

S1. Supplementary results

S1.1. Feature Importance Quantification on Train and Test Dataset (RMSE)

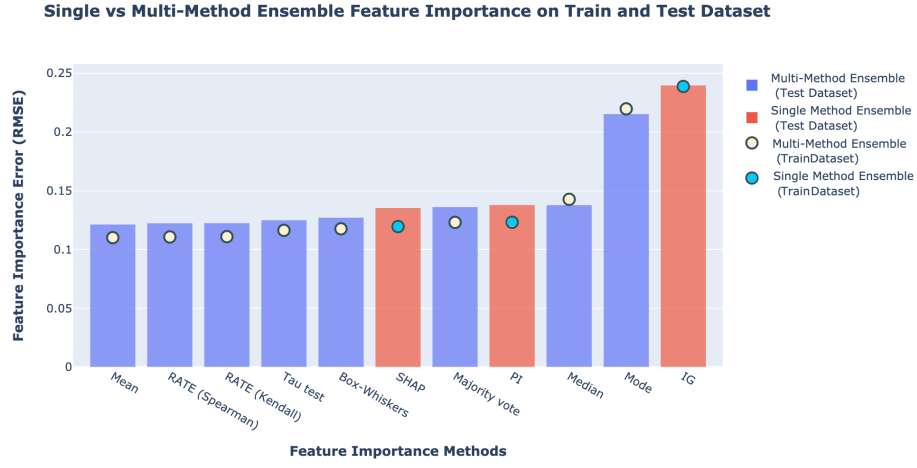


Figure S1: Average feature importance error between SME and MME with train and test dataset. (RMSE)

S1.2. Feature Importance Quantification on Train and Test Dataset (R^2)

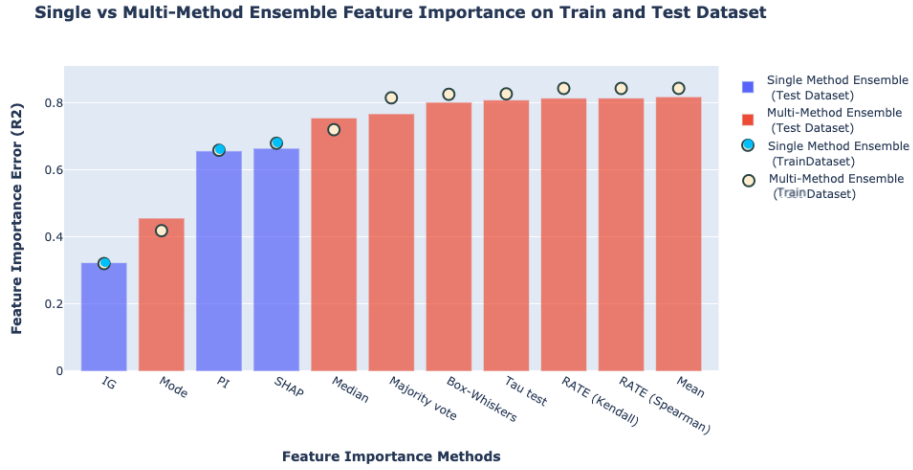


Figure S2: Average feature importance error between SME and MME with train and test dataset. (R^2)

S1.3. Effect of Noise Level on All Feature Importance (RMSE)

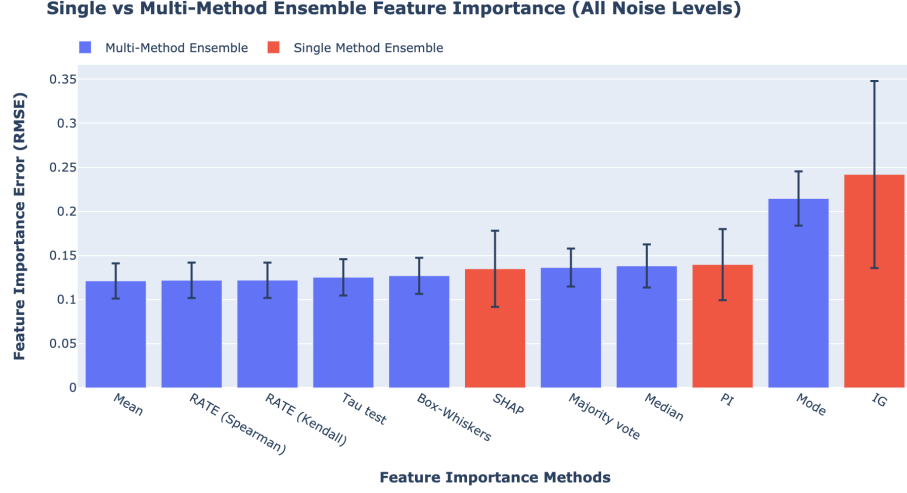


Figure S3: Effect of all noise level on all feature importance methods (RMSE)

		Noise level (Standard deviation)		
		0 (10^{-2})	2 (10^{-2})	4 (10^{-2})
SME	PI	13.8±2.1	13.4±2.0	14.5±2.7
	SHAP	13.4±2.4	13.3±2.4	13.6±2.5
	IG	23.1±10.6	25.0±10.5	24.3±10.6
MME	RATE (Kendall)	12.0±3.2	11.9±3.3	12.6±3.7
	RATE (Spearman)	12.0±3.3	11.9±3.3	12.5±3.7
	Median	13.8±4.1	13.8±3.2	14.3±4.6
	Mean	12.0±3.2	11.8±3.3	12.5±3.7
	Mode	22.8±5.4	19.9±5.3	21.5±5.1
	Box-whiskers	12.5±3.4	12.6±3.4	12.9±3.7
	Tau test	12.3±3.4	12.2±3.3	13.0±3.8
	Majority vote	13.3±3.7	13.7±3.4	13.7±3.9

Table S1: Summary of feature importance RMSE between different SME and MME for different noise level.

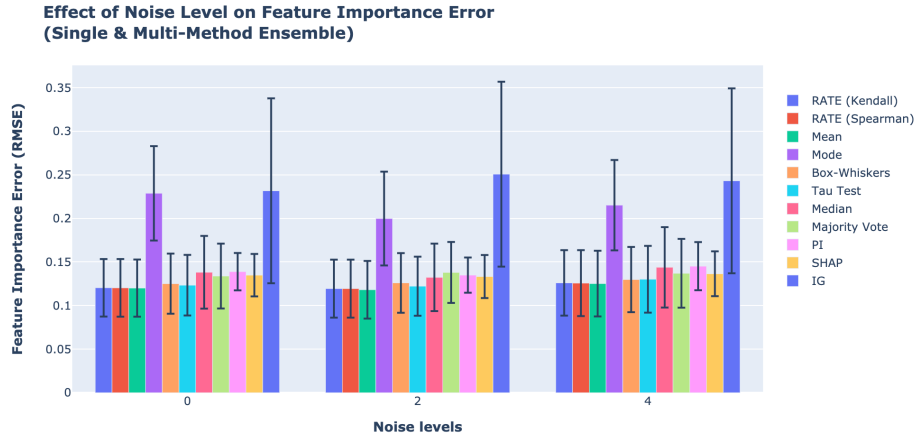


Figure S4: Effect of noise levels on ensemble feature importance. (RMSE)

S1.4. Effect of Noise Level on All Feature Importance (R^2)

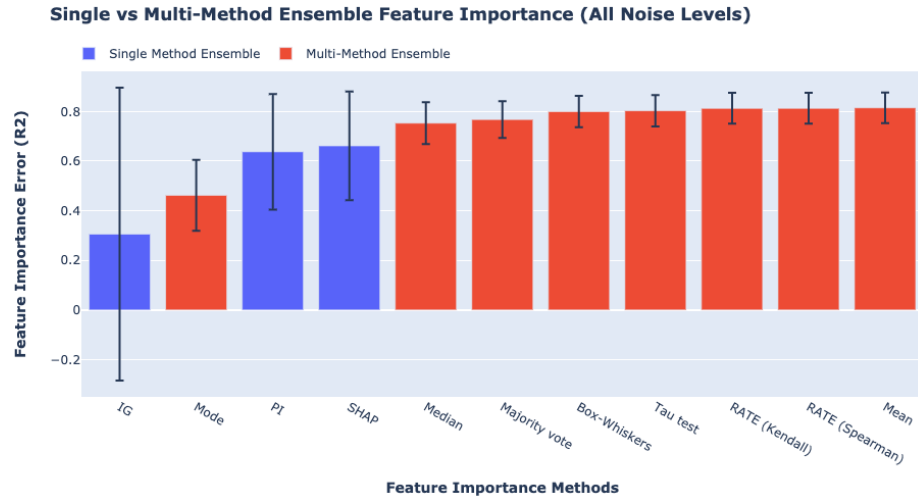


Figure S5: Effect of all noise level on all feature importance methods (R^2)

		Noise level (Standard deviation)		
		0	2	4
0.	PI	0.63±0.11	0.67±0.10	0.60±0.17
	SHAP	0.65±0.12	0.67±0.11	0.65±0.13
	IG	0.29±0.59	0.28±0.59	0.34±0.59
MME	RATE (Kendall)	0.81±0.09	0.82±0.10	0.79±0.11
	RATE (Spearman)	0.81±0.09	0.82±0.10	0.79±0.11
	Median	0.75±0.15	0.78±0.12	0.72±0.15
	Mean	0.81±0.09	0.82±0.10	0.79±0.11
	Mode	0.39±0.26	0.52±0.25	0.46±0.22
	Box-whiskers	0.80±0.10	0.80±0.10	0.79±0.11
	Tau test	0.80±0.11	0.81±0.10	0.78±0.11
	Majority vote	0.77±0.12	0.76±0.12	0.76±0.13

Table S2: Summary of feature importance R^2 between different SME and MME for different noise level.

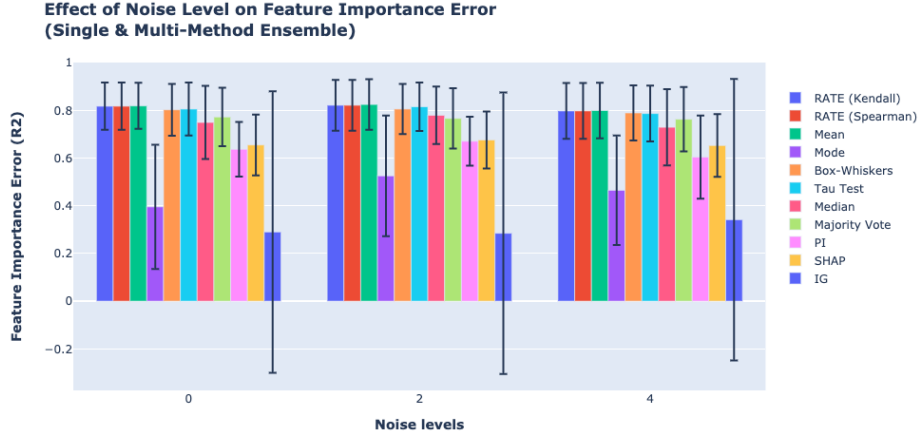


Figure S6: Effect of noise levels on ensemble feature importance. (R^2)

S1.5. Effect Informative Level on All Feature Importance (RMSE)

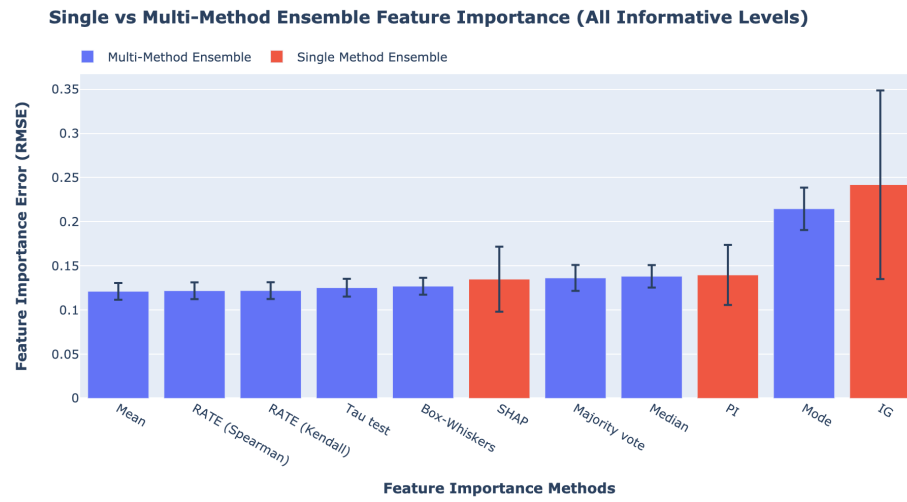


Figure S7: Effect of feature informative level on all ensemble feature importance methods. (RMSE)

		Features informative level (%)				
Models		20 (10^{-2})	40 (10^{-2})	60 (10^{-2})	80 (10^{-2})	100 (10^{-2})
SME	PI	6.0±0.9	11.1±1.2	15.6±2.3	17.4±1.2	19.5±1.4
	SHAP	5.1±0.8	9.9±1.3	14.0±1.5	18.0±1.9	20.2±2.1
	IG	14.9±10.6	19.7±10.6	24.0±10.6	26.7±10.6	32.1±10.6
MME	RATE (Kendall)	5.0±1.1	9.2±1.7	13.2±2.1	15.3±1.9	18.1±3.1
	RATE (Spearman)	5.0±1.1	9.2±1.7	13.2±2.1	15.3±1.9	18.1±3.1
	Median	5.1±1.5	10.8±2.5	15.3±2.7	17.5±3.1	20.1±3.7
	Mean	4.9±1.4	9.2±1.7	13.1±2.0	15.2±1.9	17.9±3.1
	Mode	20.2±4.3	18.8±6.0	22.9±6.1	22.6±4.8	22.5±5.3
	Box-whiskers	5.1±1.3	9.8±1.8	13.7±2.0	16.2±2.0	18.5±3.1
	Tau test	5.0±1.4	9.7±1.8	13.7±2.2	15.8±2.0	18.2±3.1
	Majority vote	8.0±2.4	12.2±3.1	15.3±2.8	15.1±3.2	16.9±4.4

Table S3: Summary of feature importance RMSE between different SME and MME for different percentage of informative level.

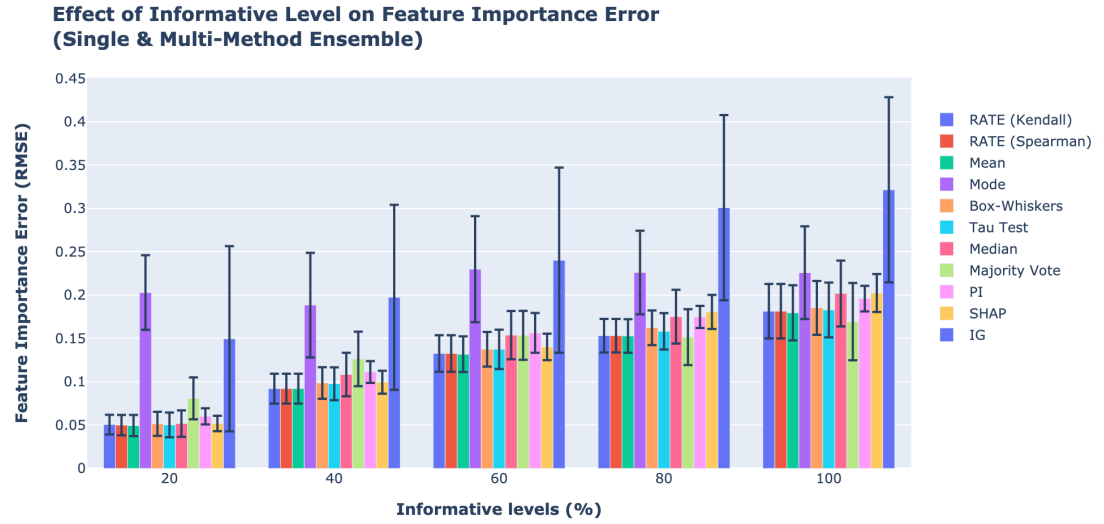


Figure S8: Effect of feature informative levels on ensemble feature importance methods. (RMSE)

S1.6. Effect Informative Level on All Feature Importance (R^2)

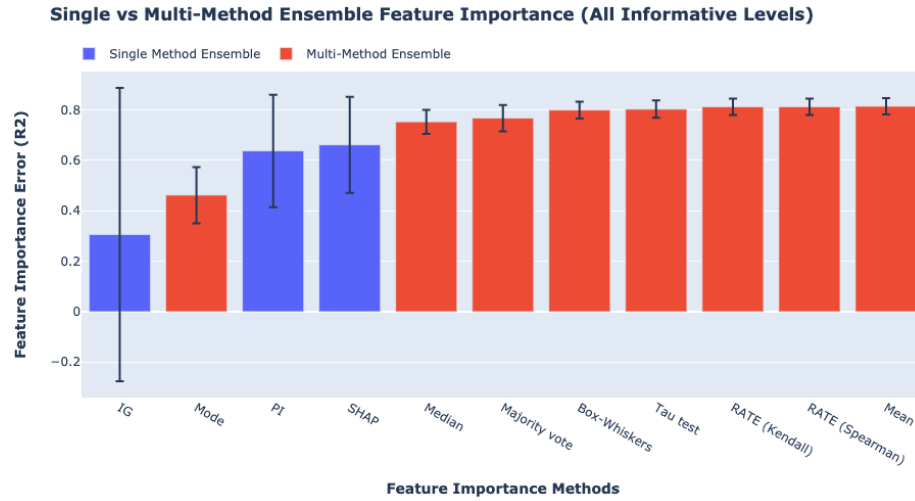


Figure S9: Effect of feature informative level on all ensemble feature importance methods. (R^2)

		Features informative level (%)				
Models		20	40	60	80	100
SME	PI	0.90±0.02	0.79±0.04	0.63±0.16	0.57±0.06	0.27±0.12
	SHAP	0.92±0.02	0.83±0.04	0.73±0.05	0.55±0.08	0.25±0.15
	IG	0.65±0.58	0.58±0.58	0.44±0.58	0.17±0.58	-0.32±0.58
MME	RATE (Kendall)	0.95±0.01	0.90±0.03	0.83±0.05	0.78±0.05	0.57±0.13
	RATE (Spearman)	0.95±0.01	0.90±0.03	0.83±0.05	0.78±0.05	0.57±0.13
	Median	0.95±0.02	0.86±0.05	0.77±0.07	0.70±0.09	0.46±0.19
	Mean	0.95±0.01	0.90±0.03	0.83±0.05	0.78±0.05	0.58±0.13
	Mode	0.37±0.22	0.57±0.28	0.49±0.24	0.52±0.19	0.34±0.29
	Box-whiskers	0.95±0.02	0.89±0.03	0.82±0.05	0.75±0.06	0.56±0.13
	Tau test	0.95±0.02	0.89±0.03	0.82±0.05	0.76±0.06	0.57±0.14
	Majority vote	0.88±0.05	0.81±0.07	0.77±0.08	0.77±0.09	0.59±0.20

Table S4: Summary of feature importance R^2 between different SME and MME for different percentage of informative level.

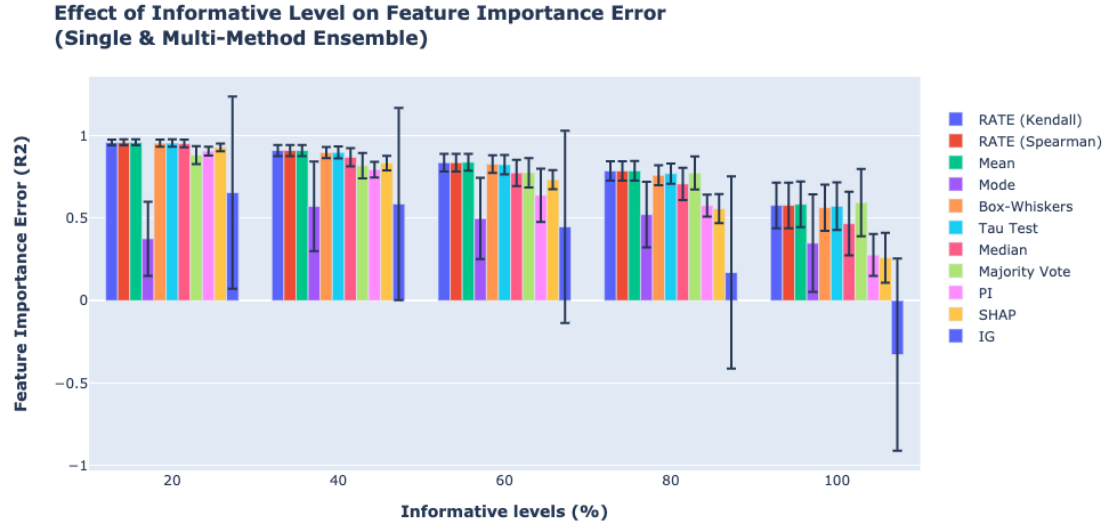


Figure S10: Effect of feature informative levels on ensemble feature importance methods. (R^2)

S1.7. Effect of Number of Features on All Feature Importance (RMSE)

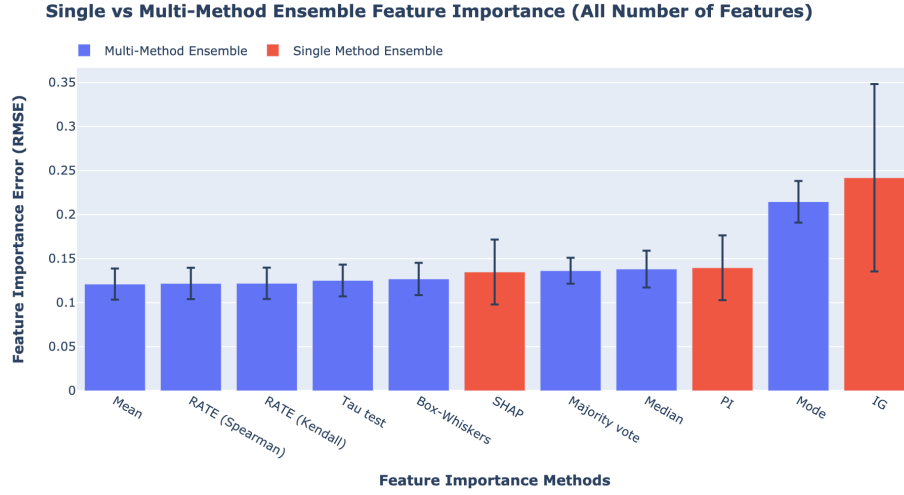


Figure S11: Effect of number of features on all ensemble feature importance methods. (RMSE)

		Number of features		
		20 (10^{-2})	60 (10^{-2})	100 (10^{-2})
SME	PI	10.3±1.9	14.9±1.9	16.5±2.4
	SHAP	8.5±1.6	14.2±2.2	17.6±2.4
	IG	23.6±10.6	24.0±10.6	24.7±10.6
MME	RATE (Kendall)	8.6±2.5	12.7±3.0	15.1±3.6
	RATE (Spearman)	8.67±2.5	12.7±3.0	15.1±3.6
	Median	8.6±2.8	15.4±3.9	17.2±4.0
	Mean	8.5±2.5	12.7±2.9	15.0±3.6
	Mode	29.7±5.8	18.3±3.3	16.2±2.2
	Box-whiskers	9.0±2.8	13.5±3.1	15.4±3.5
	Tau test	8.5±2.7	13.4±3.0	15.5±3.5
	Majority vote	8.3±2.3	13.0±3.1	19.4±3.3

Table S5: Summary of feature importance RMSE between different SME and MME for different number of features.

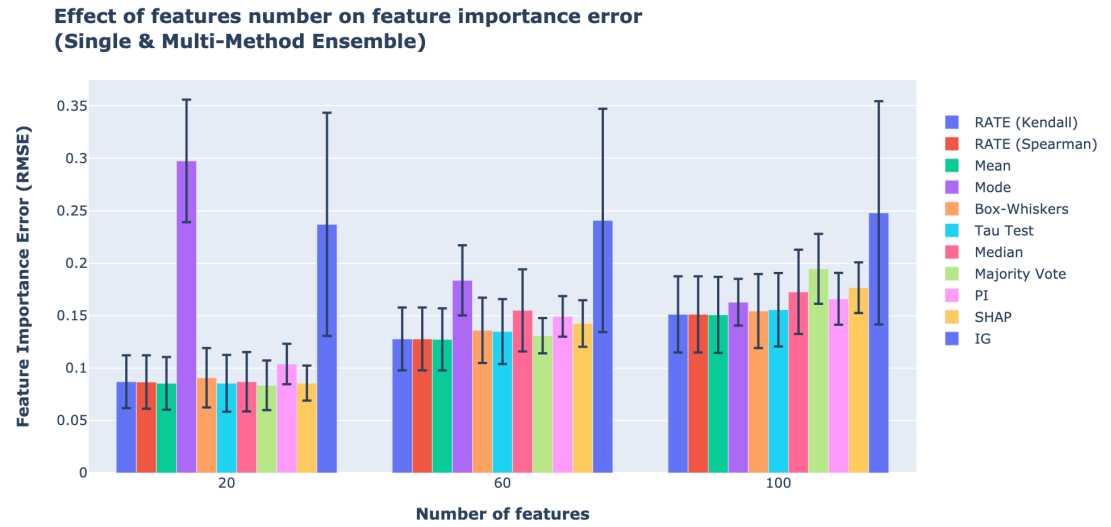


Figure S12: Effect of number of features on ensemble feature importance methods. (RMSE)

S1.8. Effect of Number of Features on All Feature Importance (R^2)

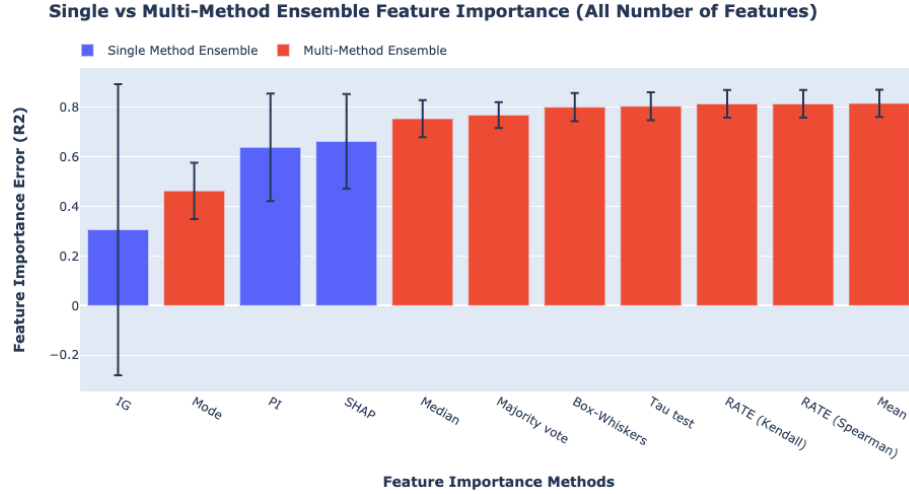


Figure S13: Effect of number of features on all ensemble feature importance methods. (R^2)

		Number of features		
		20	60	100
SME	PI	0.81±0.07	0.60±0.11	0.50±0.16
	SHAP	0.87±0.05	0.62±0.11	0.48±0.13
	IG	0.34±0.58	0.32±0.58	0.24±0.58
MME	RATE (Kendall)	0.91±0.04	0.80±0.09	0.71±0.12
	RATE (Spearman)	0.91±0.04	0.80±0.09	0.71±0.29
	Median	0.91±0.04	0.71±0.14	0.63±0.16
	Mean	0.91±0.04	0.80±0.09	0.71±0.12
	Mode	0.09±0.29	0.60±0.14	0.68±0.08
	Box-whiskers	0.90±0.04	0.78±0.09	0.70±0.13
	Tau test	0.91±0.04	0.78±0.09	0.70±0.13
	Majority vote	0.92±0.03	0.81±0.04	0.56±0.14

Table S6: Summary of feature importance R^2 between different SME and MME for different number of features.

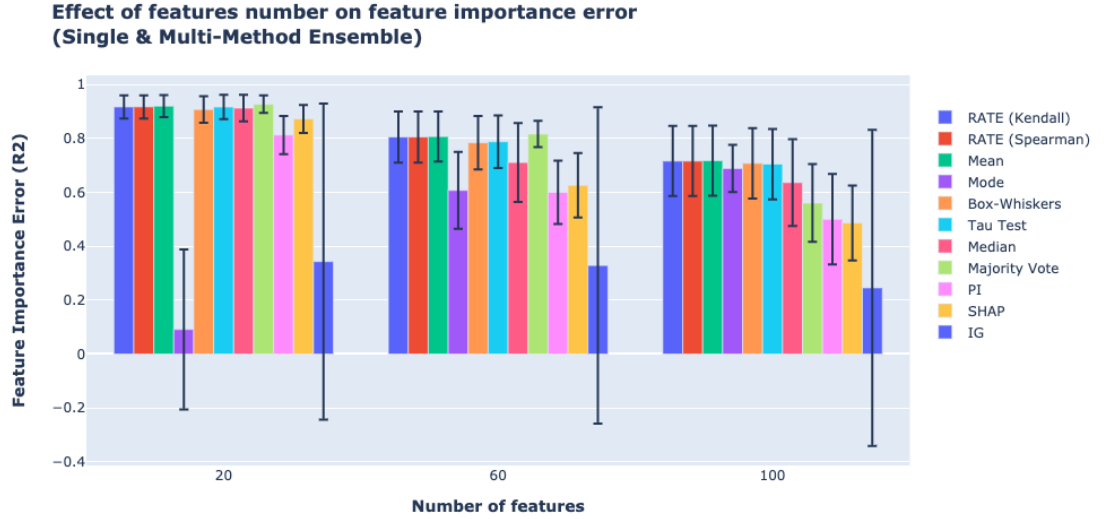


Figure S14: Effect of number of features on ensemble feature importance methods. (R^2)