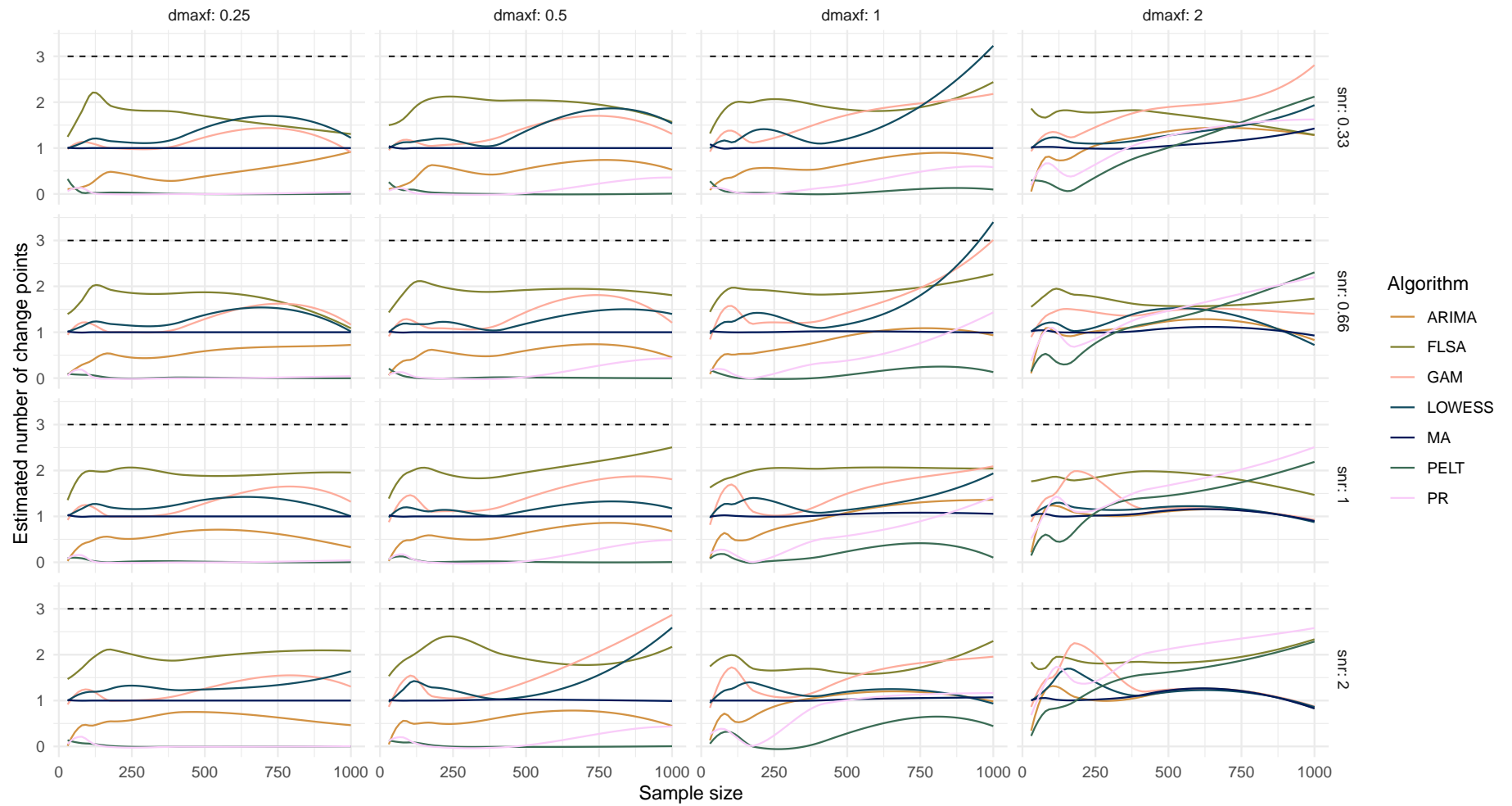


Boxplot of number of change points difference over sample size

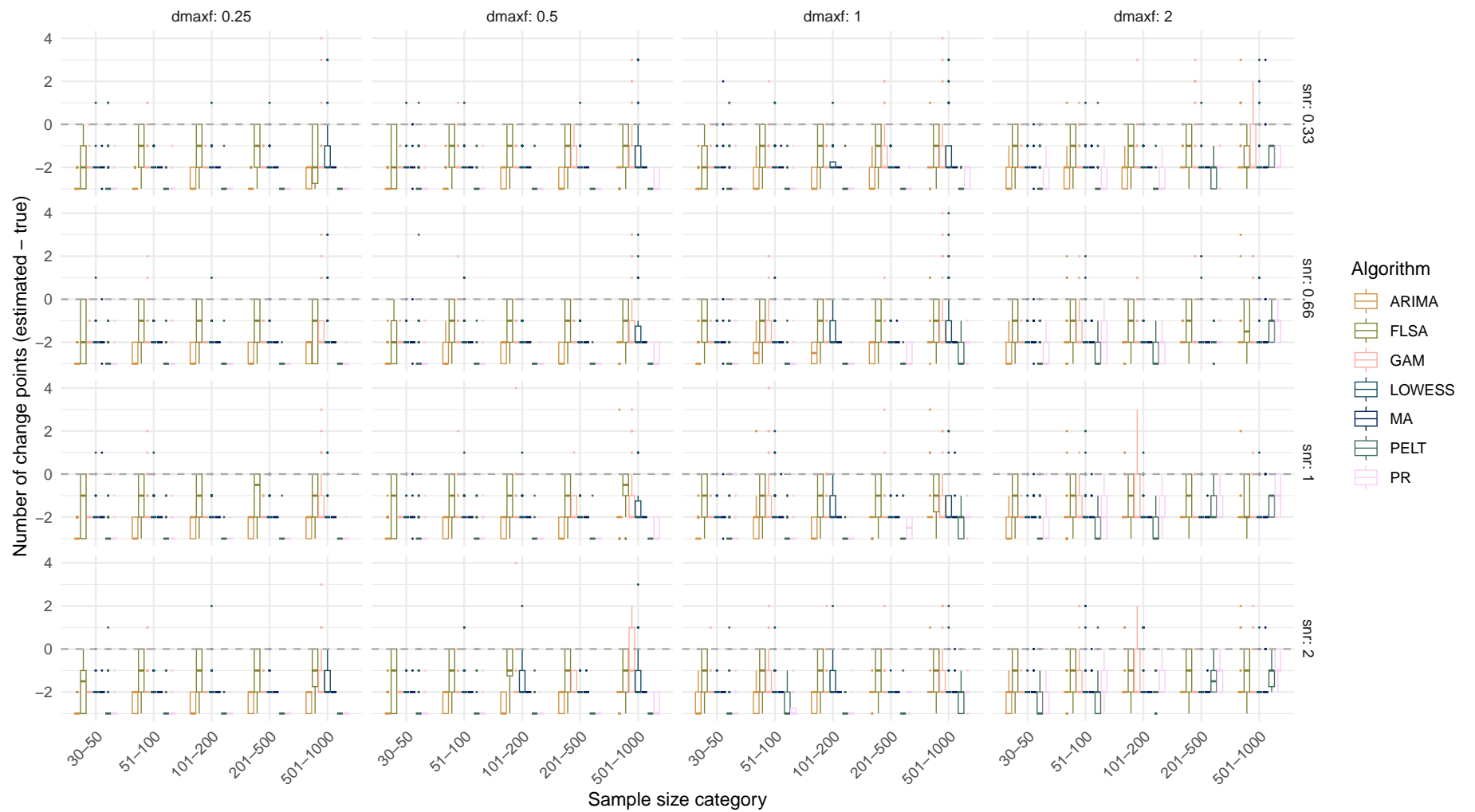


## Systematic change pattern: Quadratic

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

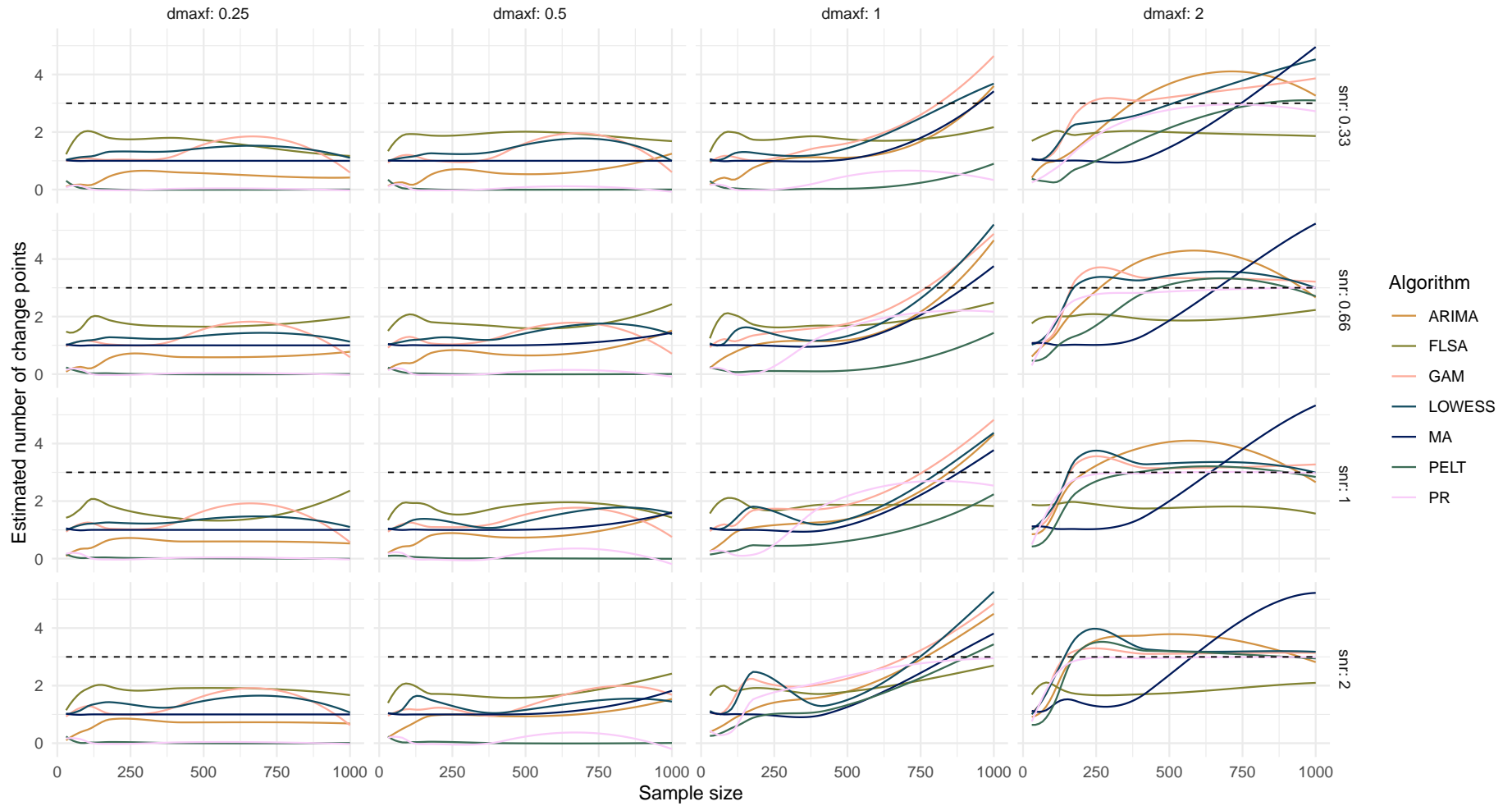


Boxplot of number of change points difference over sample size

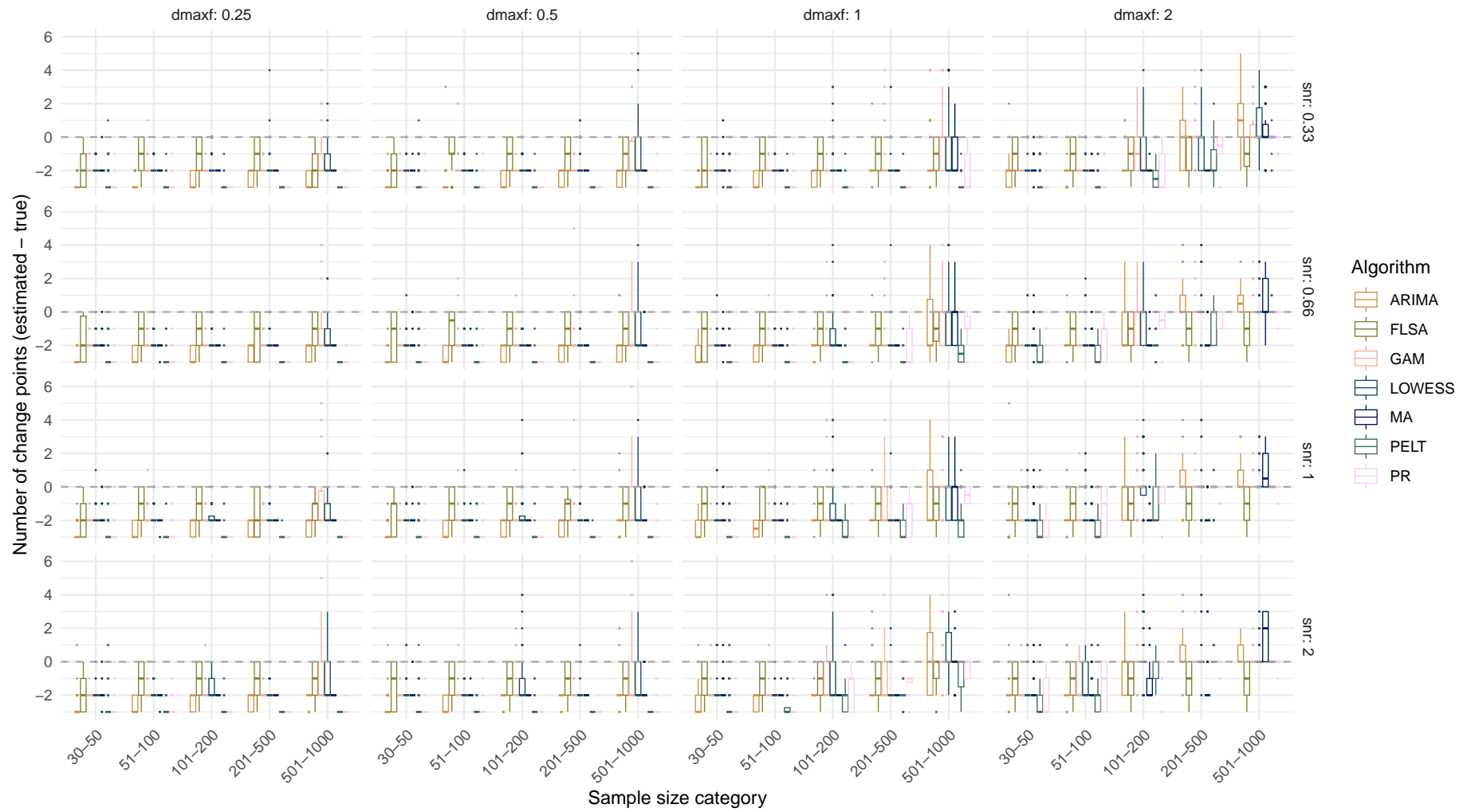


## Systematic change pattern: Recurrent

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

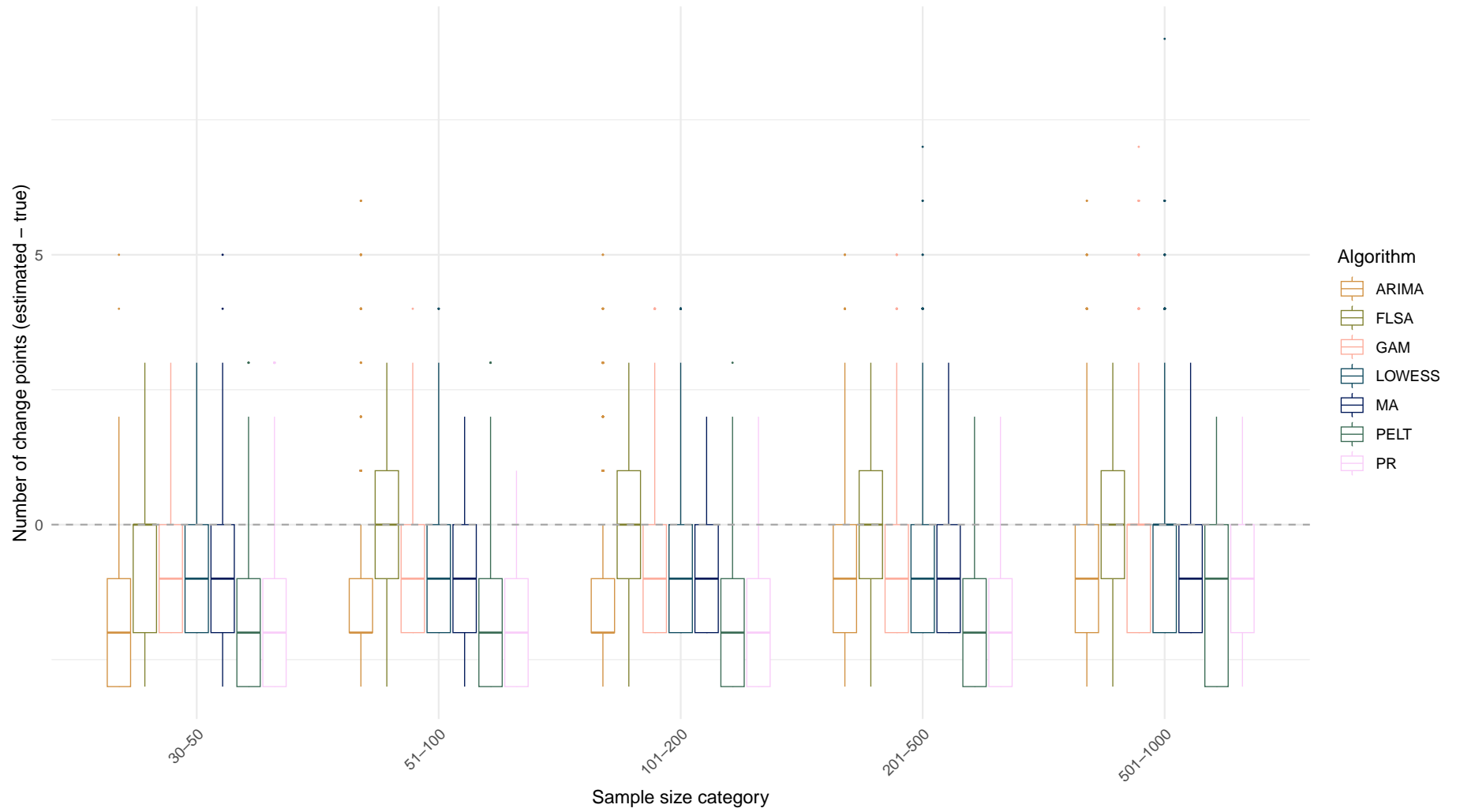


Boxplot of number of change points difference over sample size

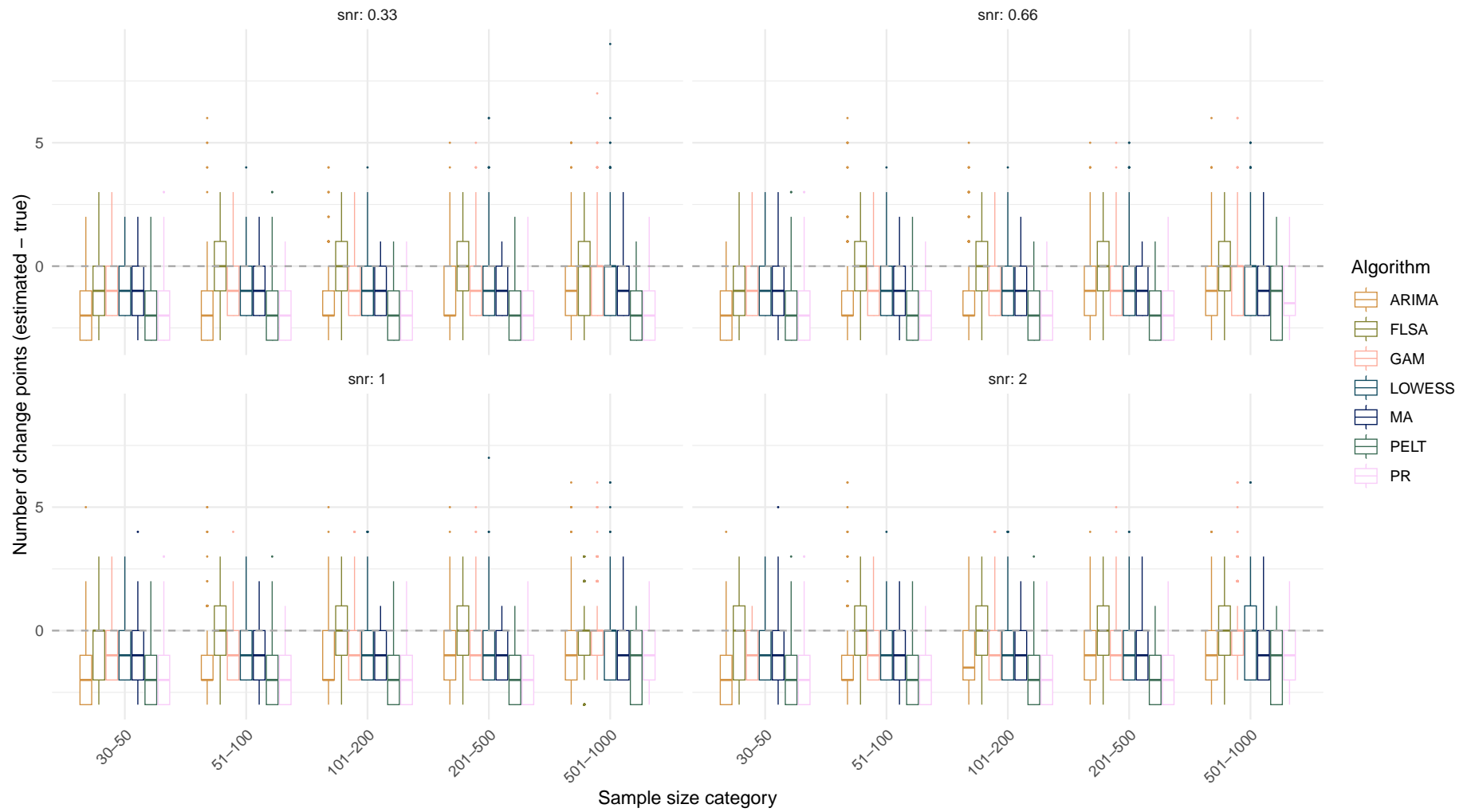


## Systematic change pattern: All patterns combined

Boxplot of number of change points difference over sample size



Boxplot of number of change points difference over sample size

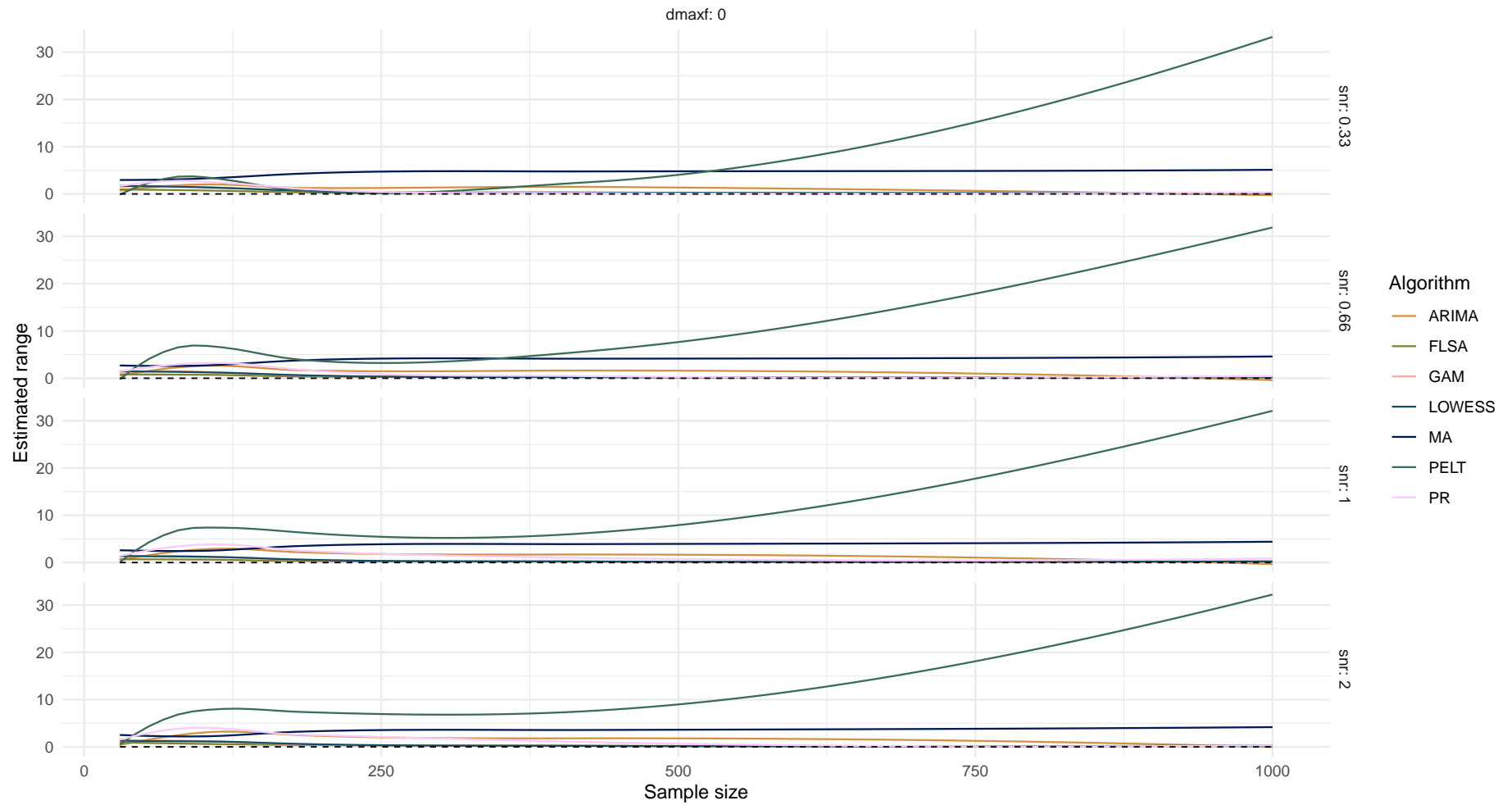


# Log-normal distribution

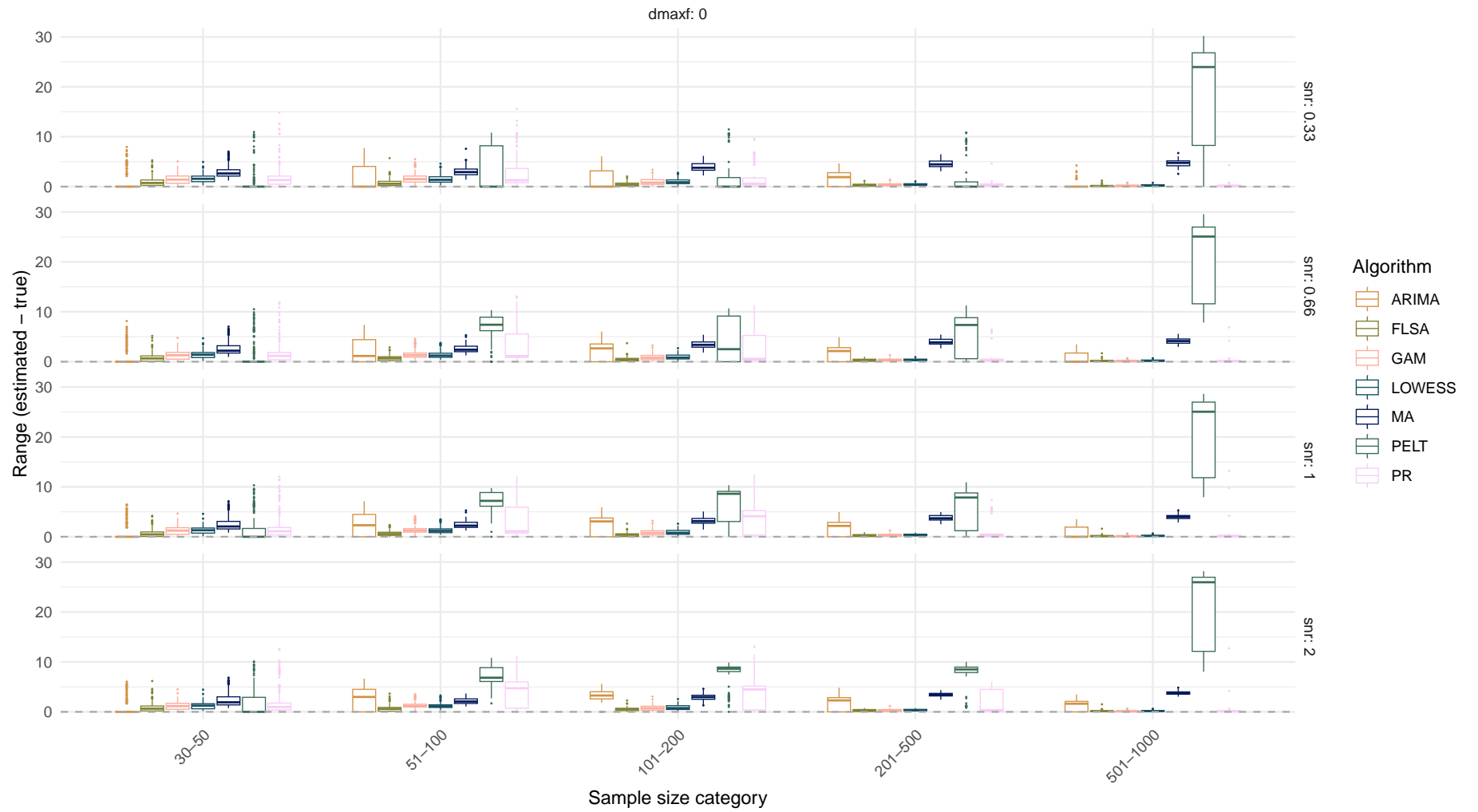
Estimand: Range

Systematic change pattern: No change

Estimated range over sample size  
(Dashed line indicates the true range)

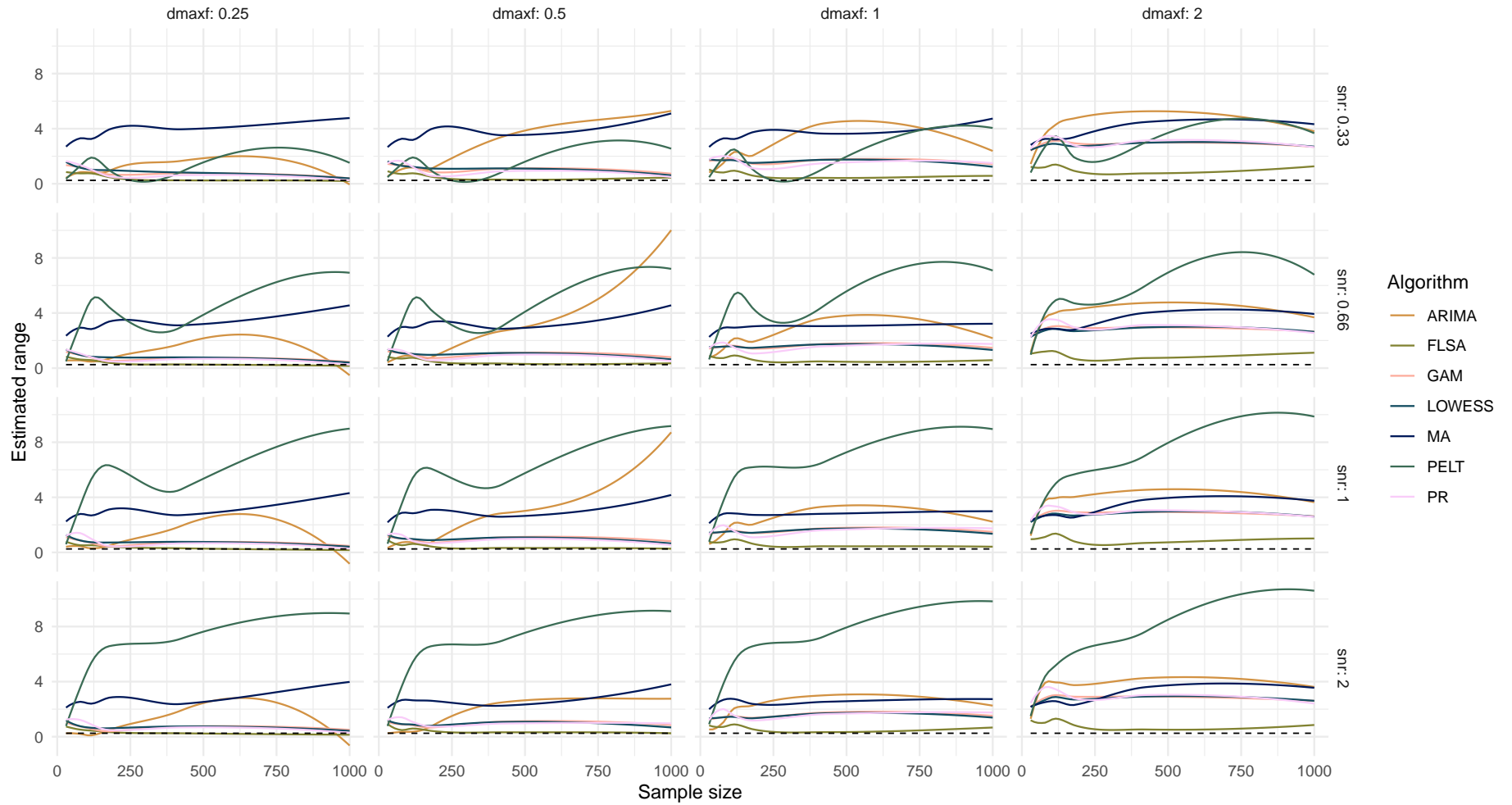


Boxplot of range difference over sample size

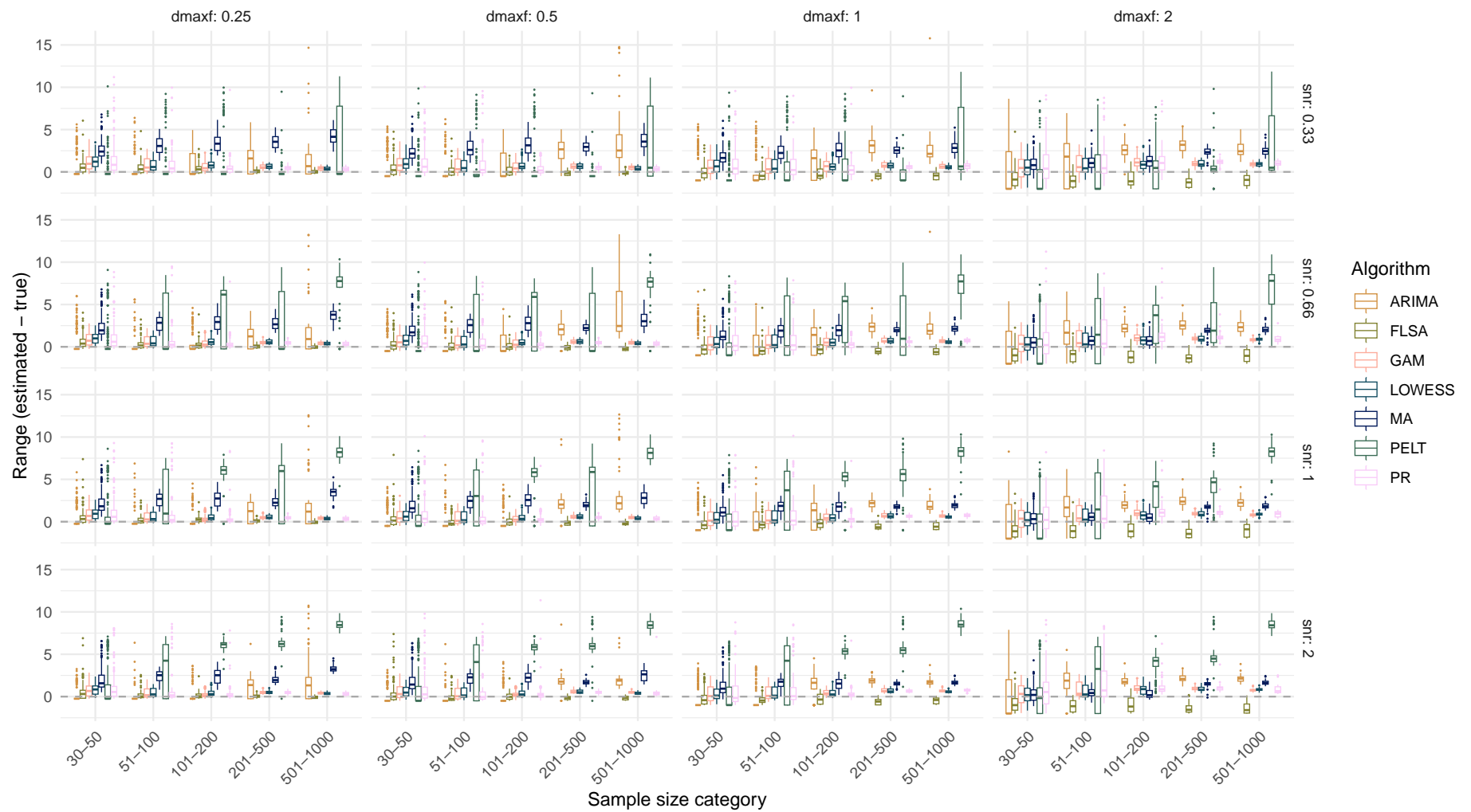


## Systematic change pattern: Jump

Estimated range over sample size  
(Dashed line indicates the true range)

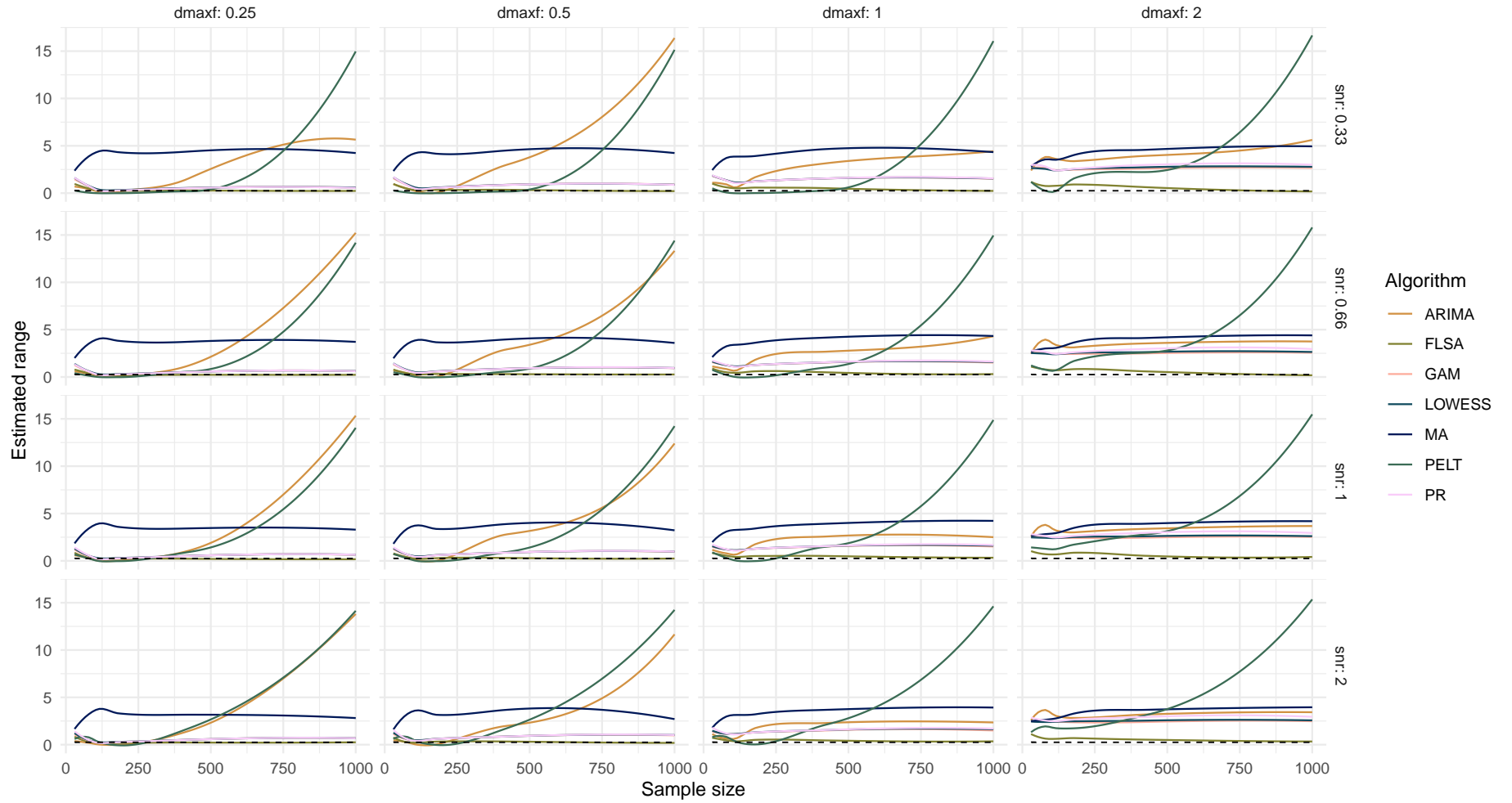


Boxplot of range difference over sample size

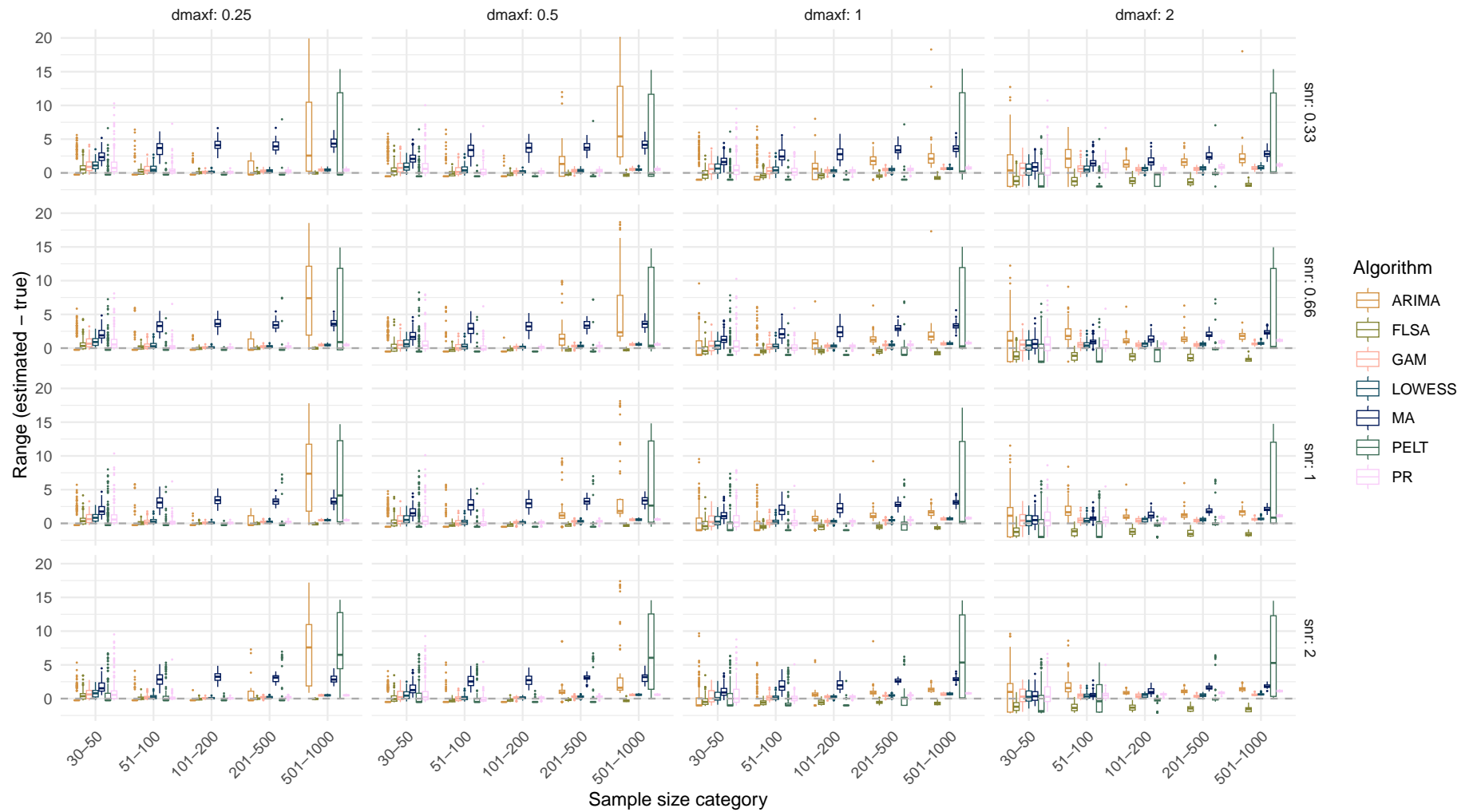


# Systematic change pattern: Linear

Estimated range over sample size  
(Dashed line indicates the true range)

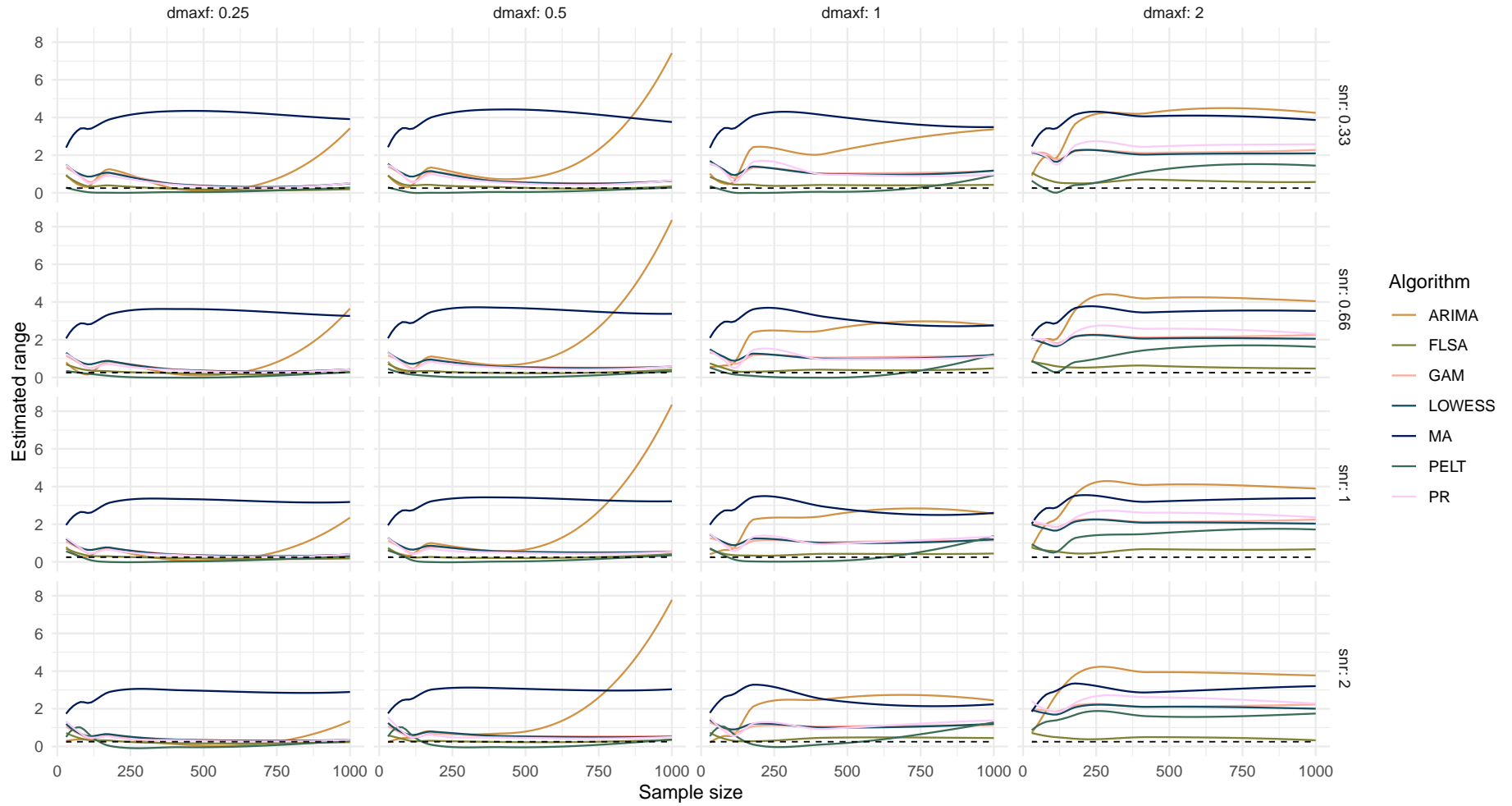


Boxplot of range difference over sample size

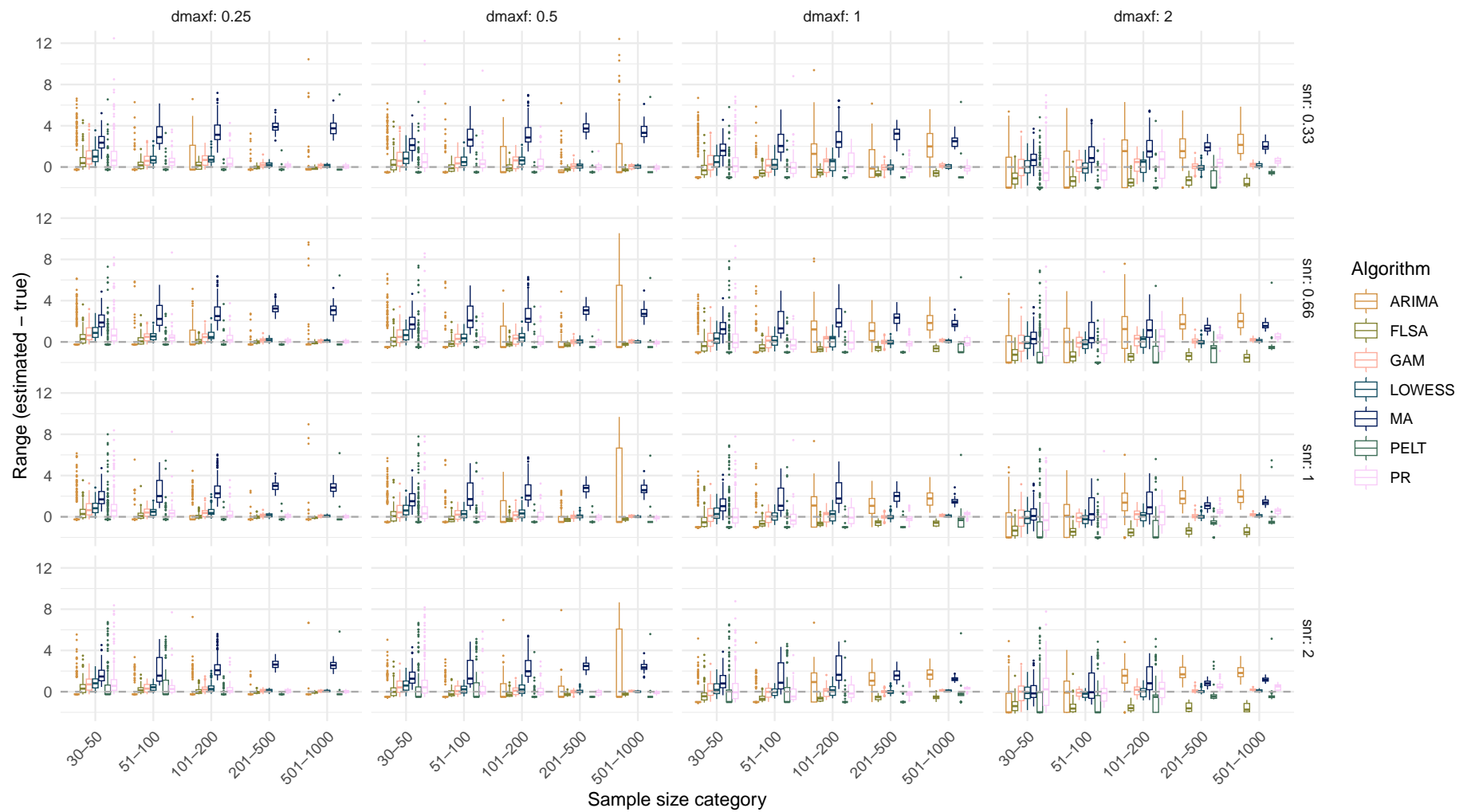


## Systematic change pattern: Quadratic

Estimated range over sample size  
 (Dashed line indicates the true range)

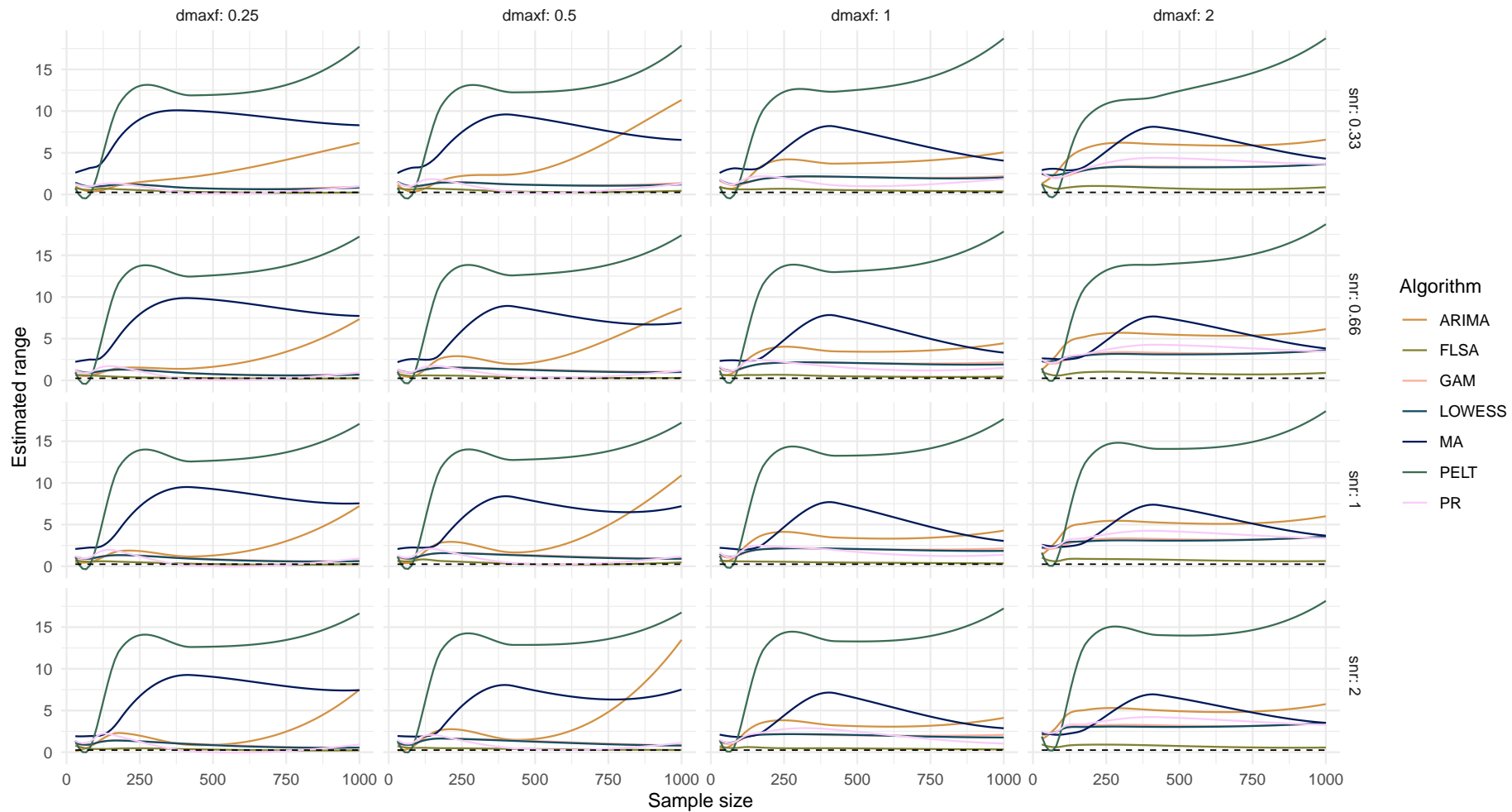


Boxplot of range difference over sample size

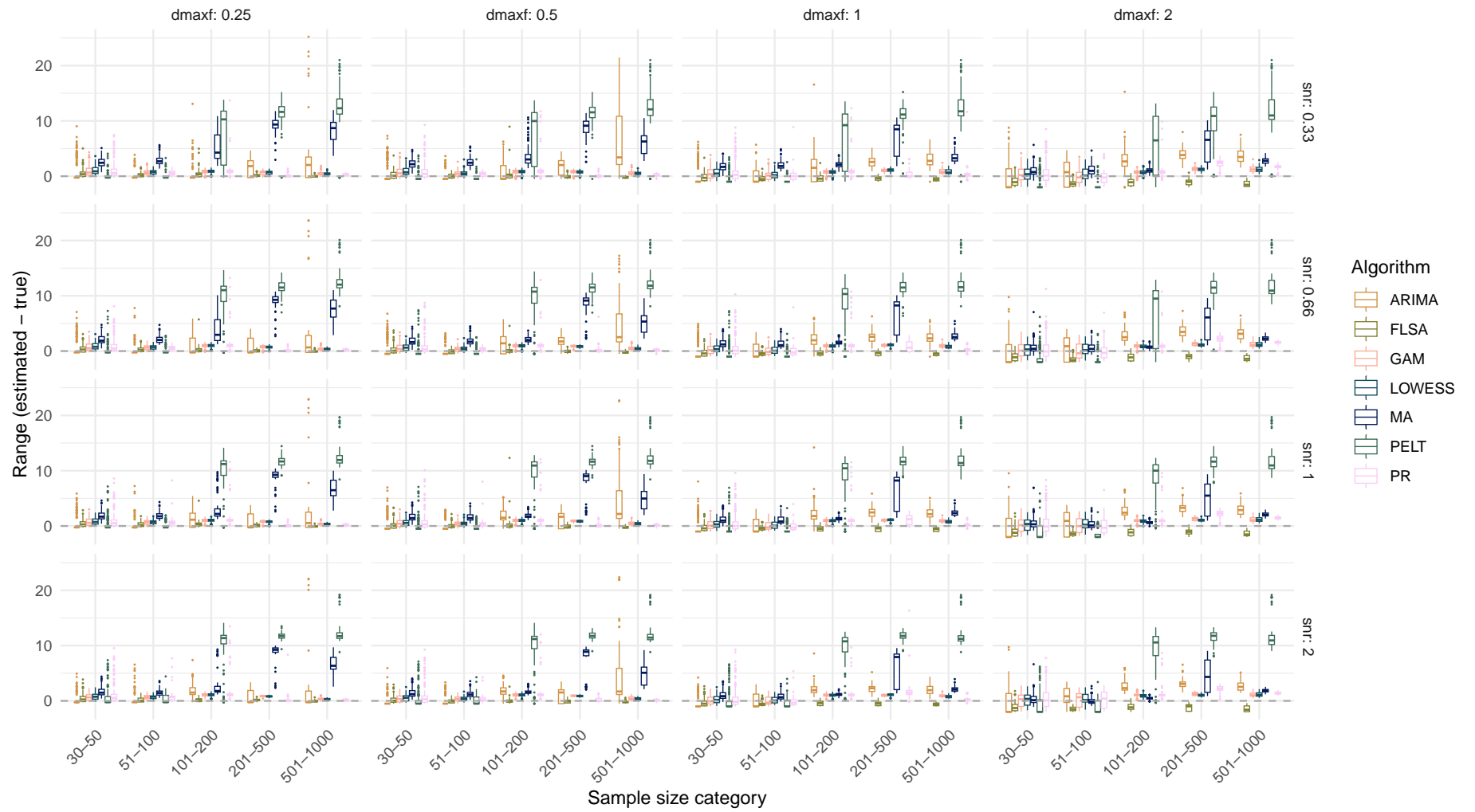


## Systematic change pattern: Recurrent

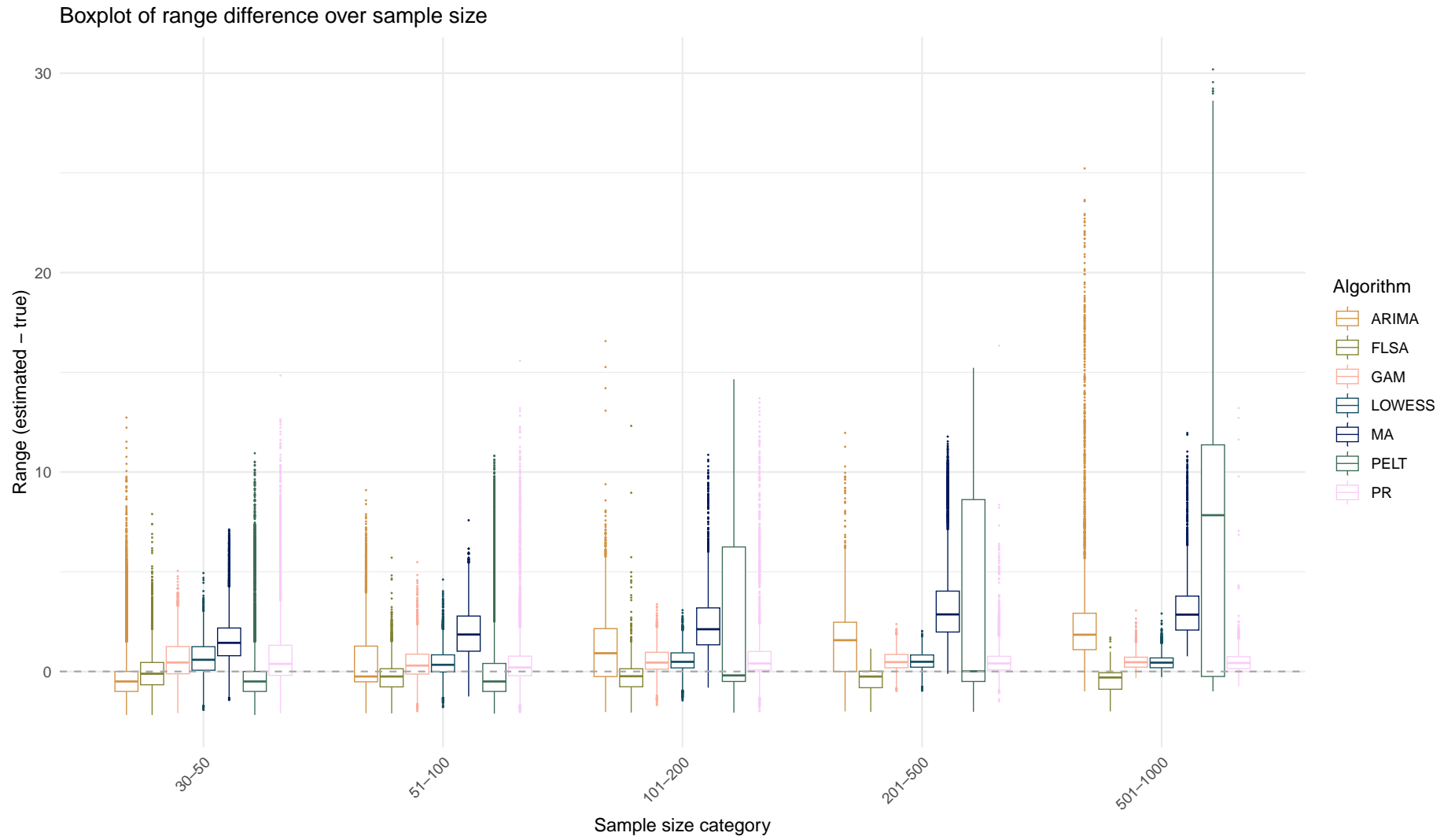
Estimated range over sample size  
(Dashed line indicates the true range)



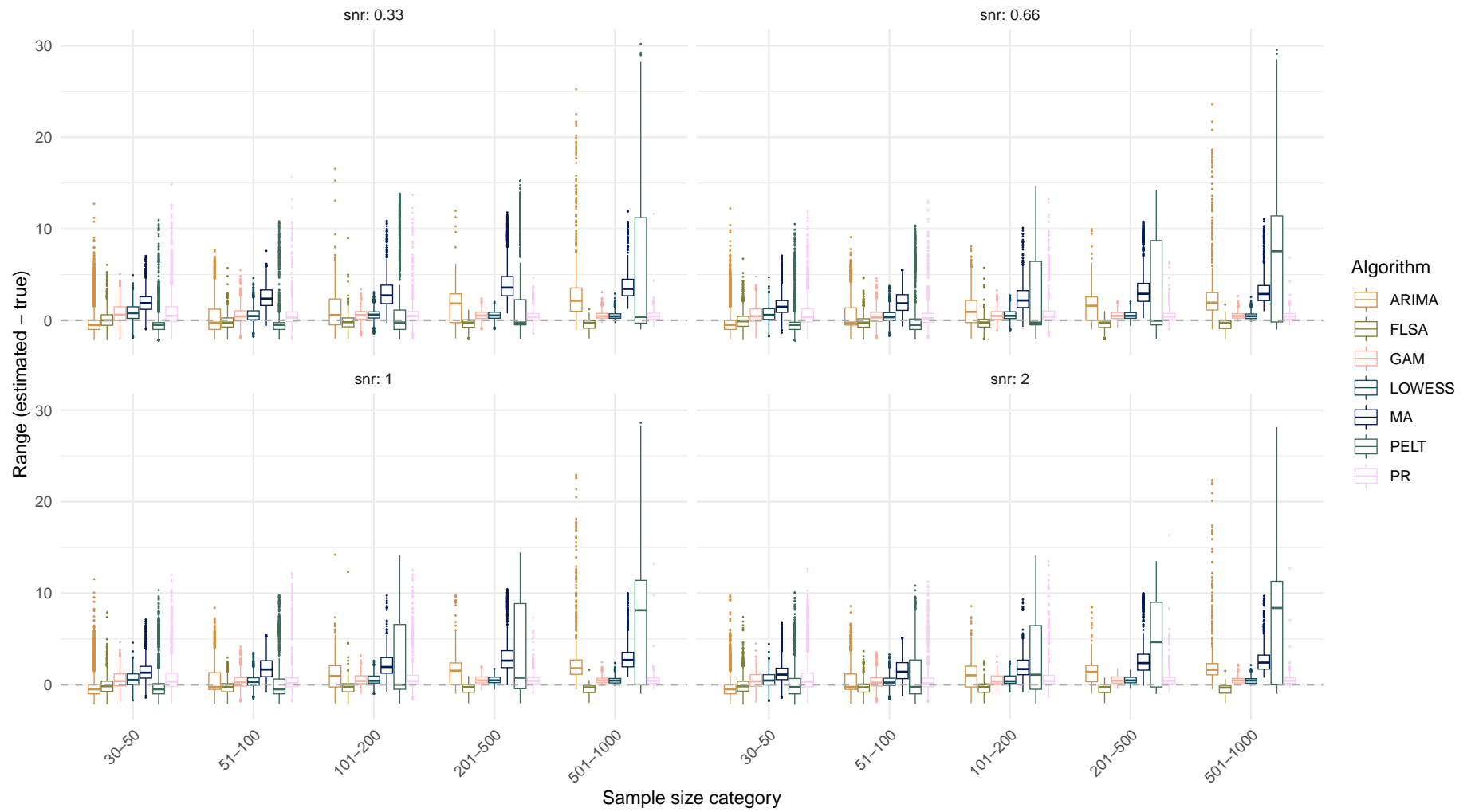
Boxplot of range difference over sample size



# Systematic change pattern: All patterns combined



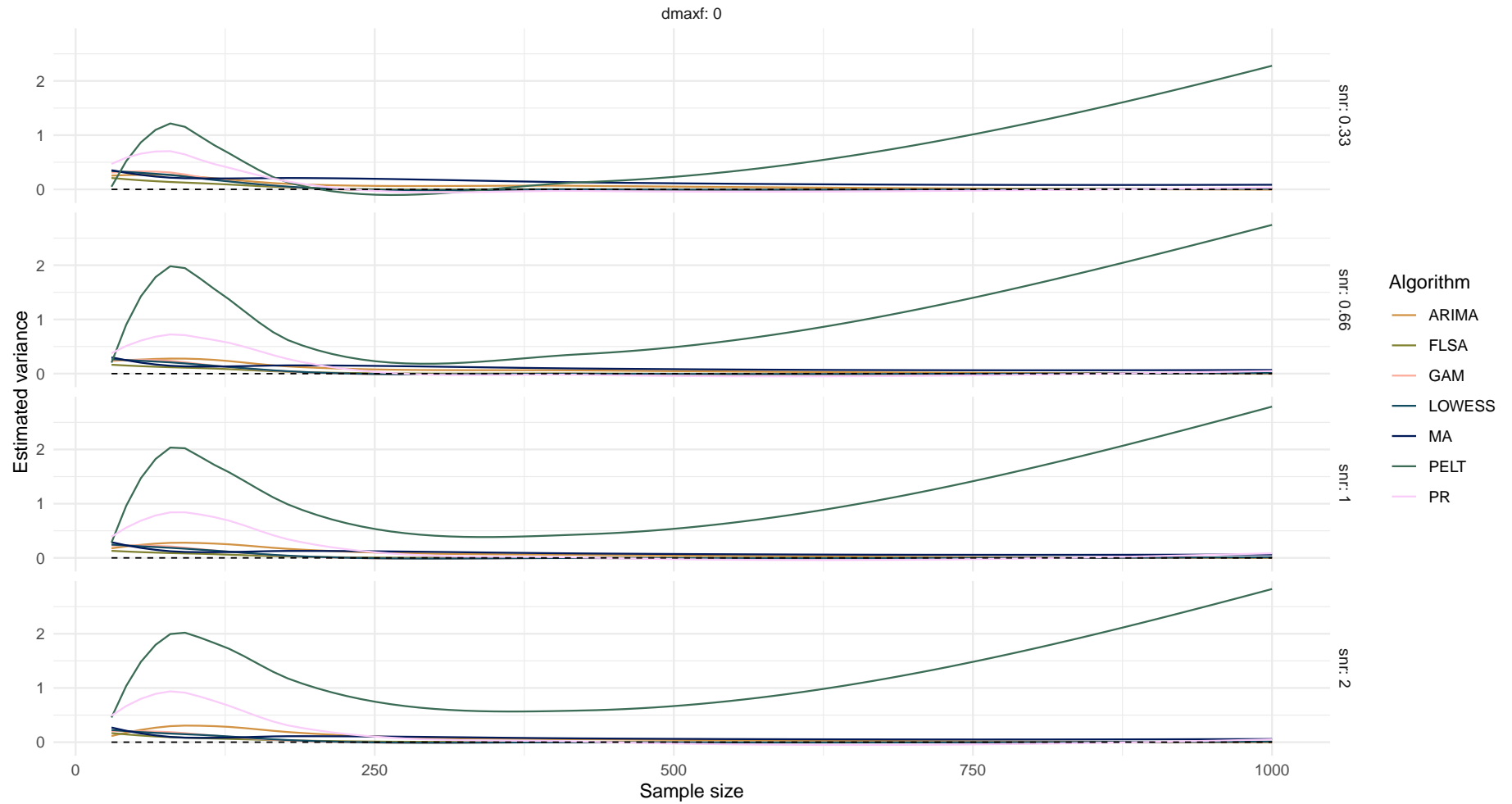
Boxplot of range difference over sample size



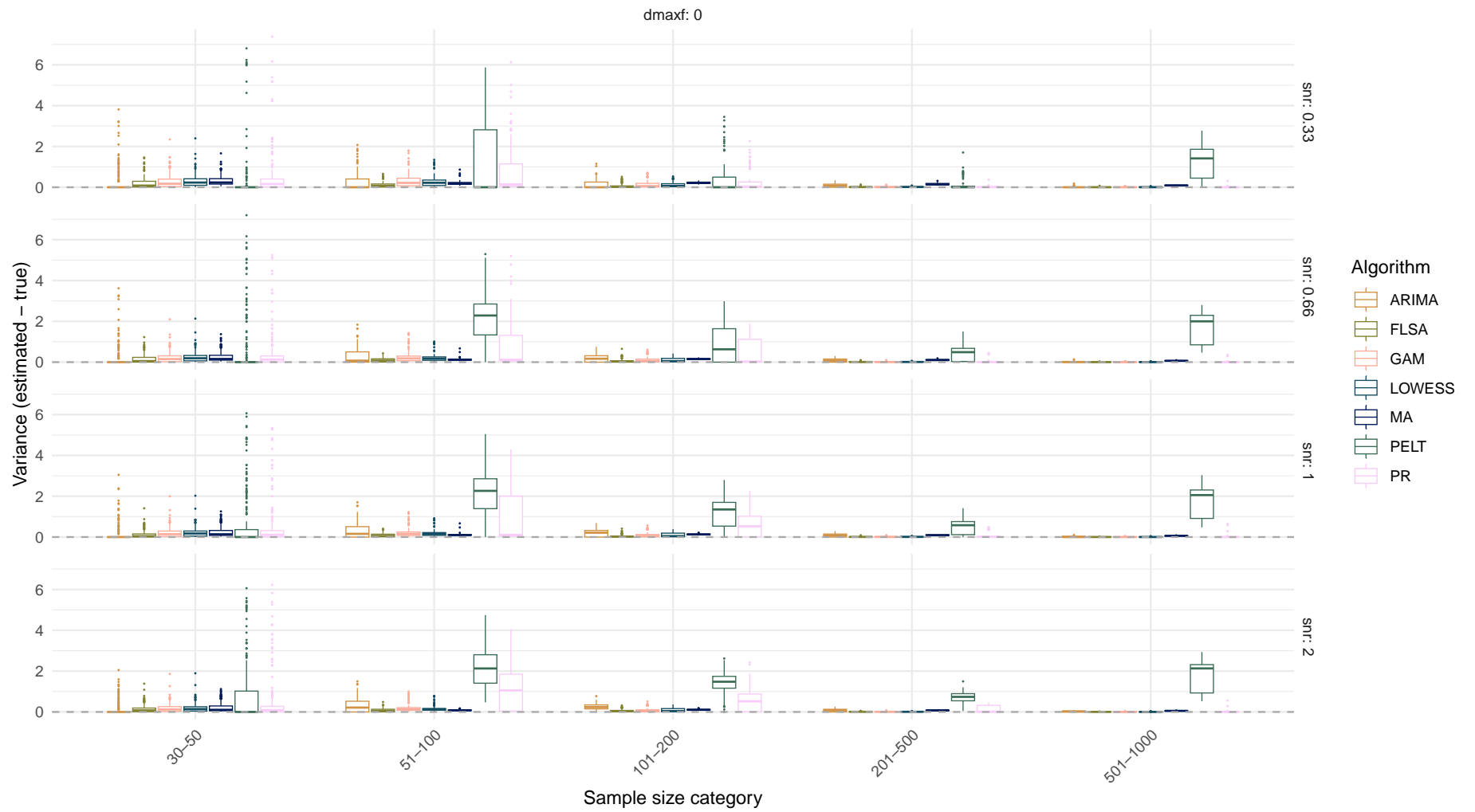
# Estimand: Variance

Systematic change pattern: No change

Estimated variance over sample size  
(Dashed line indicates the true variance)

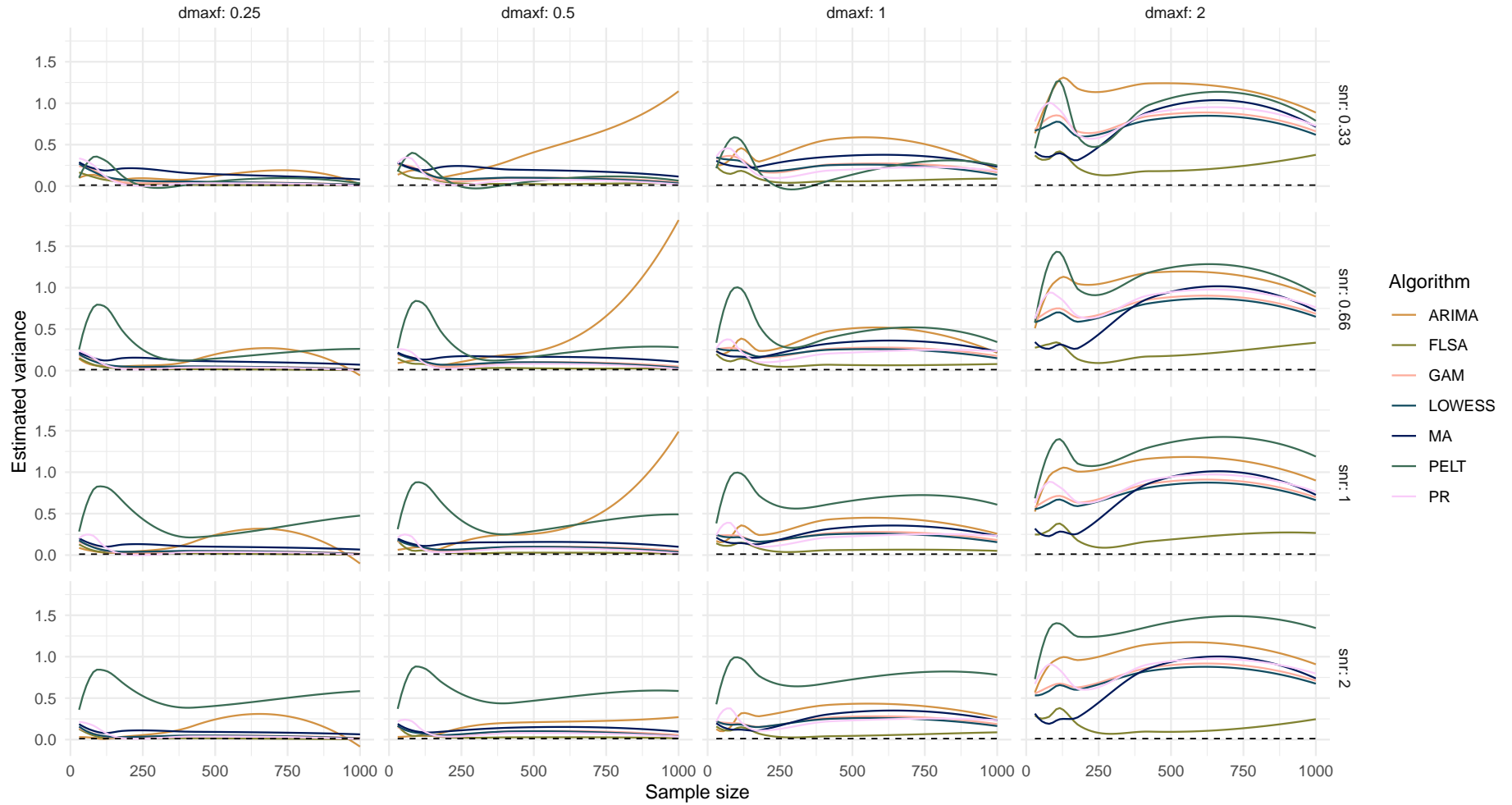


Boxplot of variance difference over sample size

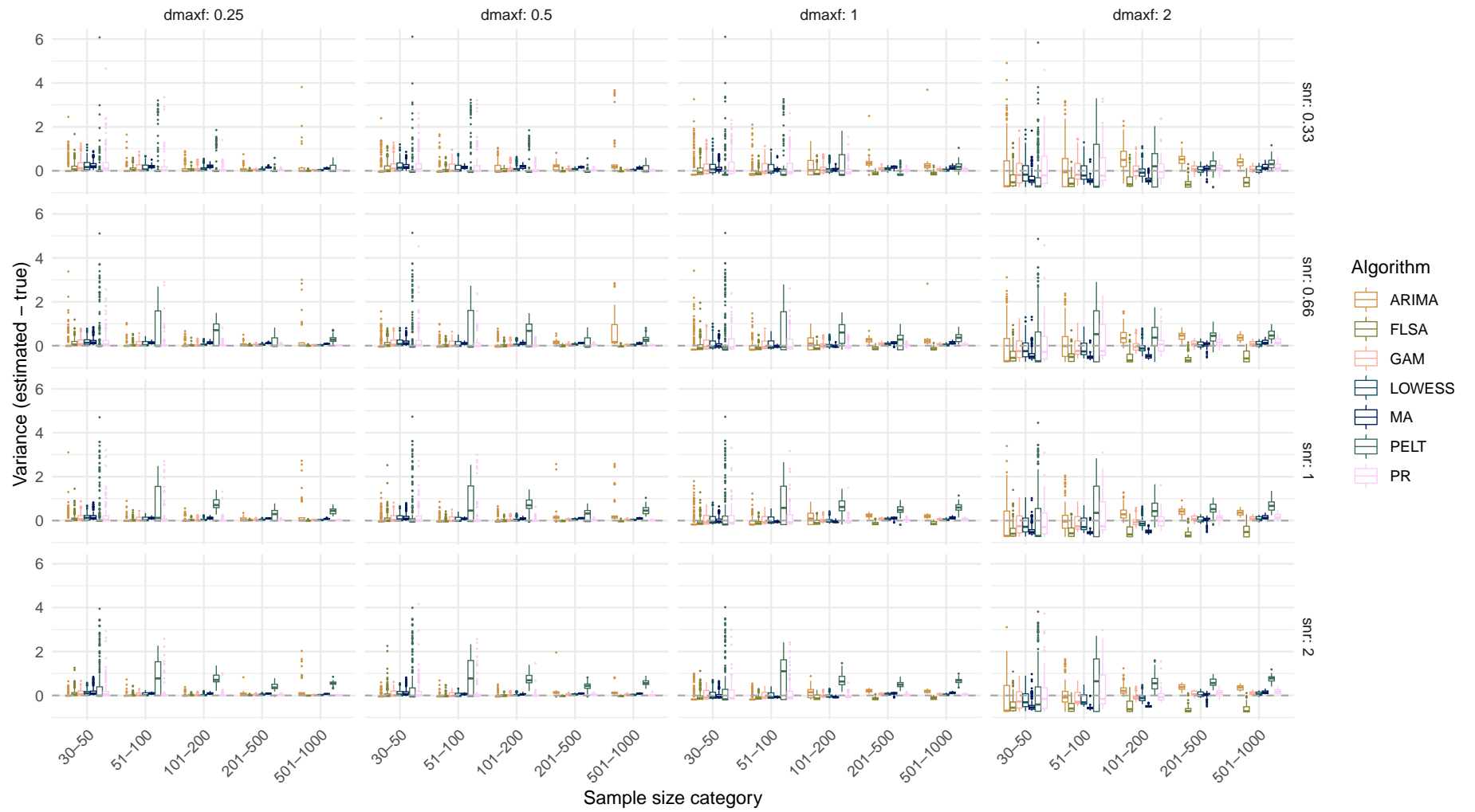


# Systematic change pattern: Jump

Estimated variance over sample size  
(Dashed line indicates the true variance)

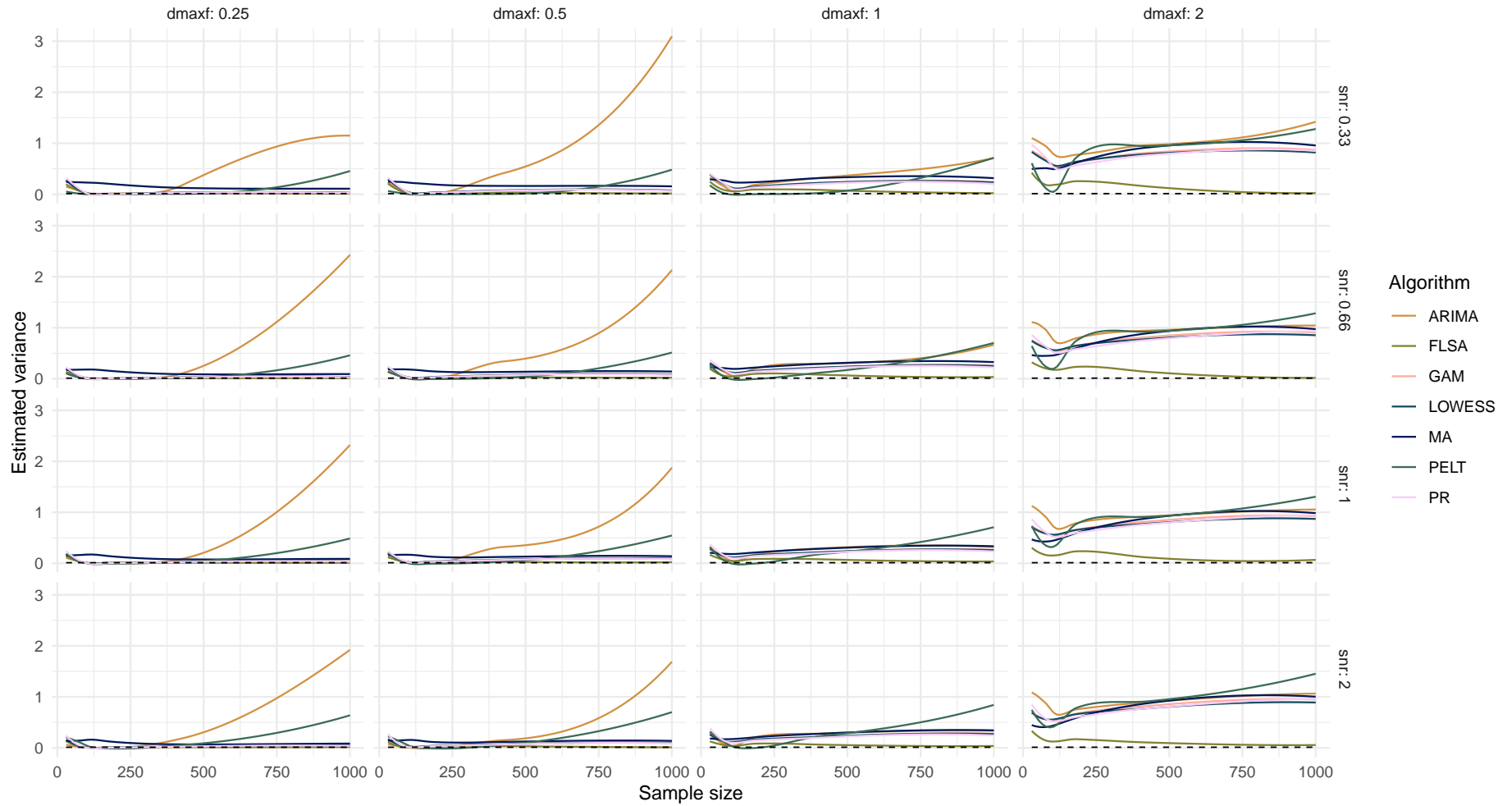


Boxplot of variance difference over sample size

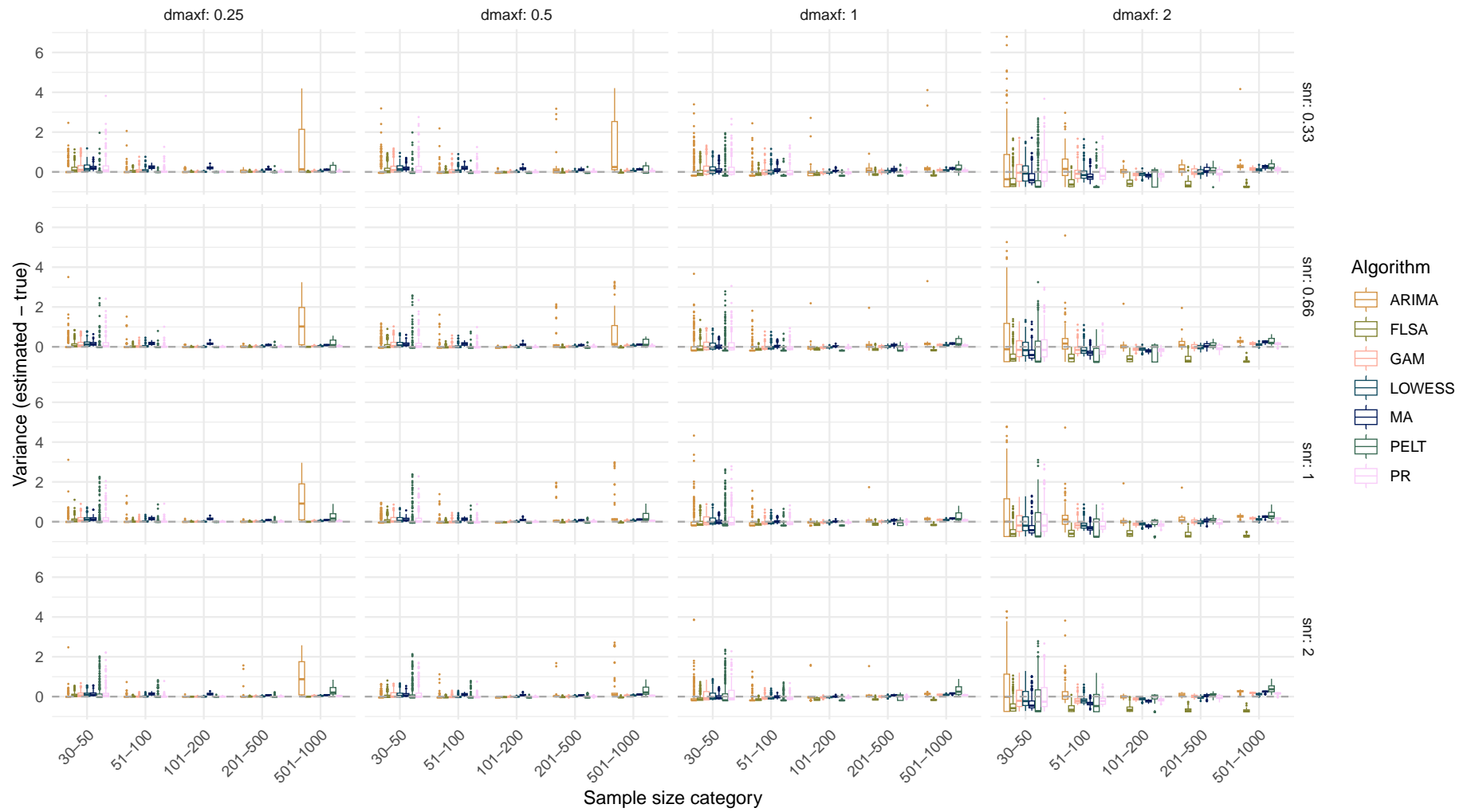


## Systematic change pattern: Linear

Estimated variance over sample size  
(Dashed line indicates the true variance)

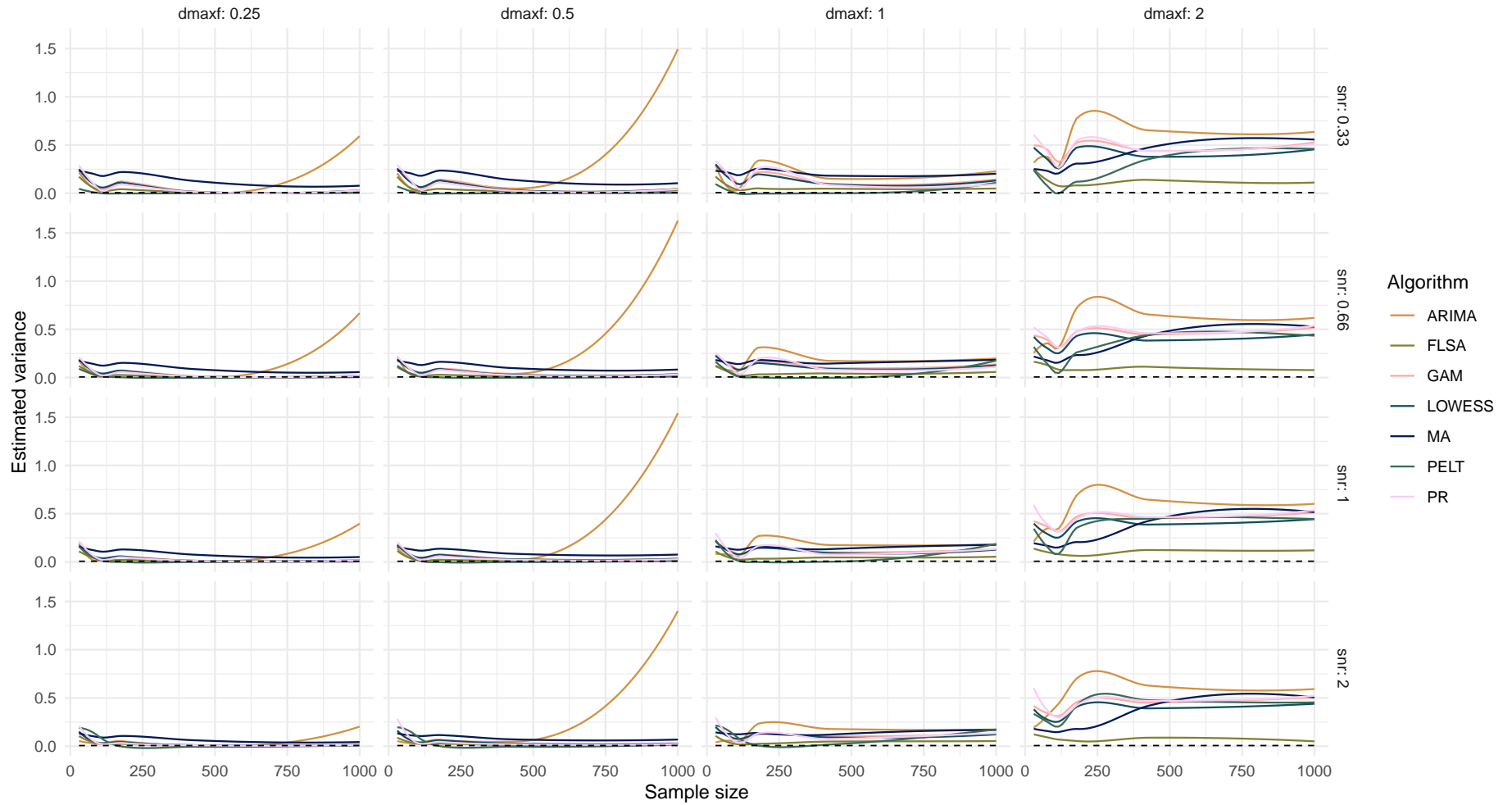


Boxplot of variance difference over sample size

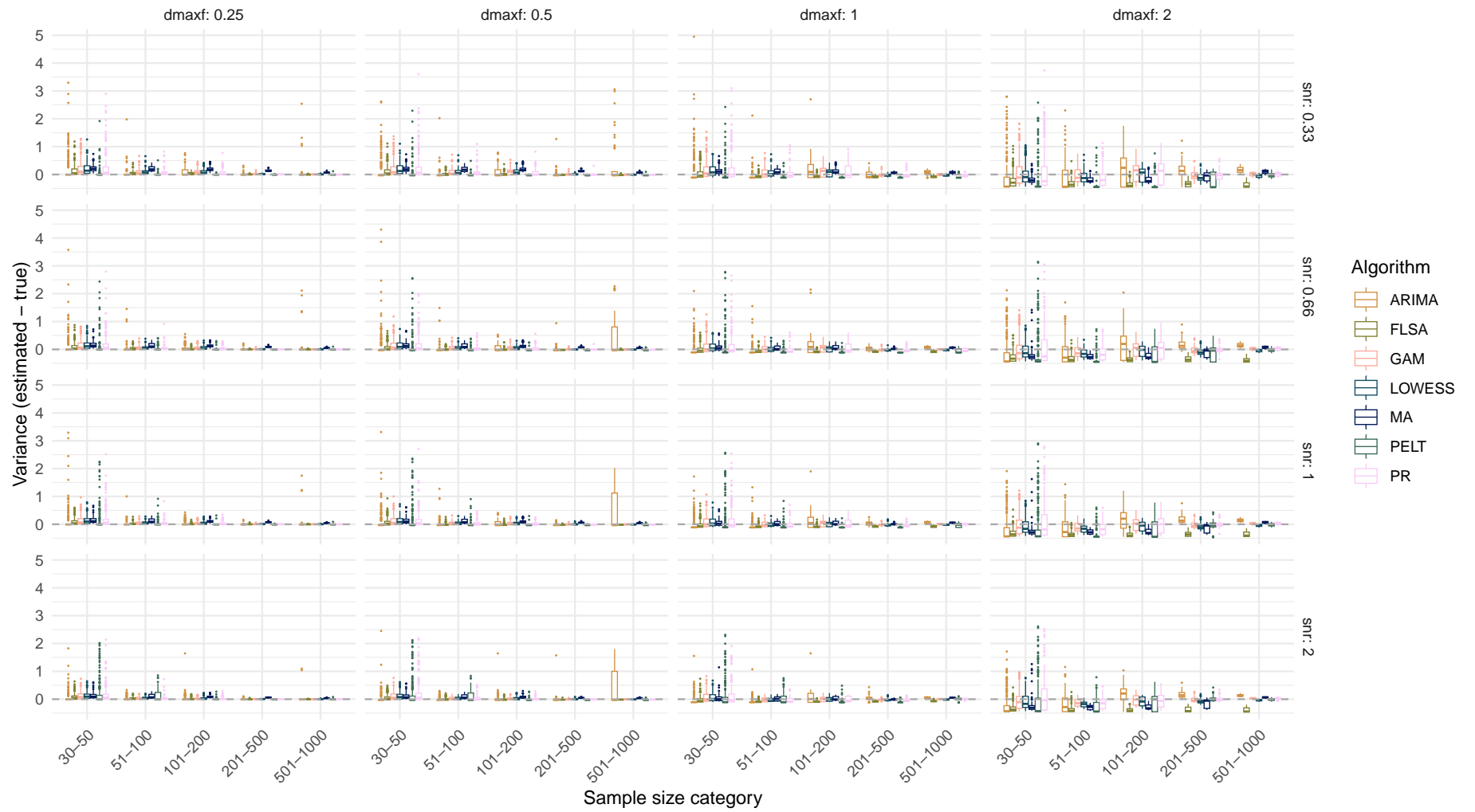


## Systematic change pattern: Quadratic

Estimated variance over sample size  
(Dashed line indicates the true variance)

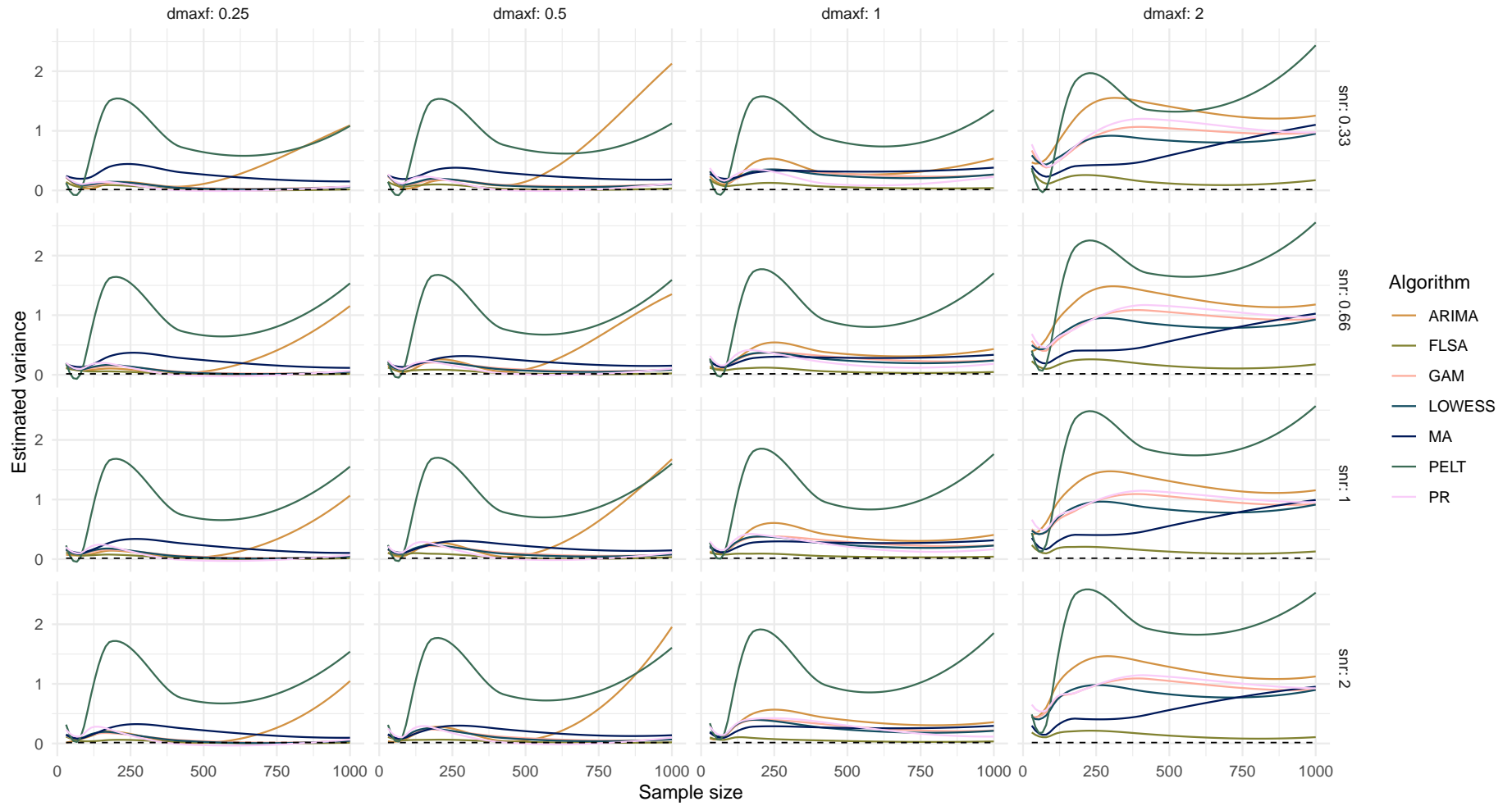


Boxplot of variance difference over sample size

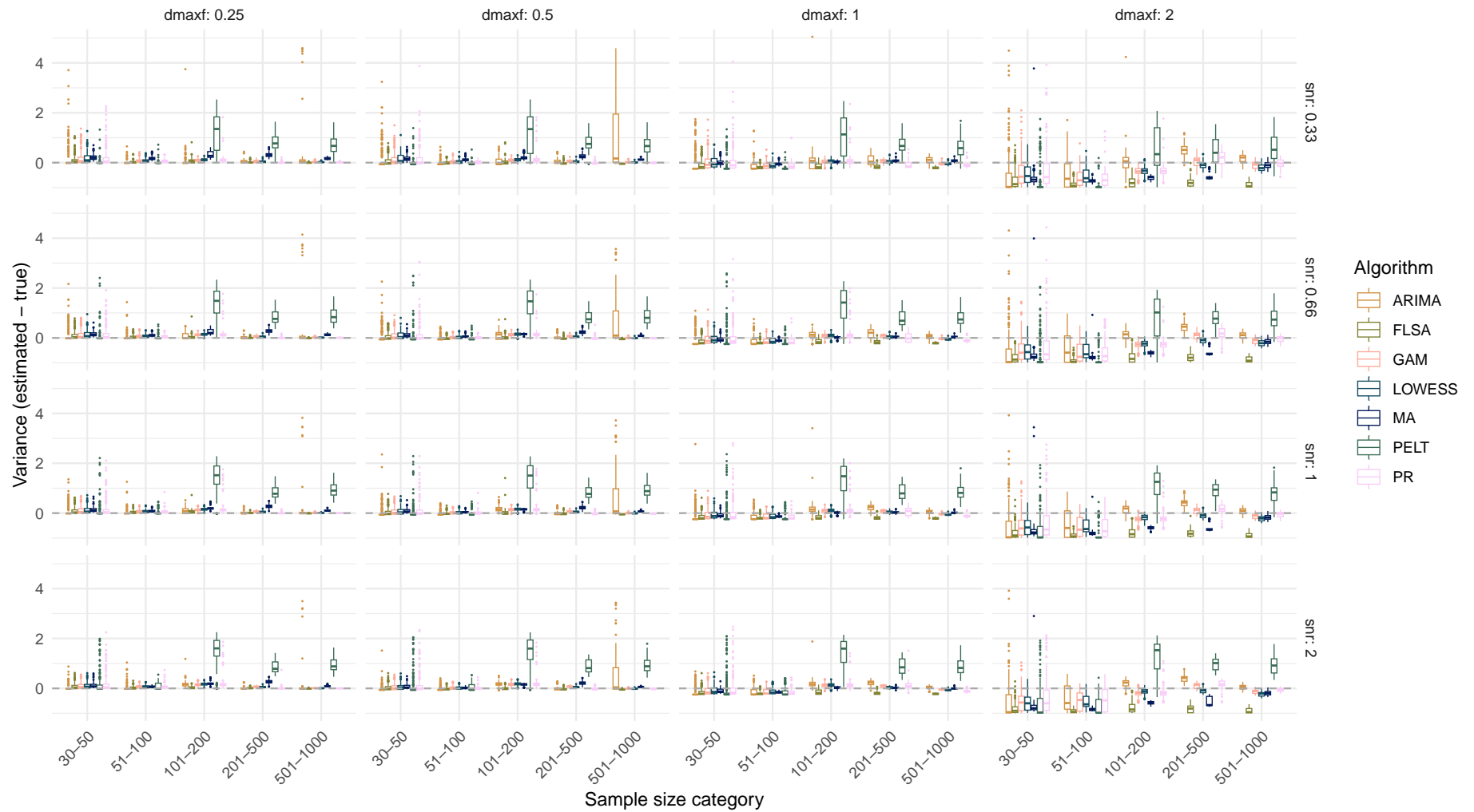


## Systematic change pattern: Recurrent

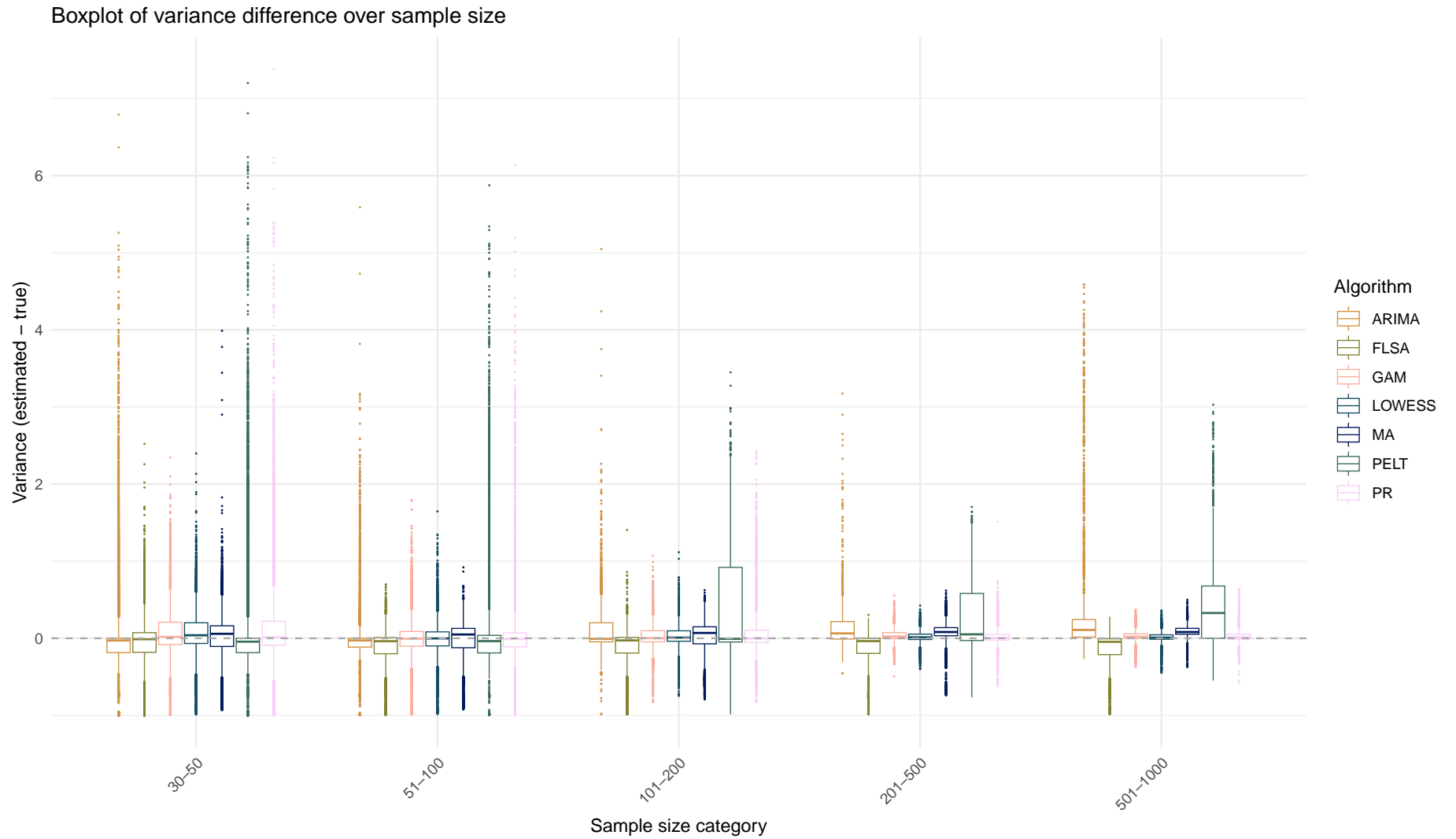
Estimated variance over sample size  
(Dashed line indicates the true variance)



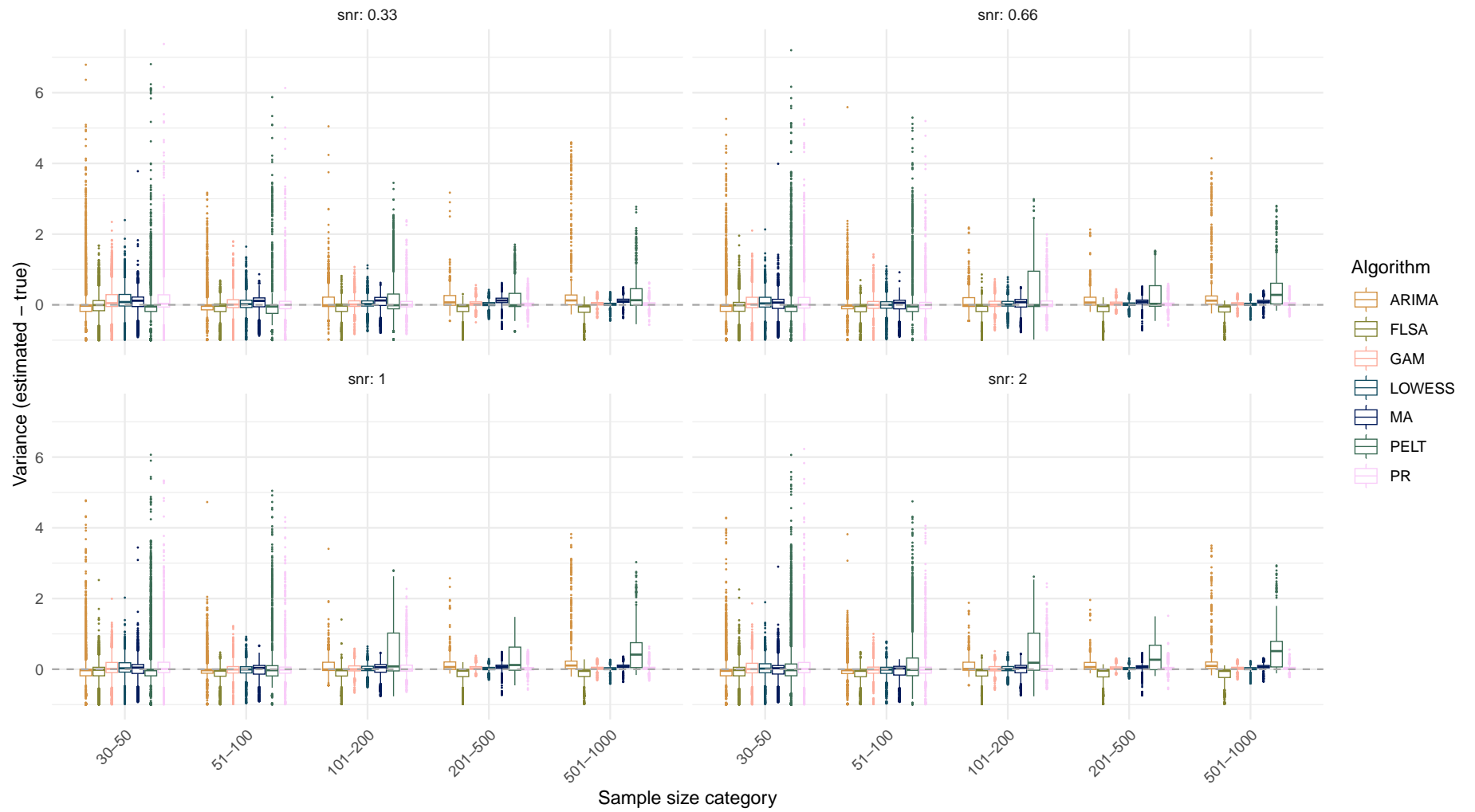
Boxplot of variance difference over sample size



## Systematic change pattern: All patterns combined



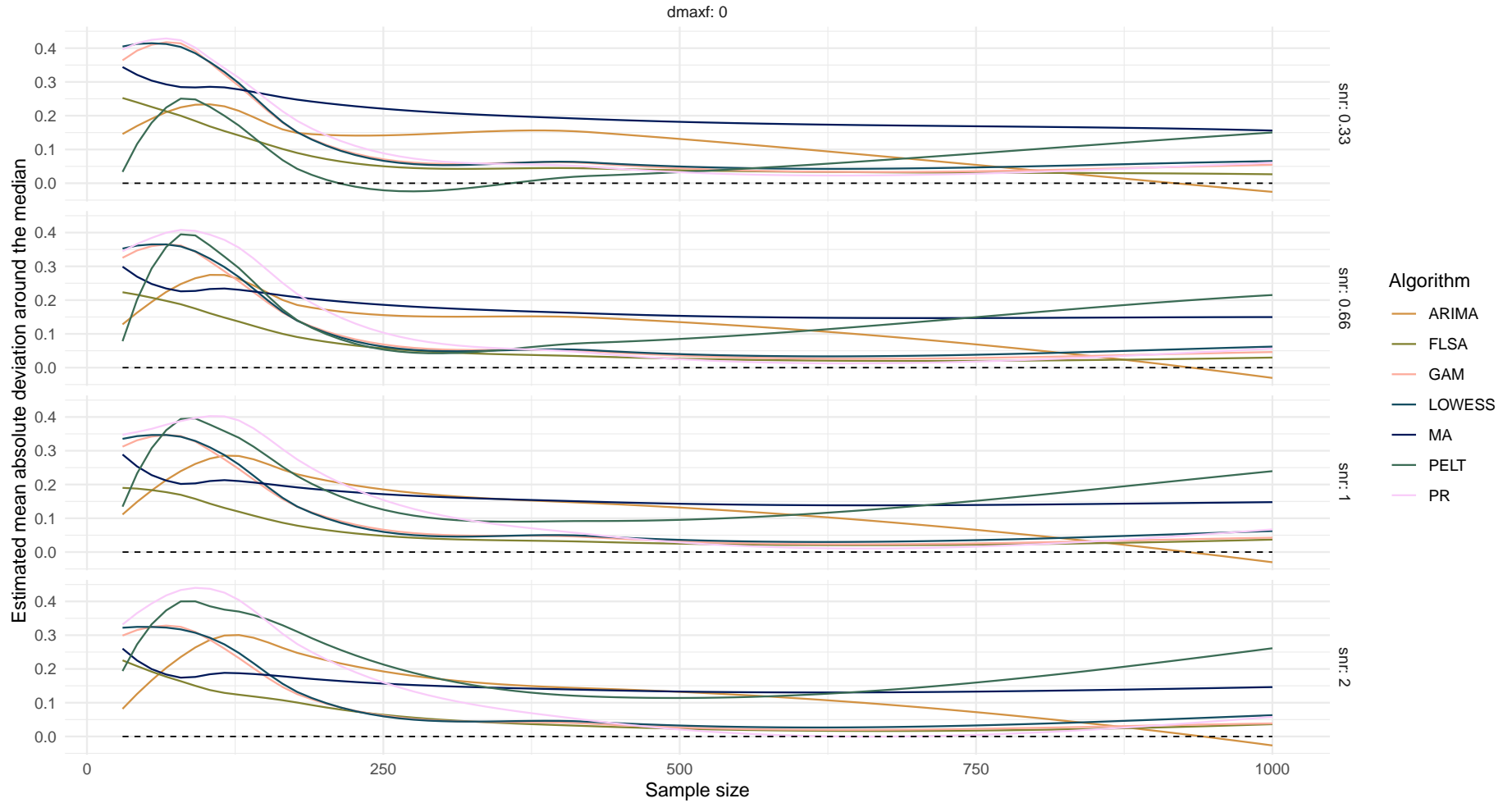
Boxplot of variance difference over sample size



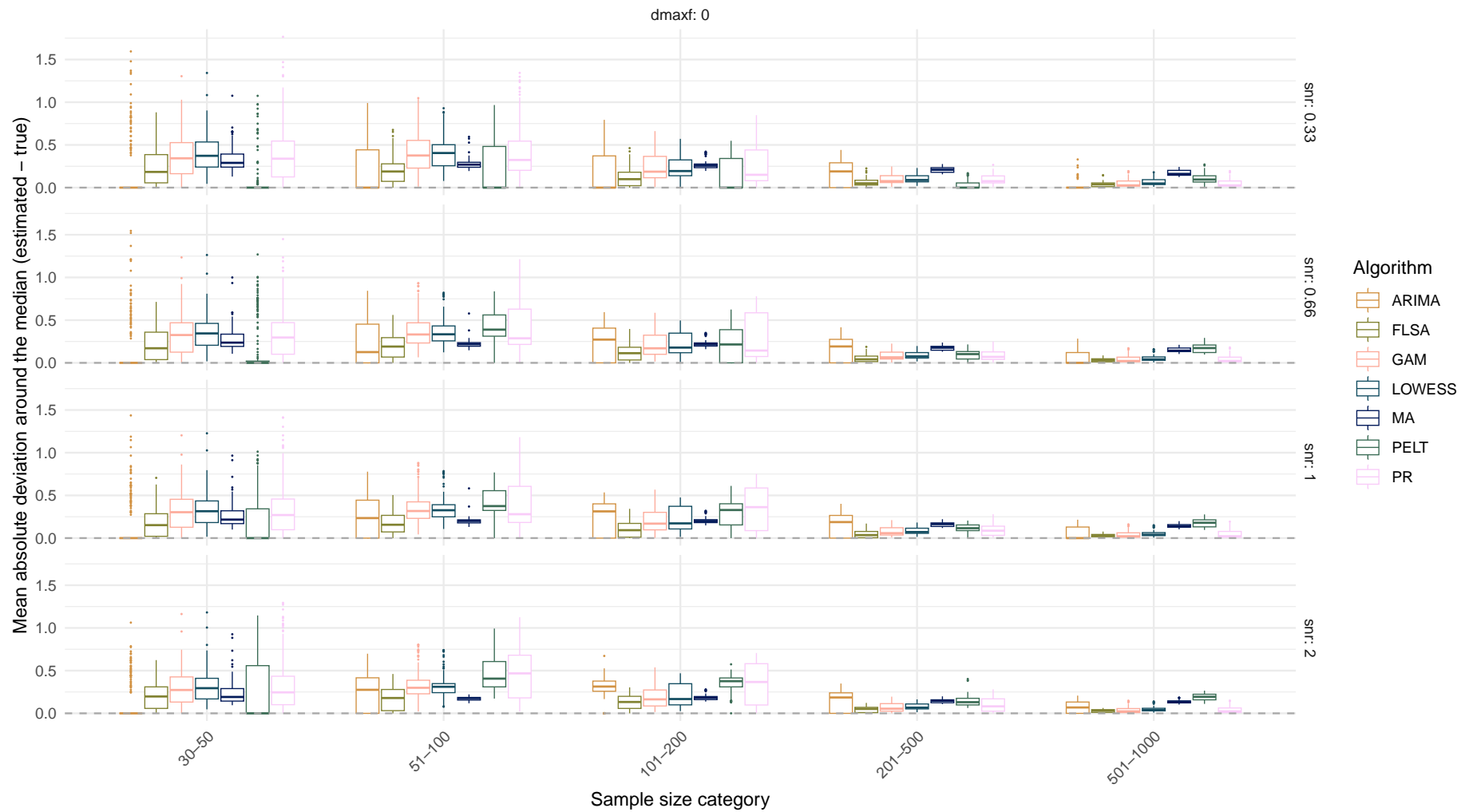
# Estimand: Mean absolute deviation around the median

Systematic change pattern: No change

Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)

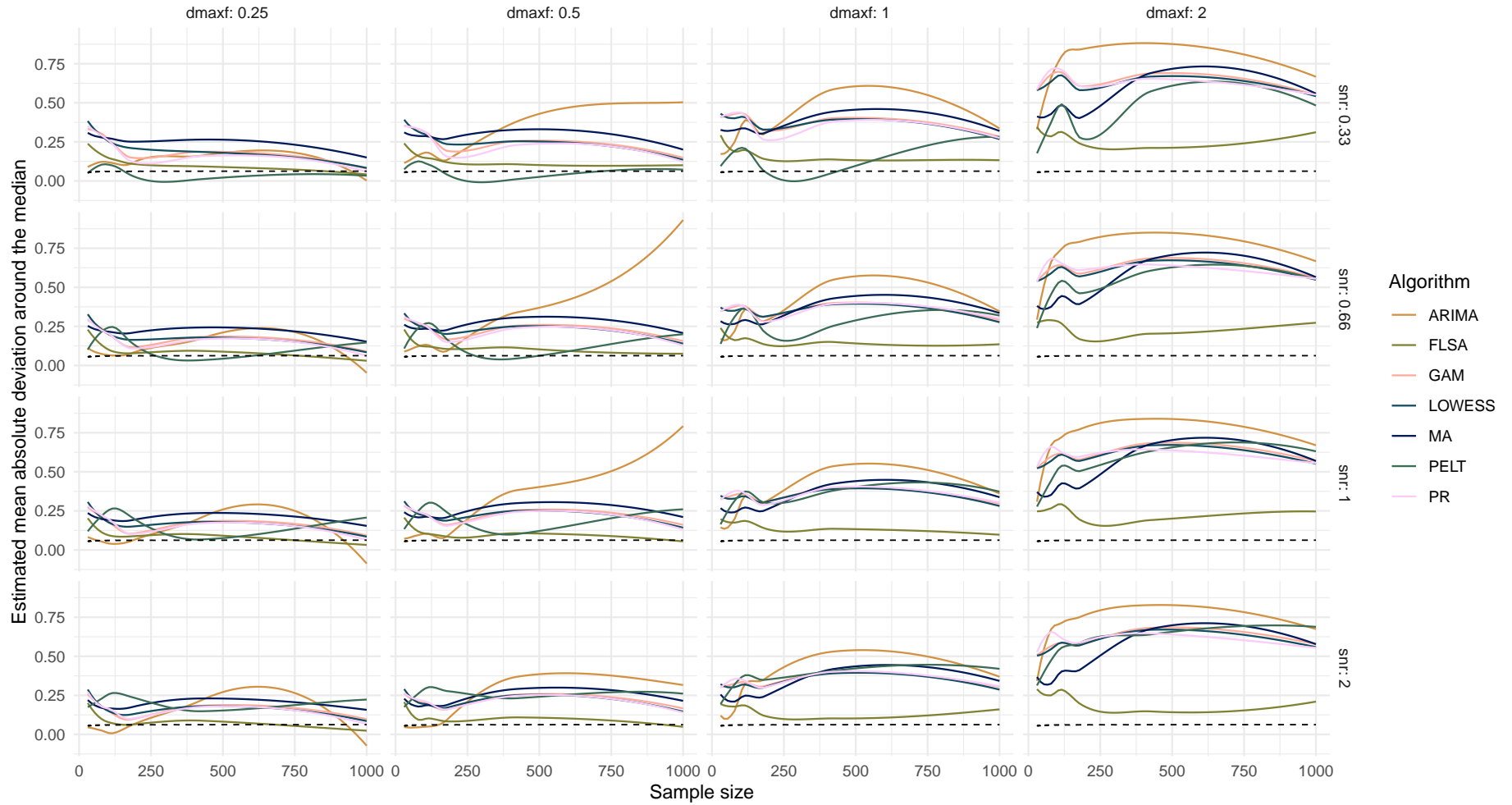


Boxplot of mean absolute deviation around the median difference over sample size

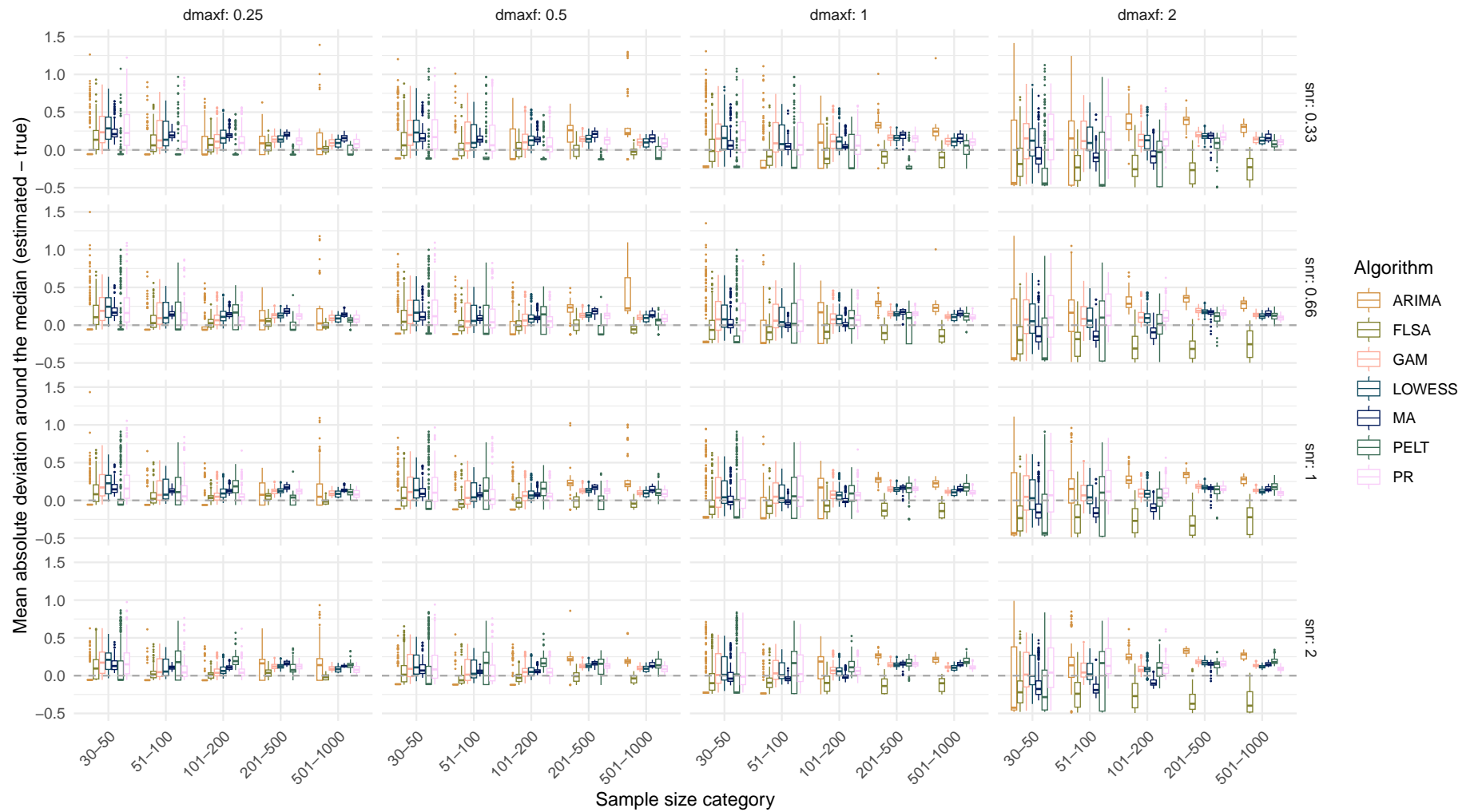


## Systematic change pattern: Jump

Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)

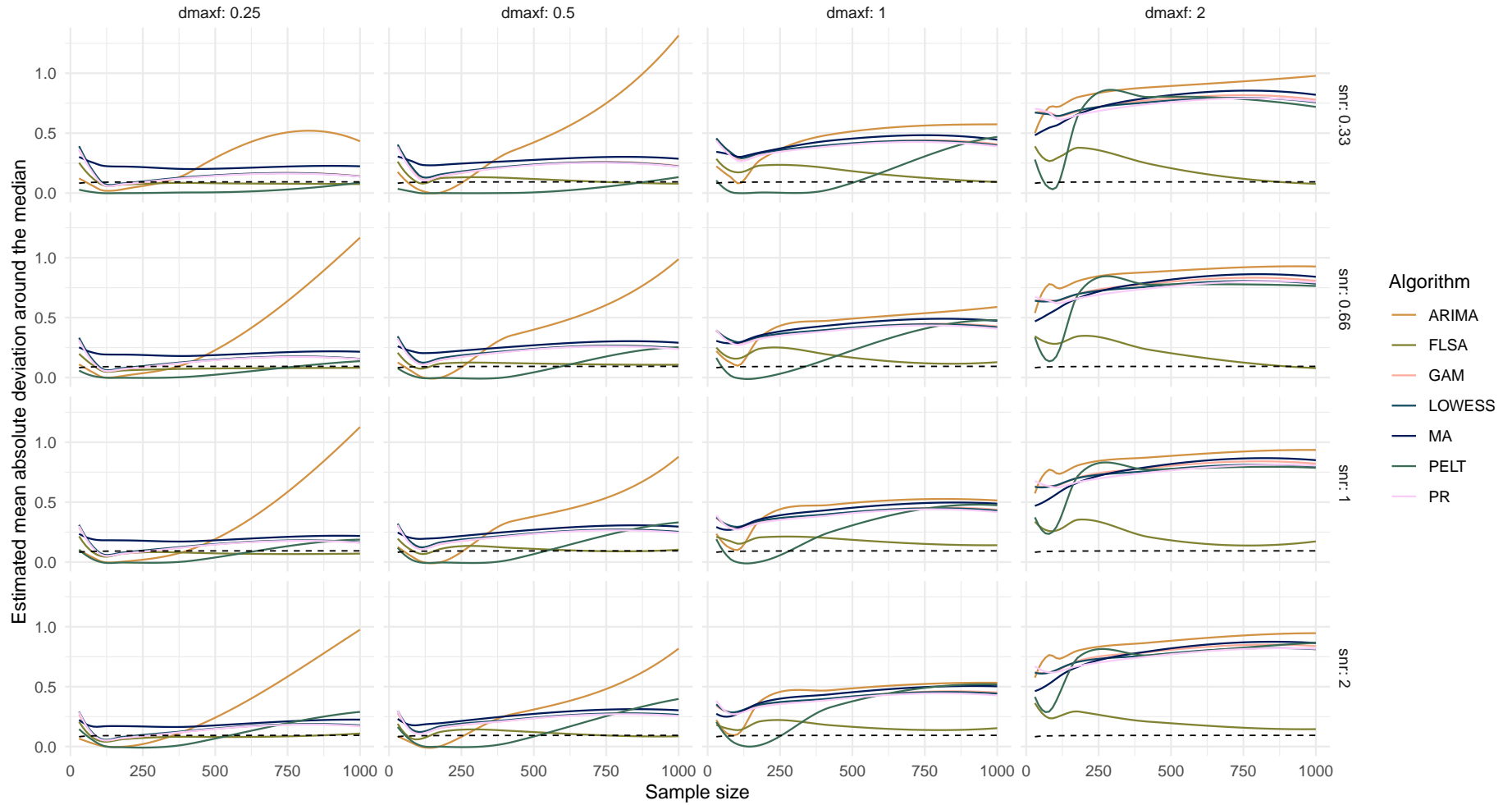


Boxplot of mean absolute deviation around the median difference over sample size

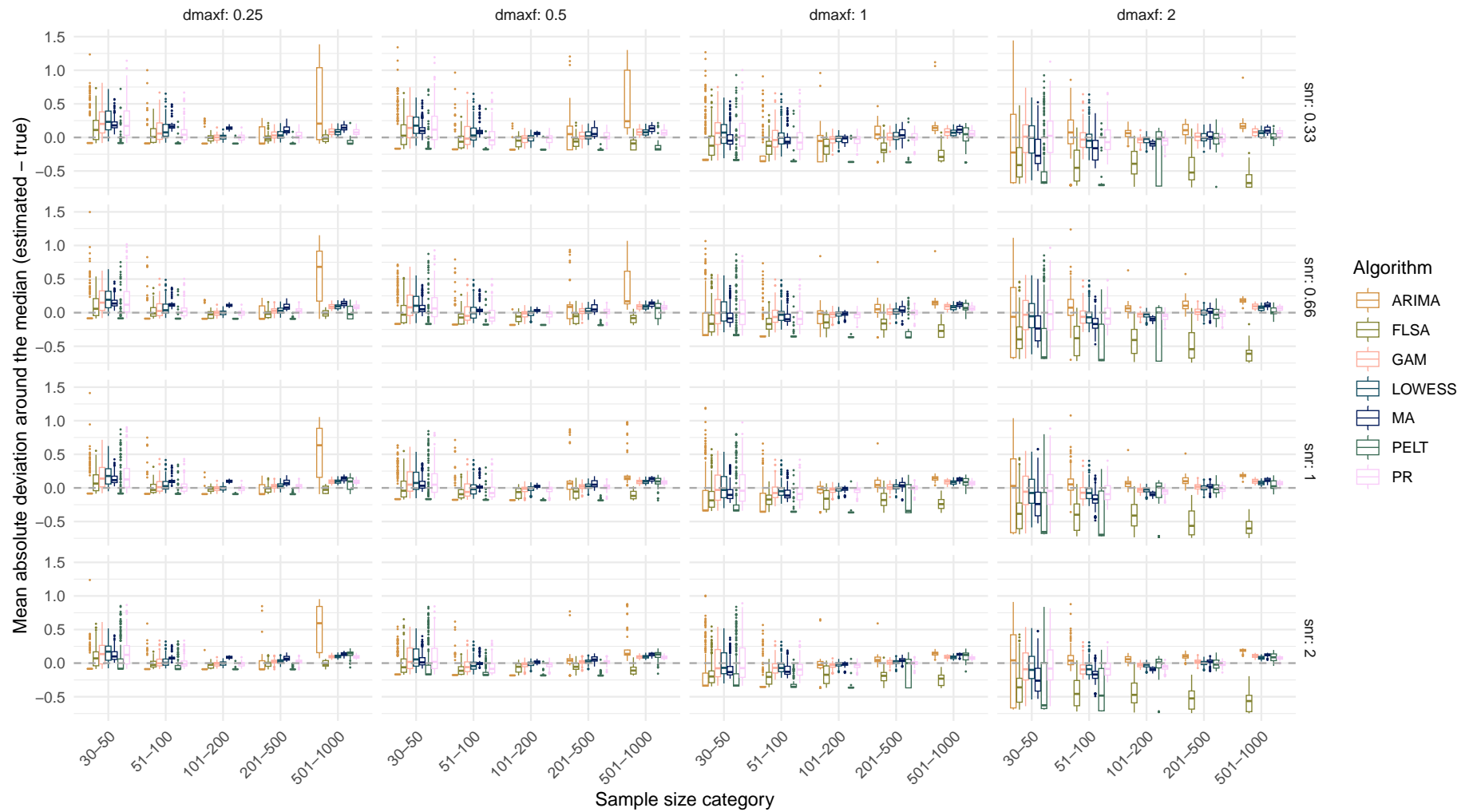


## Systematic change pattern: Linear

Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)

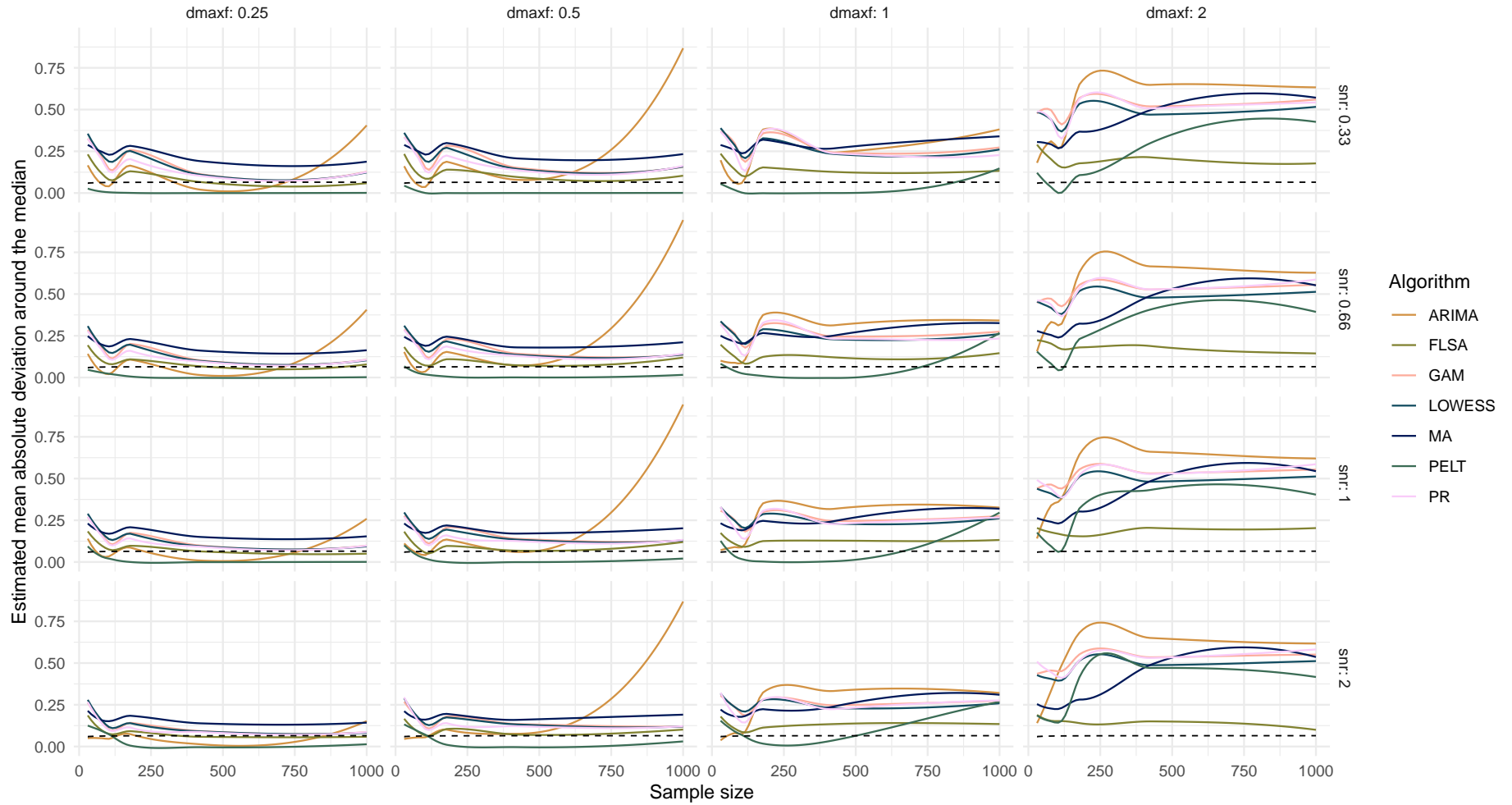


Boxplot of mean absolute deviation around the median difference over sample size

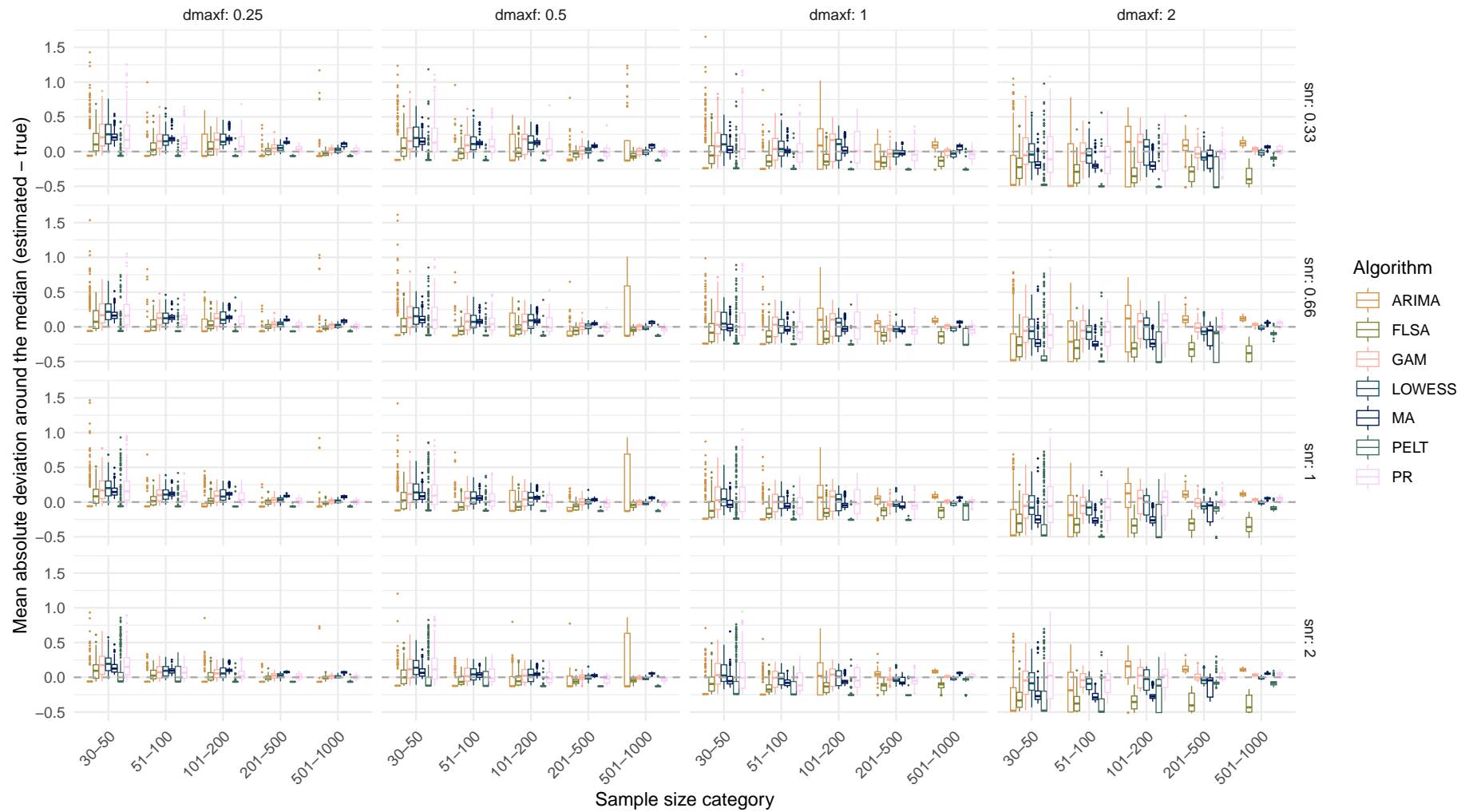


## Systematic change pattern: Quadratic

Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)

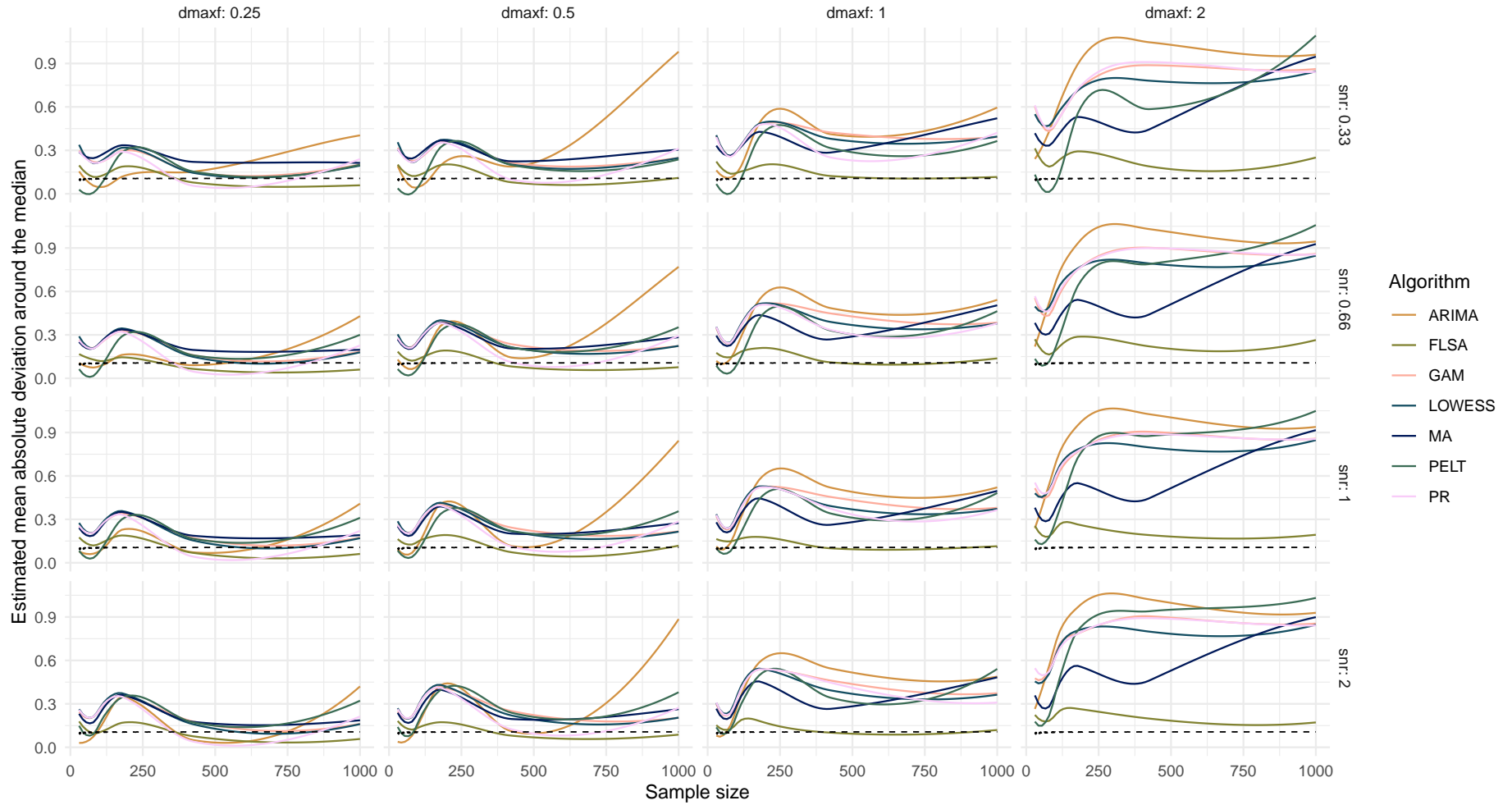


Boxplot of mean absolute deviation around the median difference over sample size

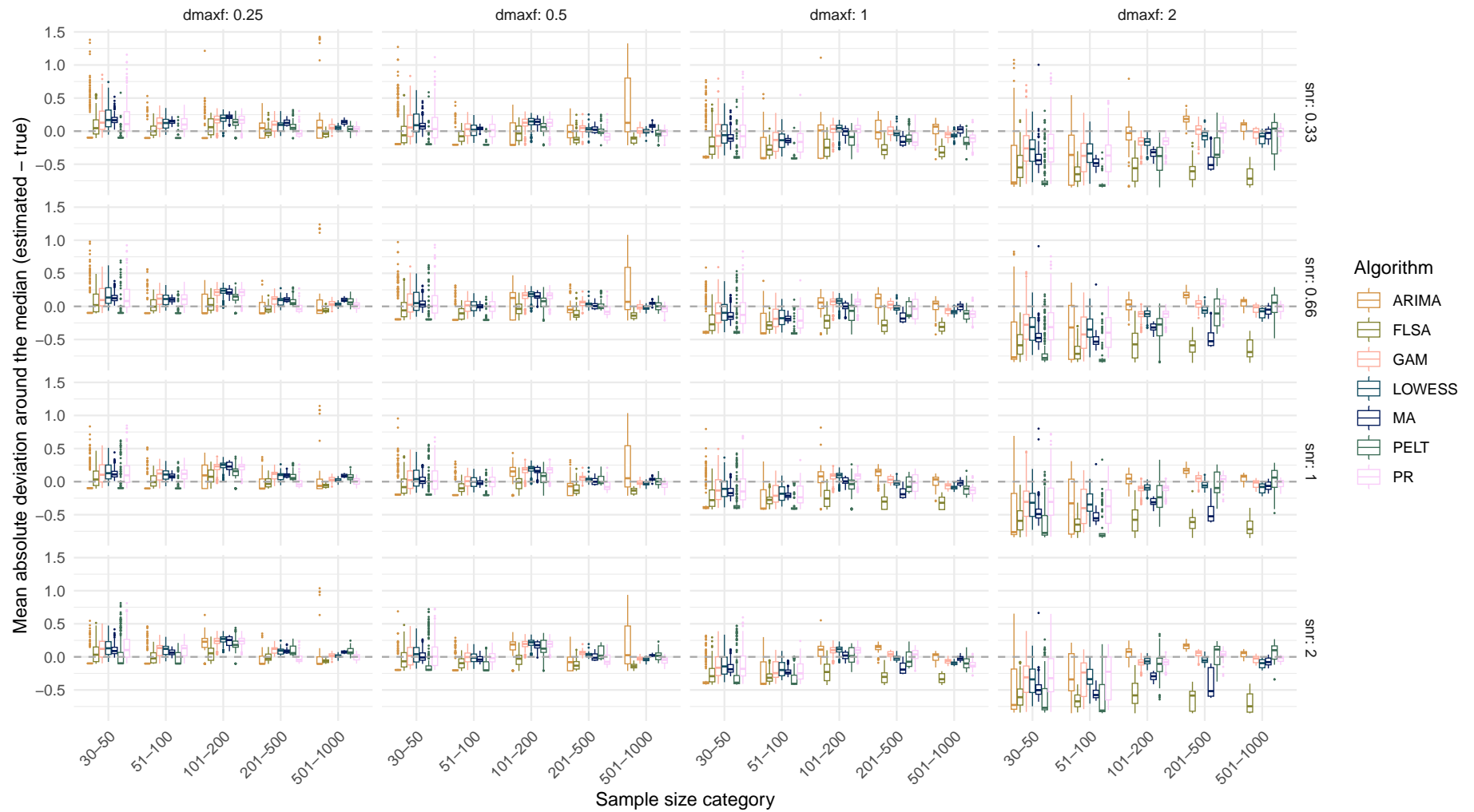


## Systematic change pattern: Recurrent

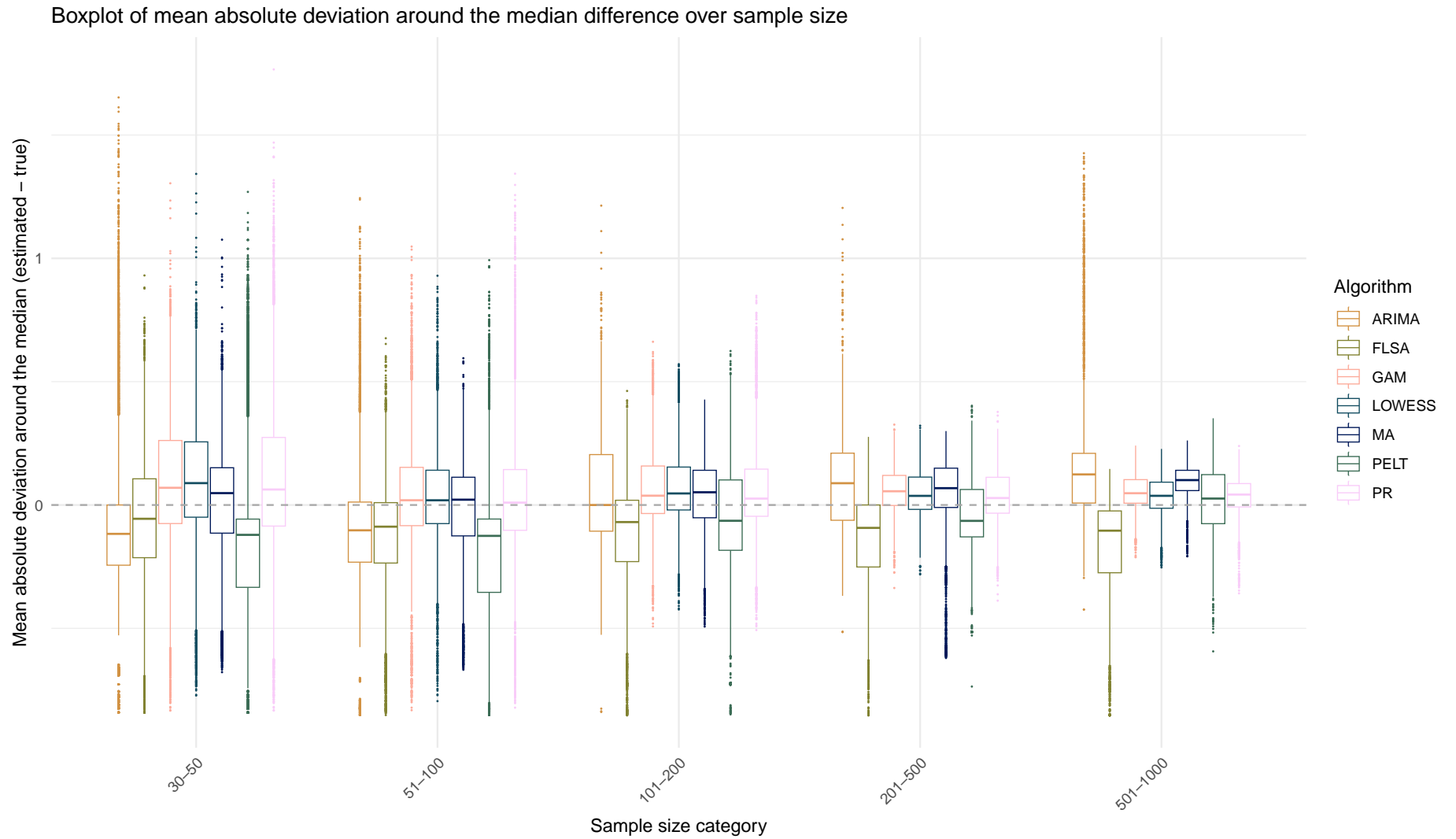
Estimated mean absolute deviation around the median over sample size  
(Dashed line indicates the true mean absolute deviation around the median)



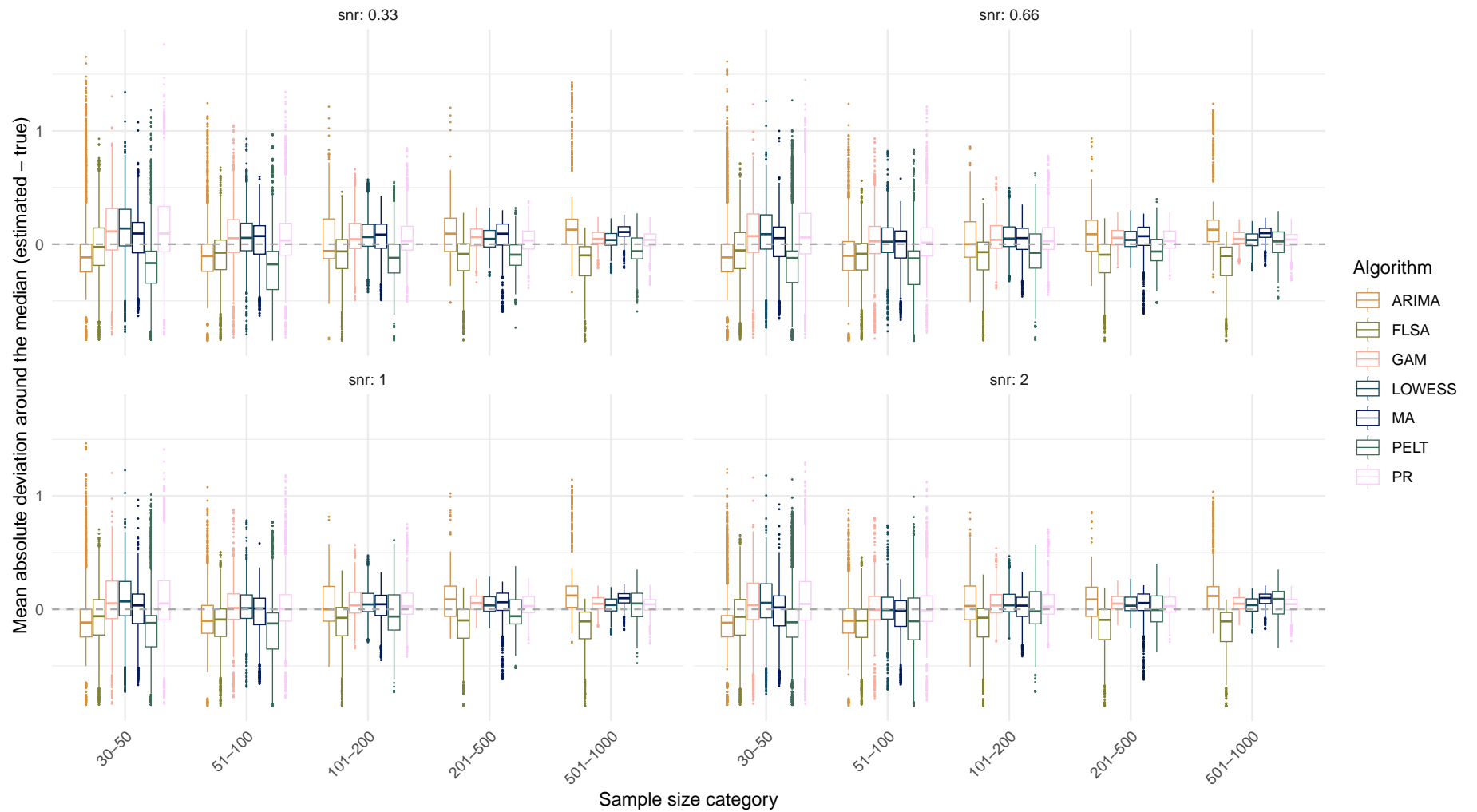
Boxplot of mean absolute deviation around the median difference over sample size



## Systematic change pattern: All patterns combined



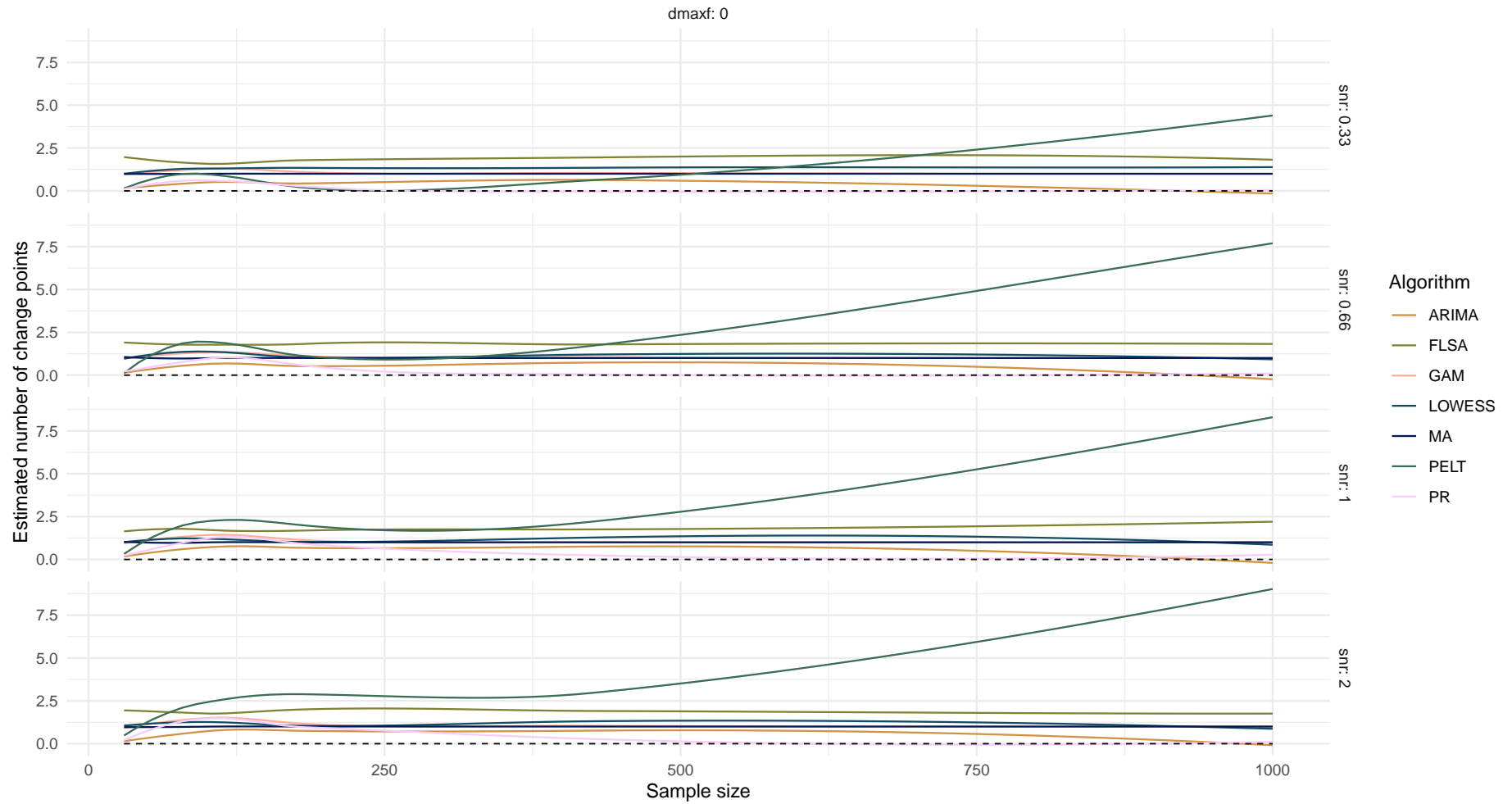
Boxplot of mean absolute deviation around the median difference over sample size



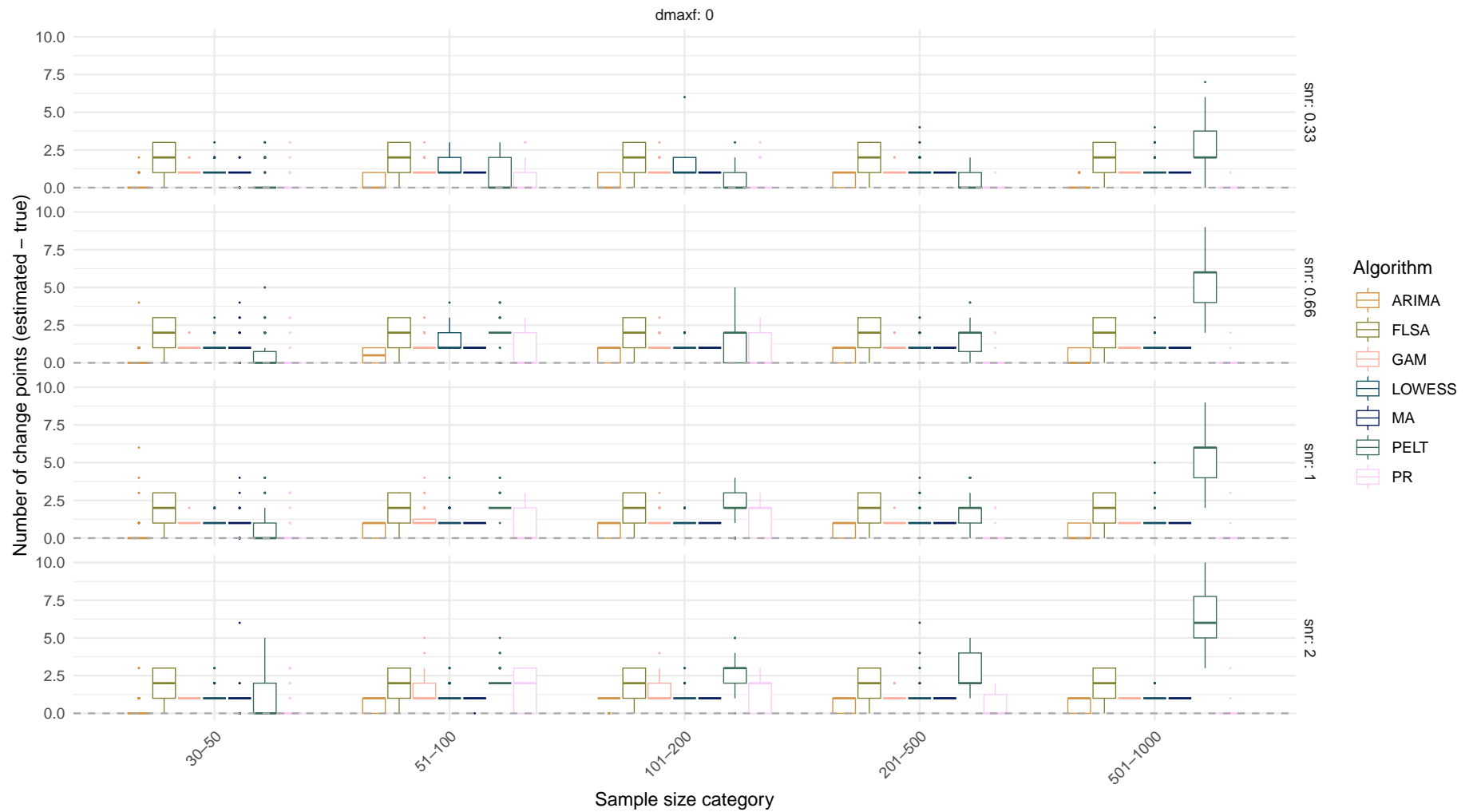
# Estimand: Number of change points

Systematic change pattern: No change

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

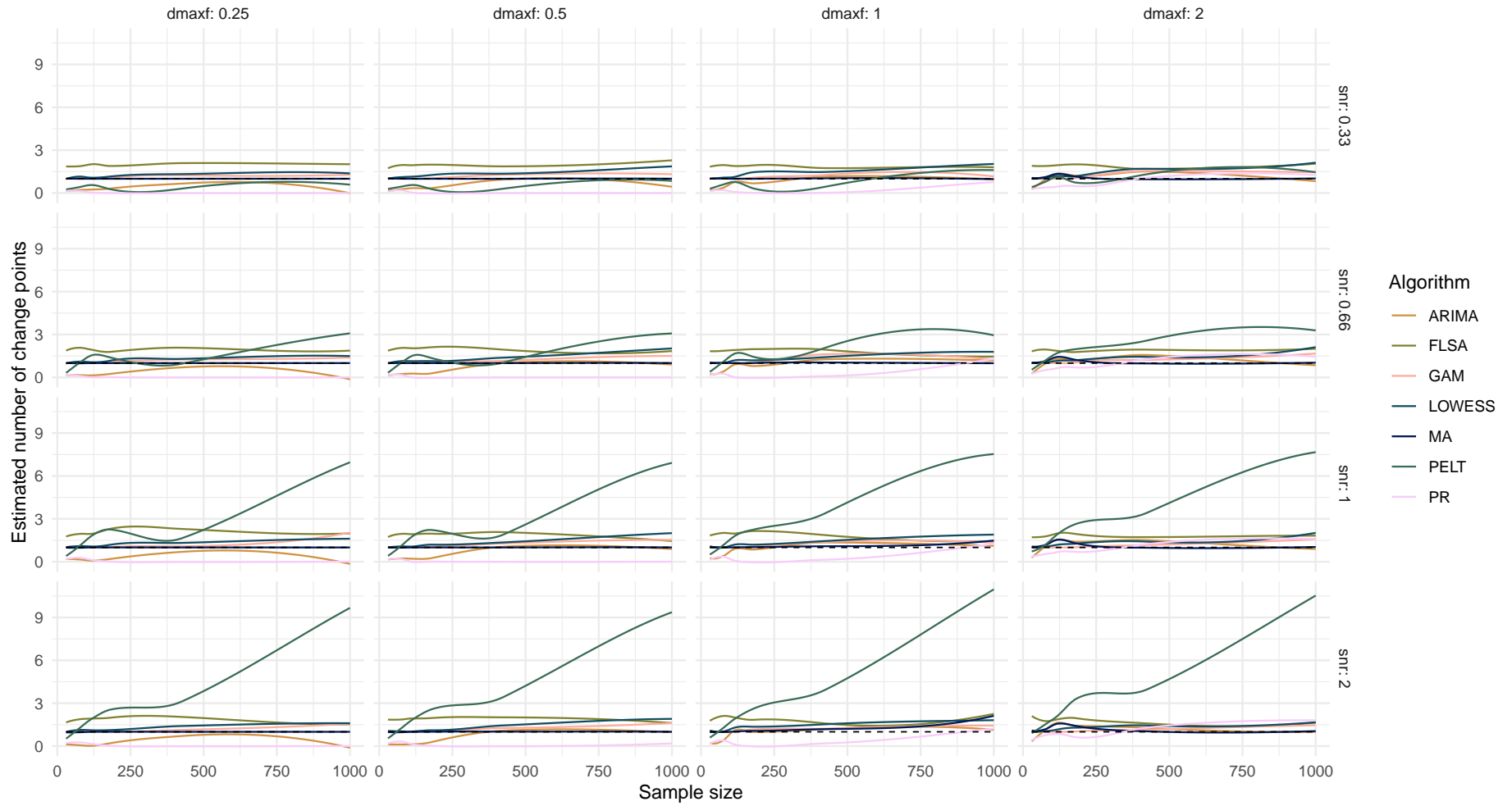


Boxplot of number of change points difference over sample size

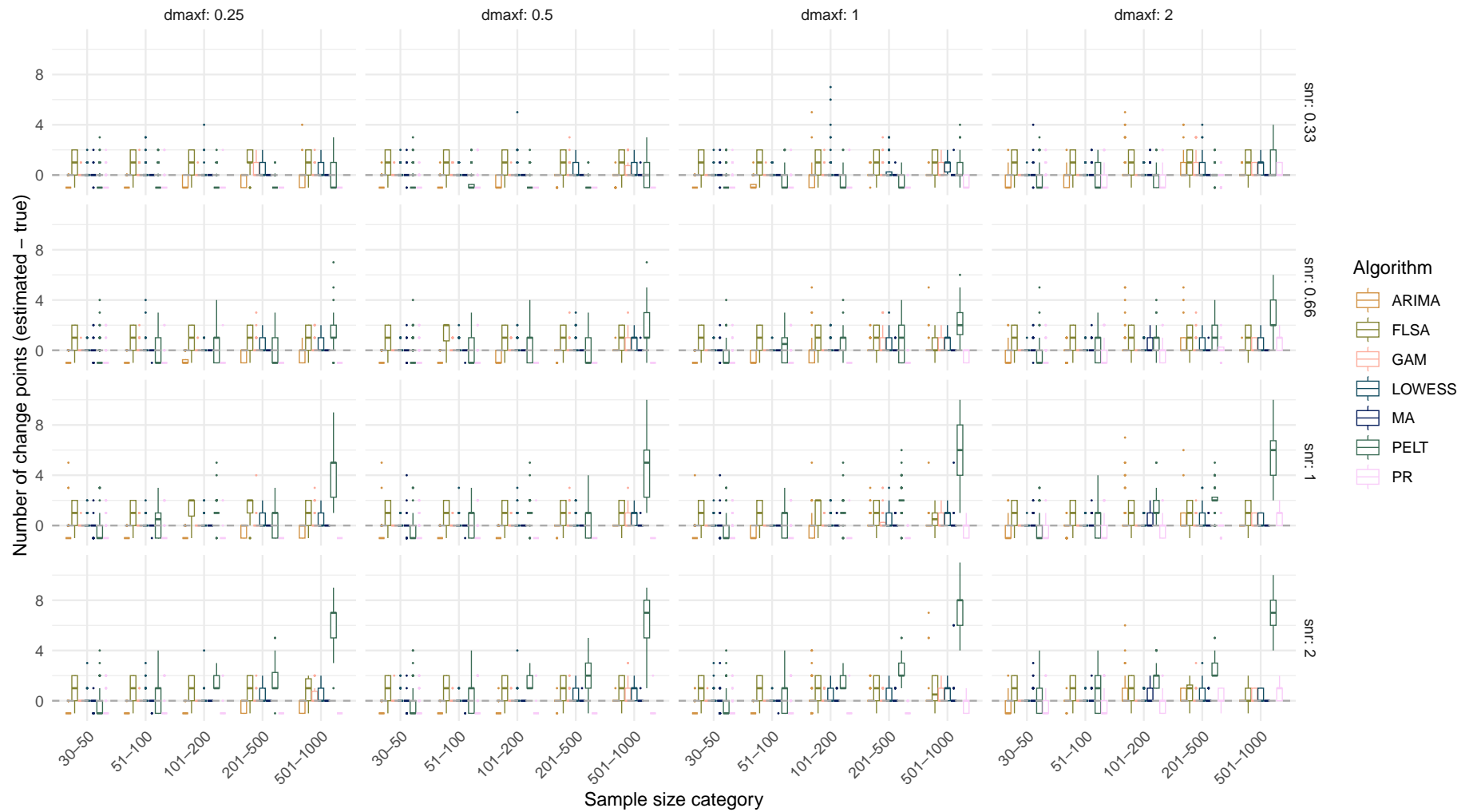


## Systematic change pattern: Jump

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

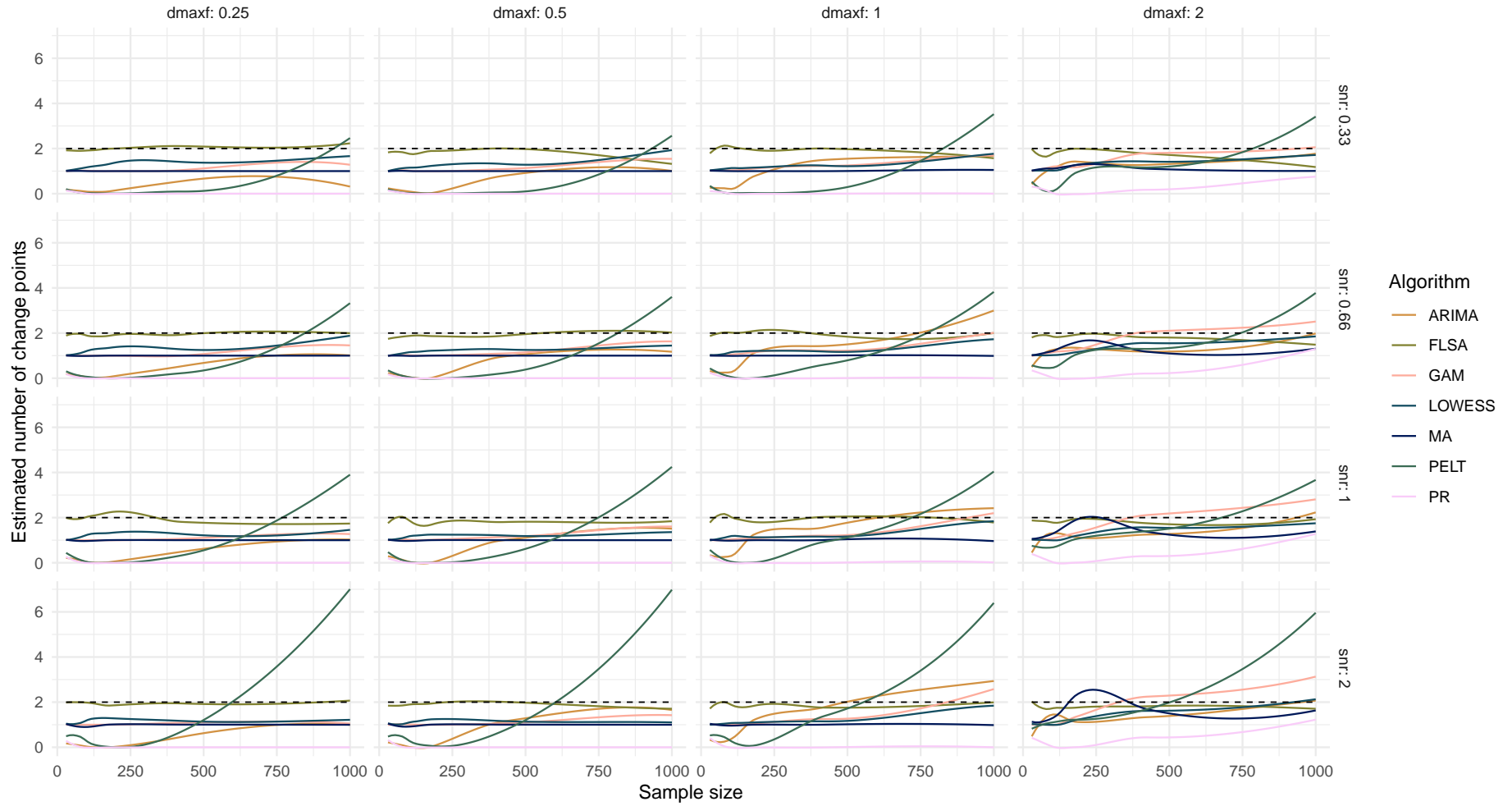


Boxplot of number of change points difference over sample size

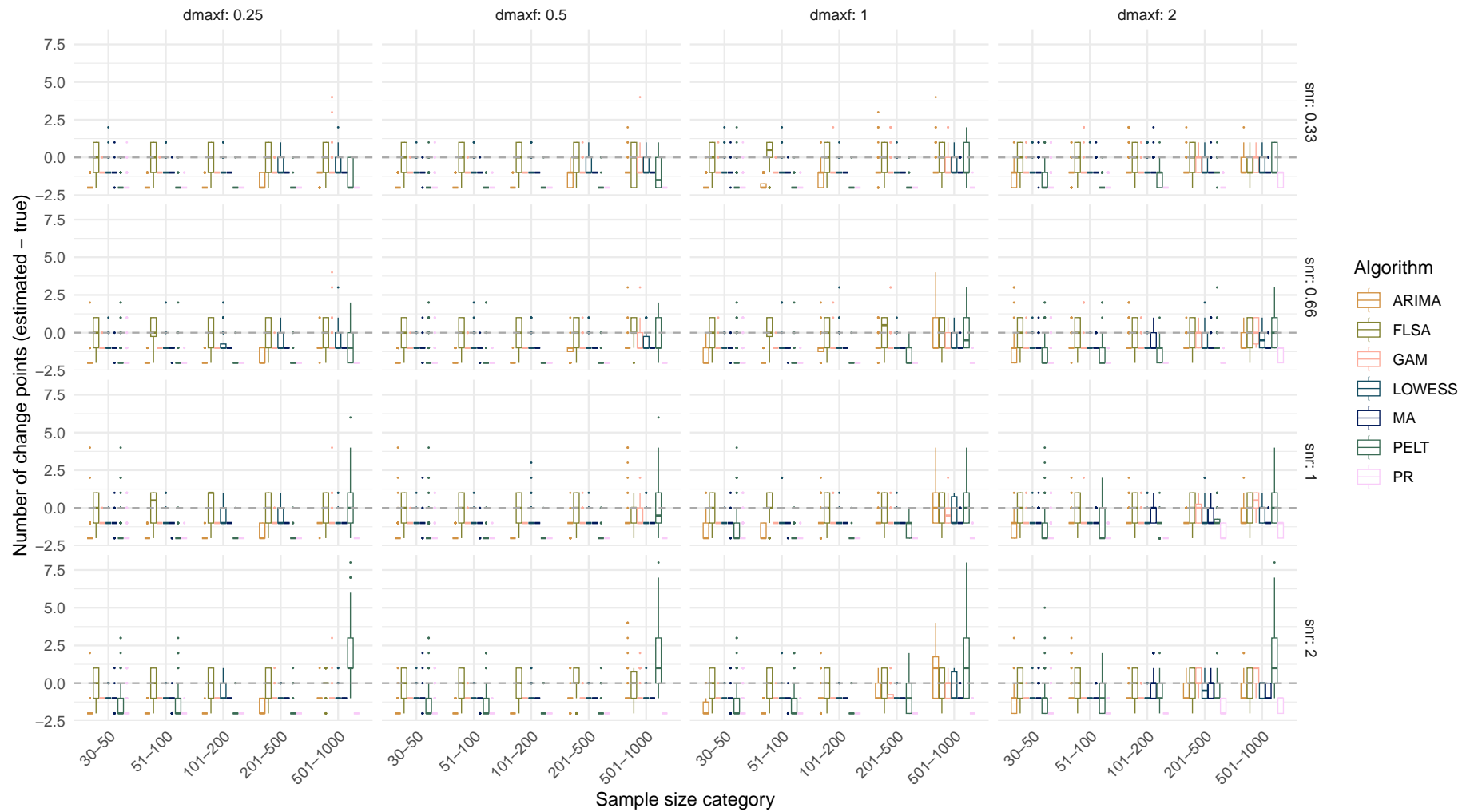


## Systematic change pattern: Linear

Estimated number of change points over sample size  
 (Dashed line indicates the true number of change points)

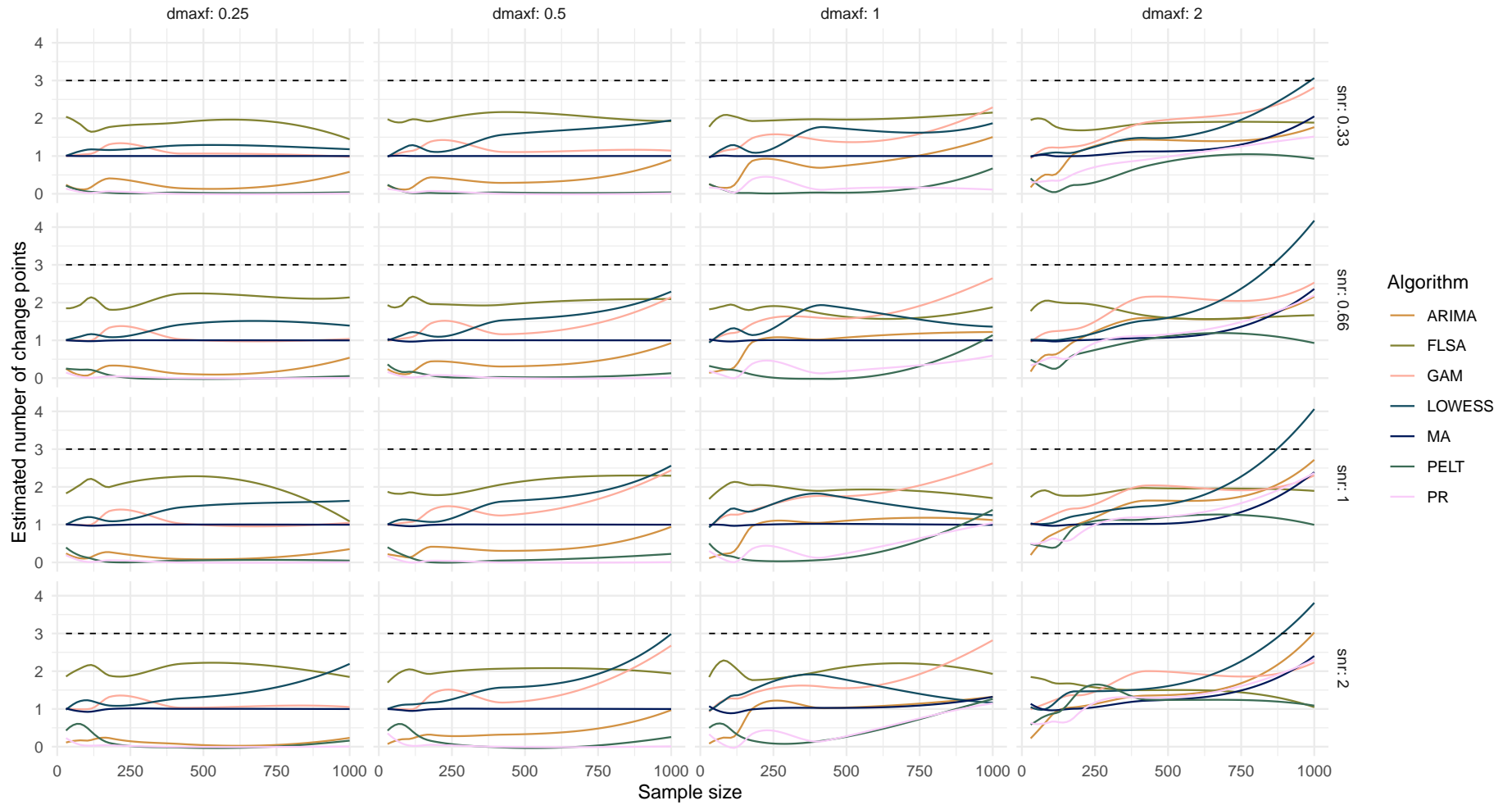


Boxplot of number of change points difference over sample size

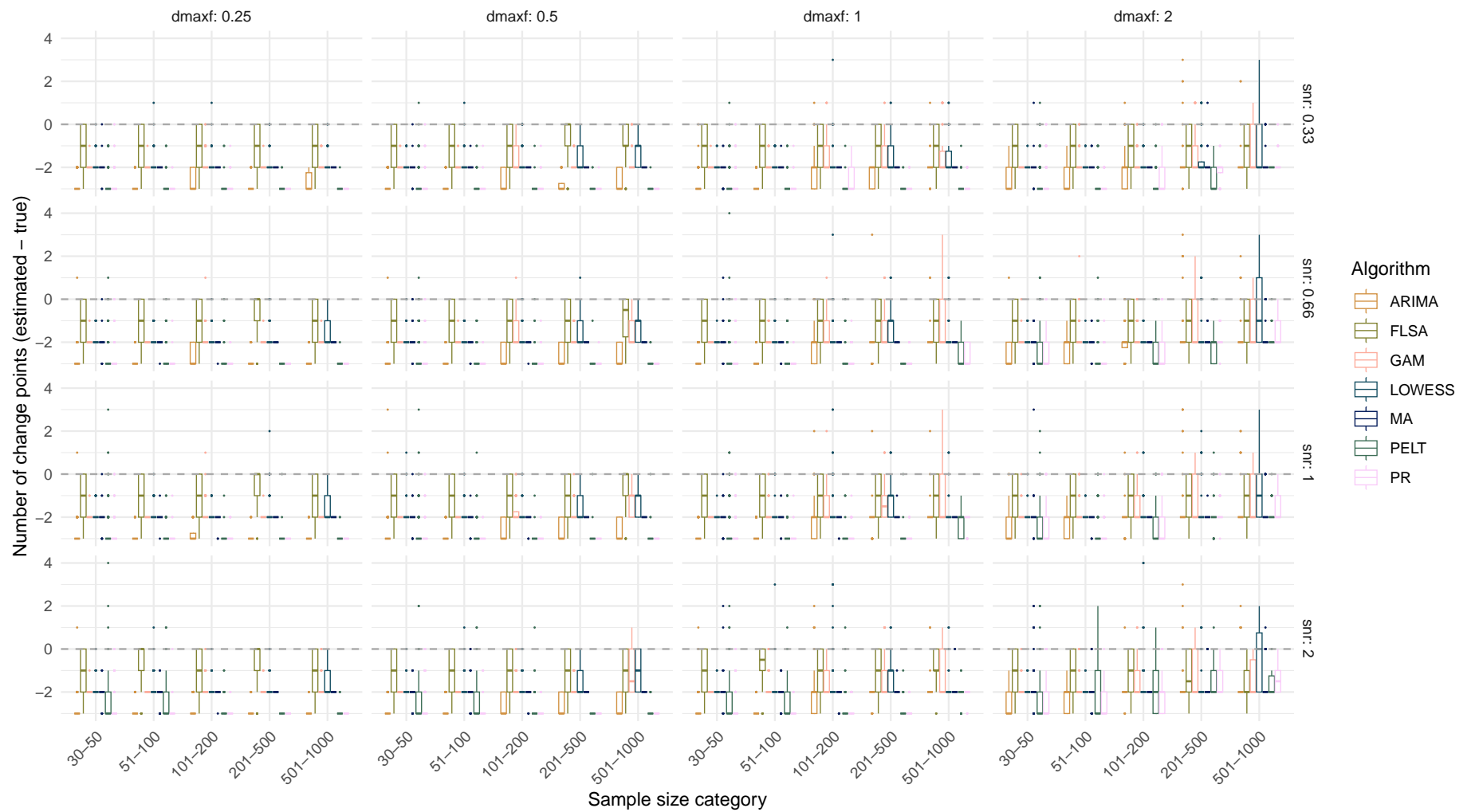


## Systematic change pattern: Quadratic

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

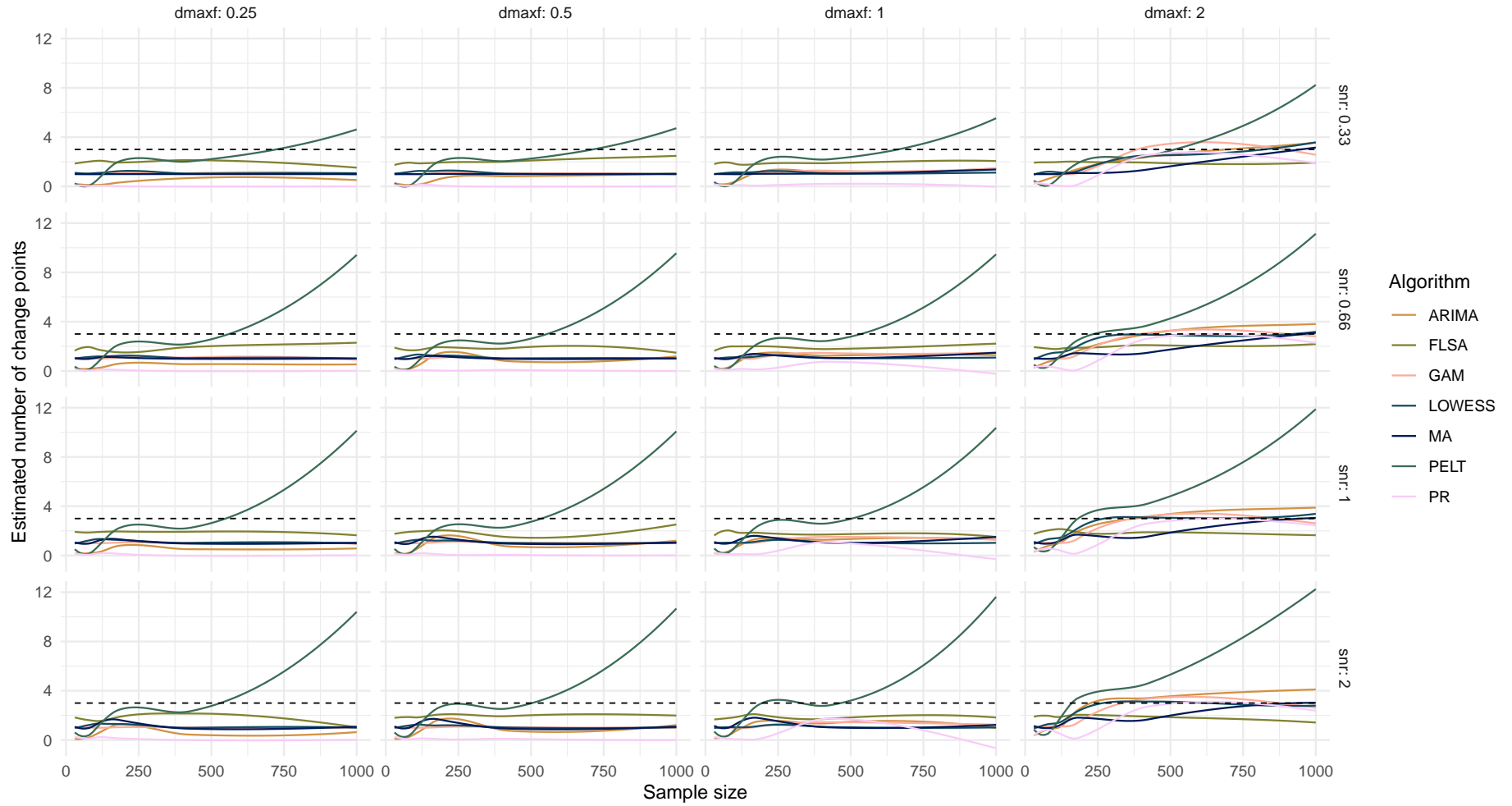


Boxplot of number of change points difference over sample size

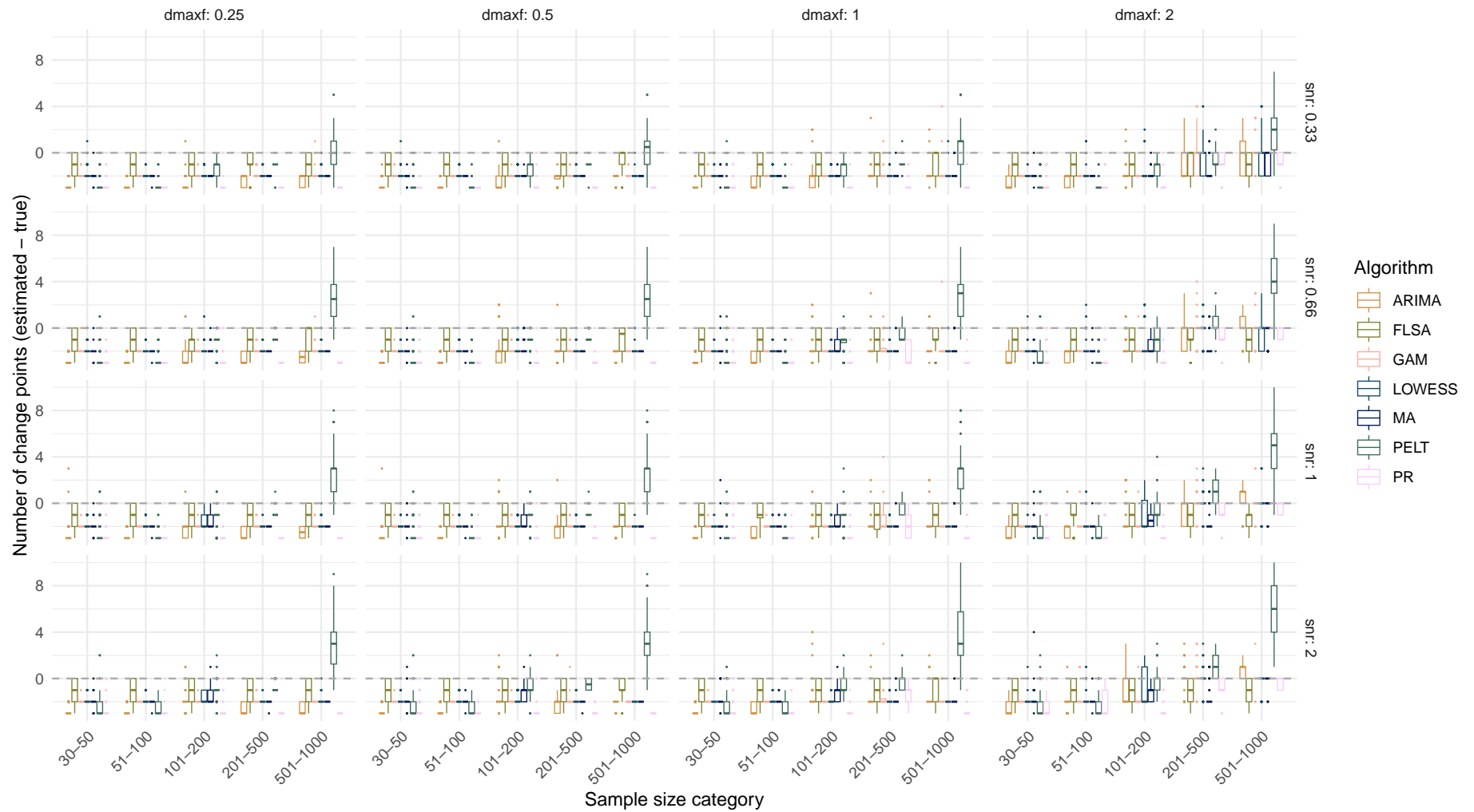


## Systematic change pattern: Recurrent

Estimated number of change points over sample size  
(Dashed line indicates the true number of change points)

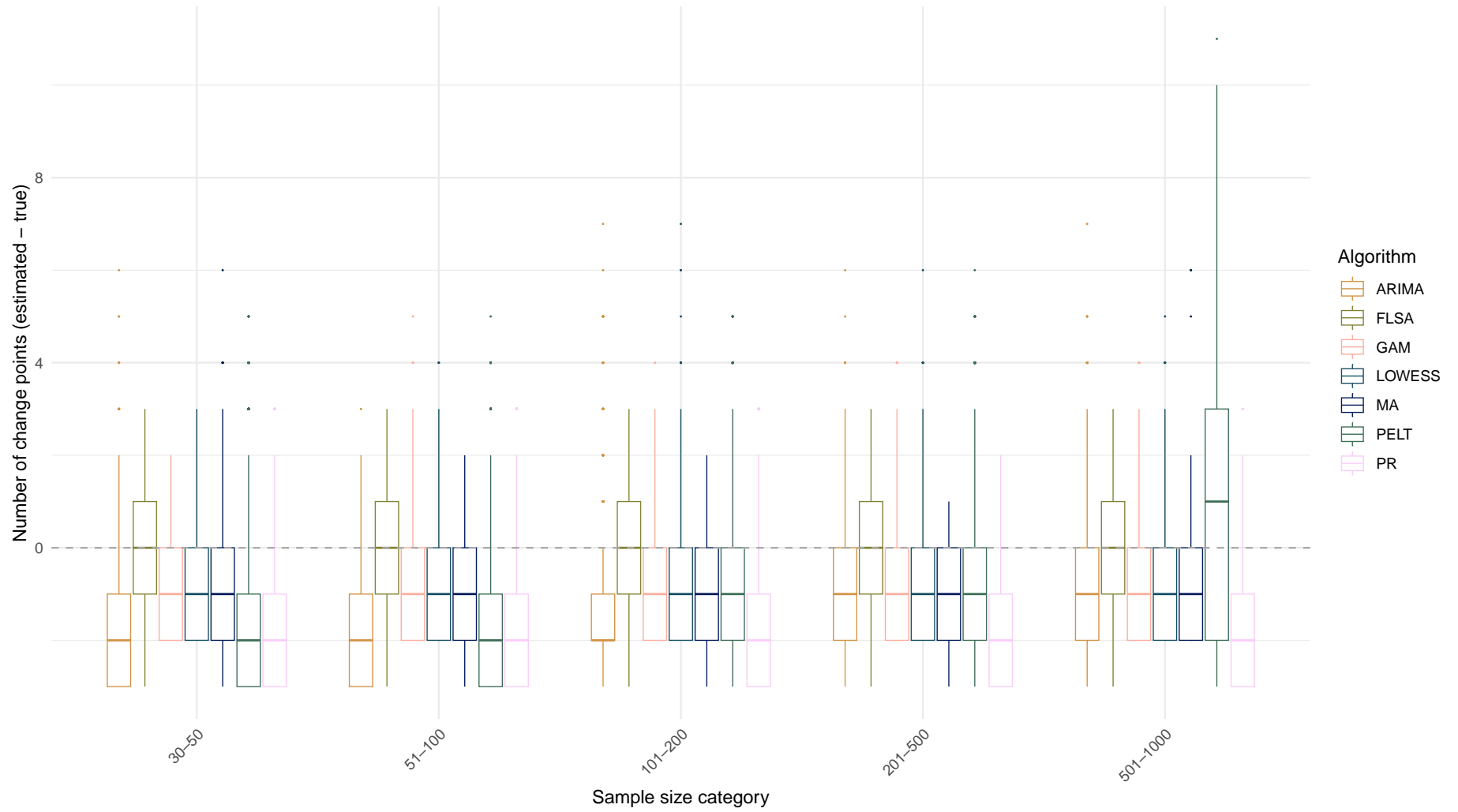


Boxplot of number of change points difference over sample size



## Systematic change pattern: All patterns combined

Boxplot of number of change points difference over sample size



Boxplot of number of change points difference over sample size

