Table 1:

Final maximin regret/dataset	CUCB	CUCB-FW	ϵ-gred	ϵ-gred-FW	IMLinUCB	IMLinUCB-FW	IMFB	IMFB-FW
pokec	9.10± 0.49	0.39± 0.13	10.42 ± 0.21	0.61± 0.21	5.08± 0.16	0.12± 0.008	2.95± 0.30	0.08± 0.34
bail	21.085 ± 0.66	0.11± 0..02	27.25 ± 0.58	0.33± 0.11	1.87± 0.03	0.50± 0.06	4.05± 0.18	0.07± 0.02
german	1.44± 0.51	1.17± 0.19	4.05± 0.51	2.61± 0.02	44.27± 2.09	32.33± 0.13	2.61± 0.37	1.33± 0.08

To support our claim, we have an additional t-test to prove that the final results using fair oracle is significantly lower than the baselines.

The α is set as 0.11, and we used stats.ttest_ind. The p_value is 0.10, and t_statistic 1.71. Thus we can say that there the mean of results with fair oracle is significantly lower than the baselines.

Table 2:

Final welfare regret(alpha=2)/dataset	CUCB	CUCB-FW	ϵ-gred	ϵ-gred-FW	IMLinUCB	IMLinUCB-FW	IMFB	IMFB-FW
pokec	12530.01 ± 231.77	244.02 ± 37.11	14720.88 ± 233.51	4886± 294.00	7241.75± 254.33	133.6± 19.88	136.83 ± 50.85	49.82 ± 10.09
bail	196292.60 ± 4105.88	3556.61 ± 63.93	240386.97 ± 10339.79	44893.83 ± 3766.20	21944.96 ± 100.89	552.86± 21.00	1747.43 ± 206.54	742.39 ± 40.88
german	607.64± 164.09	1073.29 ± 441.20	1117.88± 279.98	931.73± 199.76	14011.87± 2041.44	10548.99± 1035.47	662.76 ± 177.29	744.18 ± 197.11

To support our claim, we have an additional t-test to prove that the final results using fair oracle is significantly lower than the baselines.

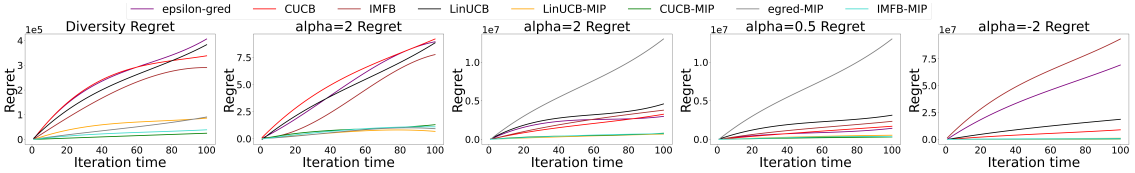
The α is set as 0.15, and we used stats.ttest_ind. The p_value is 0.14, and t_statistic 1.52. Thus we can say that there the mean of results with fair oracle is significantly lower than the baselines.

Table 3:

	CUCB	IMFB	ϵ-gred	IMLinUCB	IMLinUCB-MIP	CUCB-MIP	ϵ-gred-MIP
Maximin	9.11	7.70	8.92	7.69	0.66	1.31	0.92

	CUCB	IMFB	ϵ-gred	IMLinUCB	IMLinUCB-MIP	CUCB-MIP	ϵ-gred-MIP
Diversity	337787	290017	405019	379640	86410	25055	90311
Welfare (alpha=2)	2980099.17	3249013.44	3802188.09	4559944.78	670012.36	794457.1	13026645.58
Welfare (alpha=0.5)	1445772.92	1699921.00	2339158.61	3105772.80	540007.77	312235.29	781120.92
Welfare (alpha=-2)	69034889.79	8980091.90	92158872.73	18708994.68	1089348.65	458012.45	909953.30

Figure 1:



Dataset details

For the dataset processing of Youtube dataset, we constructed the node features with the outer product of the node ID and community ID (which group the node beongs and the community is the sensitive attribute). We also use jaccard similarity between node feature as the ground truth diffusion probability and remain the rest superparameter unchanged