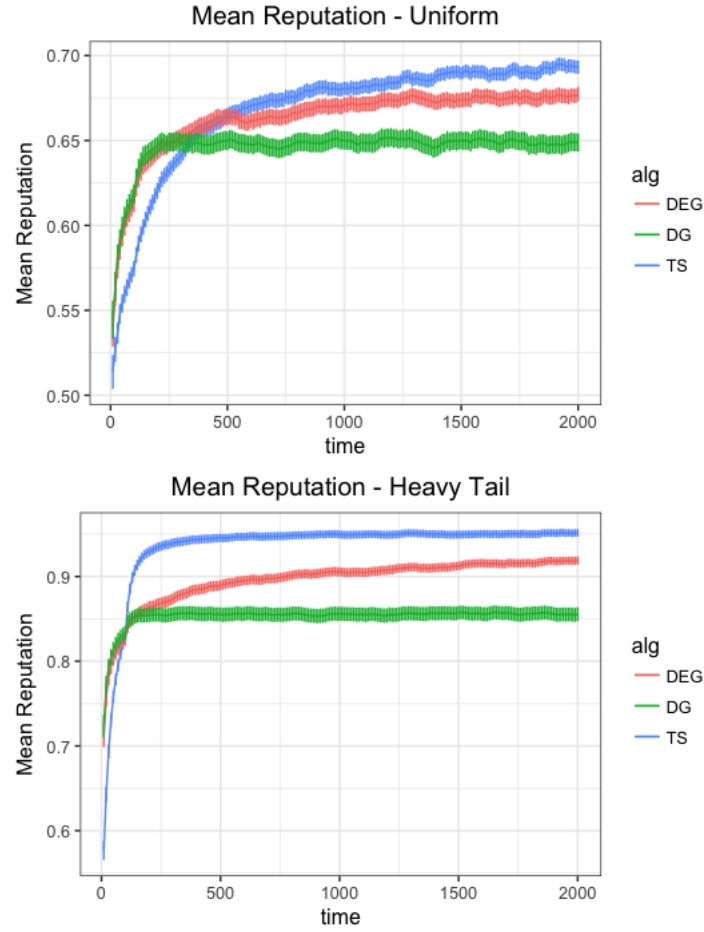


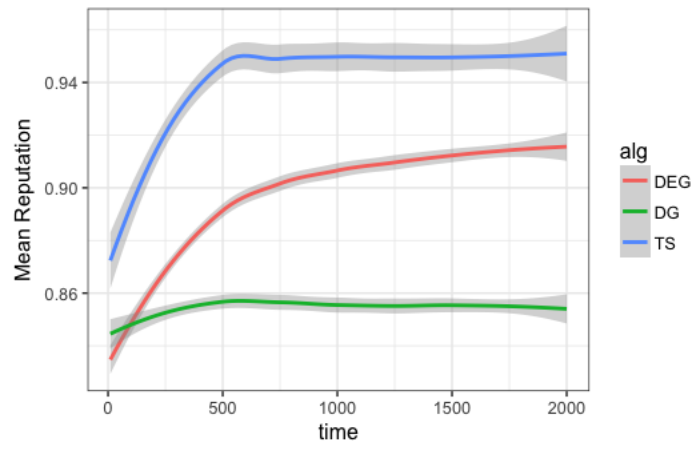
Supplemental Material

A Additional Isolation Performance Plots

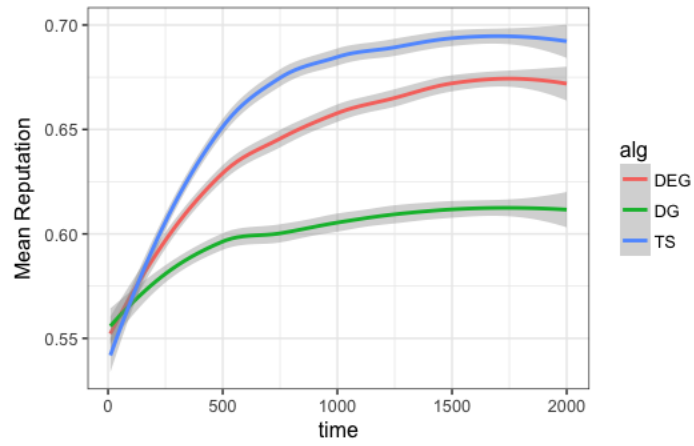
In this section we present the additional mean reputation graphs that were omitted from the main text. Additionally, we provide graphs of the smoothed mean instantaneous reward for each of the family of instances that we consider.



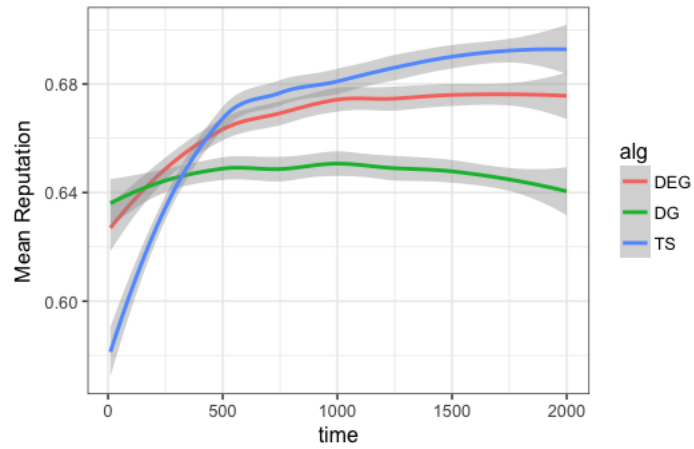
Mean Instantaneous Reward - Heavy Tail



Mean Instantaneous Reward - Needle In Haystack



Mean Instantaneous Reward - Uniform



B Reversal between Mean Reputation and Relative Reputation

In this section we present the results in isolation and in competition over the “Heavy Tail” prior discussed in the text for $K = 3$. We demonstrate evidence that $DEG > DG$ according to the mean reputation metric but that $DG > DEG$ according to the relative reputation proportion statistic and in the competition game. As shown in the text, the same results also hold for $K = 10$ for the warm starts that we consider.

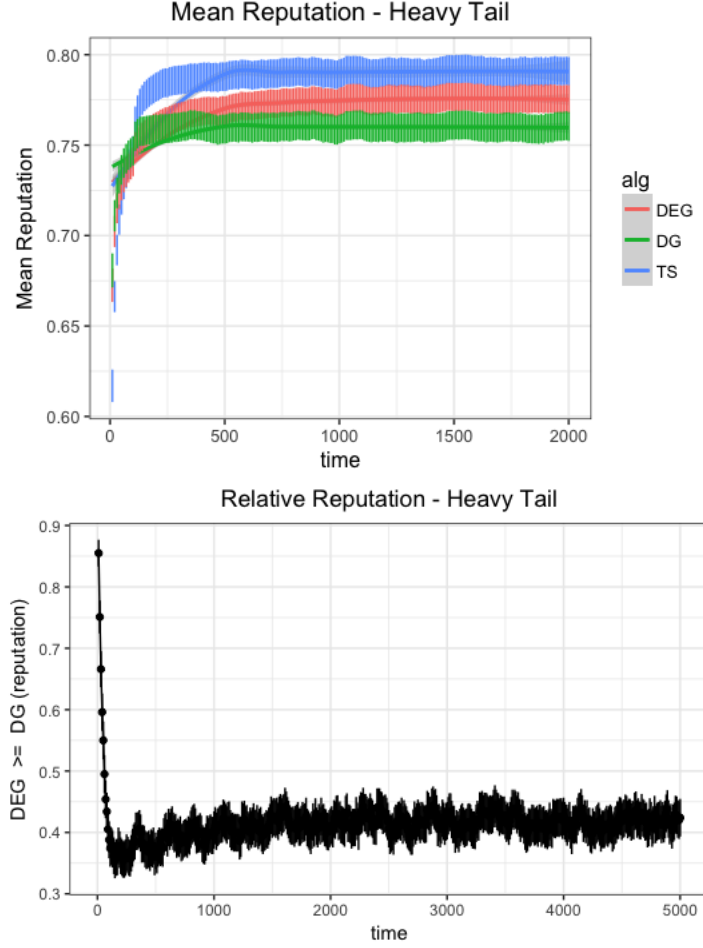


Table 1: Duopoly Experiment Heavy Tail K=3, t=5000

	$T_0 = 20$	$T_0 = 250$	$T_0 = 500$
	0.4 ± 0.02	0.59 ± 0.01	0.6 ± 0.01
TS vs DG	eeog	eeog	eeog
	avg: 770	avg: 2700	avg: 2700
	med: 0	med: 2979.5	med: 3018
	0.46 ± 0.02	0.73 ± 0.01	0.72 ± 0.01
TS vs DEG	eeog	eeog	eeog
	avg: 830	avg: 2500	avg: 2700
	med: 0	med: 2576.5	med: 2862
	0.61 ± 0.01	0.61 ± 0.01	0.6 ± 0.01
DG vs DEG	eeog	eeog	eeog
	avg: 1400	avg: 2400	avg: 2400
	med: 556	med: 2538.5	med: 2587.5

C Additional Permanent Duopoly Experiments

We present all of the results for the permanent duopoly experiments across the family of instances that we consider. The results displayed in the table are the same contain the same information as those in the text and are the average over $N = 1000$ simulations.

Table 2: Duopoly Experiment Needle In Haystack

	$T_0 = 20$	$T_0 = 250$	$T_0 = 500$
	0.64 ± 0.03	0.6 ± 0.03	0.64 ± 0.03
TS vs DG	eeog	eeog	eeog
	avg: 200	avg: 370	avg: 580
	med: 27	med: 0	med: 121.5
	0.57 ± 0.03	0.52 ± 0.03	0.56 ± 0.02
TS vs DEG	eeog	eeog	eeog
	avg: 150	avg: 460	avg: 740
	med: 14	med: 78.5	med: 627.5
	0.46 ± 0.03	0.42 ± 0.02	0.42 ± 0.02
DG vs DEG	eeog	eeog	eeog
	avg: 340	avg: 650	avg: 690
	med: 128.5	med: 408	med: 466.5

Table 3: Duopoly Experiment Heavy Tail

	$T_0 = 20$	$T_0 = 250$	$T_0 = 500$
	0.29 ± 0.03	0.72 ± 0.02	0.76 ± 0.02
TS vs DG	eeog	eeog	eeog
	avg: 55	avg: 570	avg: 620
	med: 0	med: 0	med: 98.5
	0.3 ± 0.03	0.88 ± 0.01	0.9 ± 0.01
TS vs DEG	eeog	eeog	eeog
	avg: 37	avg: 480	avg: 570
	med: 0	med: 0	med: 113.5
	0.62 ± 0.03	0.6 ± 0.02	0.57 ± 0.03
DG vs DEG	eeog	eeog	eeog
	avg: 410	avg: 790	avg: 730
	med: 7	med: 762	med: 608

Table 4: Duopoly Experiment Uniform

	$T_0 = 20$	$T_0 = 250$	$T_0 = 500$
	0.46 ± 0.03	0.52 ± 0.02	0.6 ± 0.02
TS vs DG	eeog	eeog	eeog
	avg: 230	avg: 800	avg: 910
	med: 0	med: 754	med: 906.5
	0.41 ± 0.03	0.51 ± 0.02	0.55 ± 0.02
TS vs DEG	eeog	eeog	eeog
	avg: 180	avg: 810	avg: 970
	med: 0	med: 734	med: 987
	0.51 ± 0.03	0.48 ± 0.02	0.45 ± 0.02
DG vs DEG	eeog	eeog	eeog
	avg: 470	avg: 1000	avg: 1000
	med: 57.5	med: 1088	med: 1142

D Additional Temporary Monopoly Experiments

We present results for the temporary monopoly experiment across the family of instances that we consider for varying values of X . These results confirm the claim in the text that, for sufficiently large X , Thompson Sampling is preferred over all other algorithms for the incumbent. However, it also shows that, for smaller values of X it is not necessarily the case that Thompson Sampling is the preferred algorithm. We provide many different parameterizations in order to check the robustness of the results. The results displayed in the table are the same contain the same information as those in the text and are the average over $N = 1000$ simulations.

Heavy Tail Prior

Table 5: Temporary Monopoly Experiment Heavy Tail $X = 50$

		Incumbent Algorithm		
		TS	DEG	DG
Entrant Algorithm	TS	0.054 ± 0.01	0.16 ± 0.02	0.18 ± 0.02
		Var:0.05	Var:0.1	Var:0.1
		ES:100%	ES:97%	ES:95%
	DEG	0.33 ± 0.03	0.31 ± 0.02	0.26 ± 0.02
		Var:0.2	Var:0.2	Var:0.1
		ES:95%	ES:76%	ES:79%
	DG	0.39 ± 0.03	0.41 ± 0.03	0.33 ± 0.02
		Var:0.2	Var:0.2	Var:0.2
		ES:95%	ES:76%	ES:67%

Table 6: Temporary Monopoly Experiment Heavy Tail $X = 200$

		Incumbent Algorithm		
		TS	DEG	DG
Entrant Algorithm	TS	0.003 ± 0.003	0.083 ± 0.02	0.17 ± 0.02
		Var:0.002	Var:0.07	Var:0.1
		ES:100%	ES:97%	ES:95%
	DEG	0.045 ± 0.01	0.25 ± 0.02	0.23 ± 0.02
		Var:0.03	Var:0.1	Var:0.1
		ES:92%	ES:75%	ES:78%
	DG	0.12 ± 0.02	0.36 ± 0.03	0.3 ± 0.02
		Var:0.08	Var:0.2	Var:0.1
		ES:88%	ES:76%	ES:64%

Table 7: Temporary Monopoly Experiment Heavy Tail X = 300

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.0017 ± 0.002	0.059 ± 0.01	0.16 ± 0.02
		Var:0.001	Var:0.05	Var:0.1
		ES:100%	ES:99%	ES:95%
	DEG	0.029 ± 0.007	0.23 ± 0.02	0.23 ± 0.02
		Var:0.01	Var:0.1	Var:0.1
		ES:93%	ES:74%	ES:78%
	DG	0.097 ± 0.02	0.34 ± 0.03	0.29 ± 0.02
		Var:0.06	Var:0.2	Var:0.1
		ES:89%	ES:76%	ES:66%

Table 8: Temporary Monopoly Experiment Heavy Tail X = 500

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.002 ± 0.003	0.043 ± 0.01	0.16 ± 0.02
		Var:0.002	Var:0.04	Var:0.1
		ES:100%	ES:98%	ES:94%
	DEG	0.03 ± 0.007	0.21 ± 0.02	0.24 ± 0.02
		Var:0.01	Var:0.1	Var:0.1
		ES:92%	ES:76%	ES:78%
	DG	0.091 ± 0.01	0.32 ± 0.03	0.3 ± 0.02
		Var:0.05	Var:0.2	Var:0.1
		ES:87%	ES:78%	ES:65%

Needle In Haystack Prior

Table 9: Temporary Monopoly Experiment Needle In Haystack X = 50

		Incumbent Algorithm		
		TS	DEG	DG
Entrant Algorithm	TS	0.34 ± 0.03	0.4 ± 0.03	0.48 ± 0.03
		Var:0.2	Var:0.2	Var:0.2
		ES:92%	ES:90%	ES:85%
	DEG	0.22 ± 0.02	0.34 ± 0.03	0.42 ± 0.03
		Var:0.1	Var:0.2	Var:0.2
		ES:93%	ES:83%	ES:75%
	DG	0.18 ± 0.02	0.28 ± 0.02	0.37 ± 0.03
		Var:0.1	Var:0.2	Var:0.2
		ES:89%	ES:78%	ES:70%

Table 10: Temporary Monopoly Experiment Needle In Haystack X = 200

		Incumbent Algorithm		
		TS	DEG	DG
Entrant Algorithm	TS	0.17 ± 0.02	0.31 ± 0.03	0.41 ± 0.03
		Var:0.1	Var:0.2	Var:0.2
		ES:95%	ES:90%	ES:86%
	DEG	0.13 ± 0.02	0.26 ± 0.02	0.36 ± 0.03
		Var:0.1	Var:0.2	Var:0.2
		ES:95%	ES:85%	ES:78%
	DG	0.093 ± 0.02	0.23 ± 0.02	0.33 ± 0.03
		Var:0.07	Var:0.1	Var:0.2
		ES:94%	ES:83%	ES:74%

Table 11: Temporary Monopoly Experiment Needle In Haystack X = 300

		Incumbent Algorithm		
		TS	DEG	DG
Entrant Algorithm	TS	0.1 ± 0.02	0.28 ± 0.03	0.39 ± 0.03
		Var:0.07	Var:0.2	Var:0.2
		ES:95%	ES:91%	ES:87%
	DEG	0.089 ± 0.02	0.23 ± 0.02	0.36 ± 0.03
		Var:0.06	Var:0.2	Var:0.2
		ES:94%	ES:88%	ES:80%
	DG	0.05 ± 0.01	0.21 ± 0.02	0.33 ± 0.03
		Var:0.03	Var:0.1	Var:0.2
		ES:96%	ES:83%	ES:74%

Table 12: Temporary Monopoly Experiment Needle In Haystack X = 500

		Incumbent Algorithm		
		TS	DEG	DG
Entrant Algorithm	TS	0.053 ± 0.01	0.23 ± 0.02	0.37 ± 0.03
		Var:0.04	Var:0.2	Var:0.2
		ES:95%	ES:92%	ES:88%
	DEG	0.051 ± 0.01	0.2 ± 0.02	0.33 ± 0.03
		Var:0.04	Var:0.1	Var:0.2
		ES:97%	ES:89%	ES:80%
	DG	0.031 ± 0.009	0.18 ± 0.02	0.31 ± 0.02
		Var:0.02	Var:0.1	Var:0.2
		ES:98%	ES:88%	ES:76%

Uniform Prior

Table 13: Temporary Monopoly Experiment Uniform X = 50

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.27 ± 0.03	0.21 ± 0.02	0.26 ± 0.02
		Var:0.2	Var:0.1	Var:0.2
		ES:91%	ES:88%	ES:83%
	DEG	0.39 ± 0.03	0.3 ± 0.03	0.34 ± 0.03
		Var:0.2	Var:0.2	Var:0.2
		ES:84%	ES:80%	ES:73%
	DG	0.39 ± 0.03	0.31 ± 0.02	0.33 ± 0.02
		Var:0.2	Var:0.2	Var:0.2
		ES:85%	ES:74%	ES:70%

Table 14: Temporary Monopoly Experiment Uniform X = 200

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.12 ± 0.02	0.16 ± 0.02	0.2 ± 0.02
		Var:0.08	Var:0.1	Var:0.1
		ES:89%	ES:87%	ES:84%
	DEG	0.25 ± 0.02	0.24 ± 0.02	0.29 ± 0.02
		Var:0.1	Var:0.1	Var:0.1
		ES:81%	ES:77%	ES:71%
	DG	0.23 ± 0.02	0.24 ± 0.02	0.29 ± 0.02
		Var:0.1	Var:0.1	Var:0.1
		ES:80%	ES:76%	ES:69%

Table 15: Temporary Monopoly Experiment Uniform X = 300

		Incumbent Algorithm		
		TS	DEG	DG
Entrant Algorithm	TS	0.094 ± 0.02	0.15 ± 0.02	0.2 ± 0.02
		Var:0.06	Var:0.1	Var:0.1
		ES:90%	ES:86%	ES:85%
	DEG	0.2 ± 0.02	0.23 ± 0.02	0.29 ± 0.02
		Var:0.1	Var:0.1	Var:0.1
		ES:80%	ES:74%	ES:70%
	DG	0.21 ± 0.02	0.23 ± 0.02	0.29 ± 0.02
		Var:0.1	Var:0.1	Var:0.1
		ES:79%	ES:74%	ES:70%

Table 16: Temporary Monopoly Experiment Uniform X = 500

		Incumbent Algorithm		
		TS	DEG	DG
Entrant Algorithm	TS	0.061 ± 0.01	0.12 ± 0.02	0.2 ± 0.02
		Var:0.03	Var:0.08	Var:0.1
		ES:91%	ES:88%	ES:84%
	DEG	0.17 ± 0.02	0.21 ± 0.02	0.29 ± 0.02
		Var:0.09	Var:0.1	Var:0.1
		ES:79%	ES:75%	ES:73%
	DG	0.18 ± 0.02	0.22 ± 0.02	0.29 ± 0.02
		Var:0.1	Var:0.1	Var:0.1
		ES:78%	ES:75%	ES:70%

E Reputation and Information Erased Experiment

This section contains the results on all of the family of instances for the reputation and information erased experiment discussed in the “Data and Reputation as Barriers to Entry” section of the paper.

Table 17: Reputation Erased Experiment Heavy Tail, X = 200

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.0096 \pm 0.006	0.11 \pm 0.02	0.18 \pm 0.02
		Var: 0.009	Var: 0.09	Var: 0.1
		ES: 100 %	ES: 98 %	ES: 95 %
	DEG	0.073 \pm 0.01	0.29 \pm 0.02	0.25 \pm 0.02
		Var: 0.05	Var: 0.2	Var: 0.1
		ES: 93 %	ES: 78 %	ES: 79 %
	DG	0.15 \pm 0.02	0.39 \pm 0.03	0.33 \pm 0.02
		Var: 0.1	Var: 0.2	Var: 0.2
		ES: 89 %	ES: 78 %	ES: 66 %

Table 18: Information Erased Experiment Heavy Tail, X = 200

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.021 \pm 0.009	0.16 \pm 0.02	0.21 \pm 0.02
		Var: 0.02	Var: 0.1	Var: 0.2
		ES: 100 %	ES: 97 %	ES: 95 %
	DEG	0.26 \pm 0.03	0.3 \pm 0.02	0.26 \pm 0.02
		Var: 0.2	Var: 0.2	Var: 0.1
		ES: 95 %	ES: 74 %	ES: 76 %
	DG	0.34 \pm 0.03	0.4 \pm 0.03	0.33 \pm 0.02
		Var: 0.2	Var: 0.2	Var: 0.1
		ES: 94 %	ES: 74 %	ES: 58 %

Table 19: Reputation Erased Experiment Needle In Haystack, X = 200

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.25 \pm 0.03	0.36 \pm 0.03	0.45 \pm 0.03
		Var: 0.2	Var: 0.2	Var: 0.2
		ES: 96 %	ES: 93 %	ES: 89 %
	DEG	0.21 \pm 0.02	0.32 \pm 0.03	0.41 \pm 0.03
		Var: 0.1	Var: 0.2	Var: 0.2
		ES: 93 %	ES: 89 %	ES: 83 %
	DG	0.18 \pm 0.02	0.29 \pm 0.03	0.4 \pm 0.03
		Var: 0.1	Var: 0.2	Var: 0.2
		ES: 92 %	ES: 86 %	ES: 78 %

Table 20: Information Erased Experiment Needle In Haystack, X = 200

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.35 \pm 0.03	0.43 \pm 0.03	0.52 \pm 0.03
		Var: 0.2	Var: 0.2	Var: 0.2
		ES: 93 %	ES: 88 %	ES: 82 %
	DEG	0.26 \pm 0.03	0.36 \pm 0.03	0.43 \pm 0.03
		Var: 0.2	Var: 0.2	Var: 0.2
		ES: 90 %	ES: 80 %	ES: 71 %
	DG	0.19 \pm 0.02	0.3 \pm 0.02	0.36 \pm 0.02
		Var: 0.1	Var: 0.1	Var: 0.2
		ES: 85 %	ES: 73 %	ES: 64 %

Table 21: Reputation Erased Experiment Uniform, X = 200

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.2 \pm 0.02	0.22 \pm 0.02	0.27 \pm 0.03
		Var: 0.1	Var: 0.1	Var: 0.2
		ES: 89 %	ES: 88 %	ES: 87 %
	DEG	0.33 \pm 0.03	0.32 \pm 0.03	0.35 \pm 0.03
		Var: 0.2	Var: 0.2	Var: 0.2
		ES: 81 %	ES: 79 %	ES: 75 %
	DG	0.32 \pm 0.03	0.31 \pm 0.03	0.35 \pm 0.03
		Var: 0.2	Var: 0.2	Var: 0.2
		ES: 80 %	ES: 77 %	ES: 73 %

Table 22: Information Erased Experiment Uniform, X = 200

Incumbent Algorithm				
		TS	DEG	DG
Entrant Algorithm	TS	0.27 \pm 0.03	0.23 \pm 0.02	0.27 \pm 0.02
		Var: 0.2	Var: 0.1	Var: 0.2
		ES: 91 %	ES: 87 %	ES: 84 %
	DEG	0.4 \pm 0.03	0.3 \pm 0.02	0.32 \pm 0.02
		Var: 0.2	Var: 0.2	Var: 0.2
		ES: 86 %	ES: 72 %	ES: 69 %
	DG	0.36 \pm 0.03	0.29 \pm 0.02	0.3 \pm 0.02
		Var: 0.2	Var: 0.1	Var: 0.1
		ES: 83 %	ES: 69 %	ES: 60 %

Table 23: Reputation Erased Experiment Heavy Tail, X = 500

	TS	DEG	DG
	0.0017 ± 0.002	0.06 ± 0.01	0.18 ± 0.02
TS	Var:0.001	Var:0.05	Var:0.1
	ES:100%	ES:99%	ES:95%
	0.04 ± 0.009	0.24 ± 0.02	0.25 ± 0.02
DEG	Var:0.02	Var:0.1	Var:0.1
	ES:93%	ES:78%	ES:79%
	0.12 ± 0.02	0.35 ± 0.03	0.33 ± 0.02
DG	Var:0.08	Var:0.2	Var:0.2
	ES:88%	ES:80%	ES:66%

Table 24: Information Erased Experiment Heavy Tail, X = 500

	TS	DEG	DG
	0.022 ± 0.009	0.13 ± 0.02	0.21 ± 0.02
TS	Var:0.02	Var:0.1	Var:0.2
	ES:100%	ES:97%	ES:95%
	0.26 ± 0.03	0.29 ± 0.02	0.28 ± 0.02
DEG	Var:0.2	Var:0.1	Var:0.1
	ES:94%	ES:73%	ES:74%
	0.33 ± 0.03	0.39 ± 0.03	0.34 ± 0.02
DG	Var:0.2	Var:0.2	Var:0.1
	ES:94%	ES:73%	ES:58%

Table 25: Reputation Erased Experiment Needle In Haystack, X = 500

	TS	DEG	DG
	0.098 ± 0.02	0.27 ± 0.03	0.41 ± 0.03
TS	Var:0.07	Var:0.2	Var:0.2
	ES:95%	ES:94%	ES:90%
	0.093 ± 0.02	0.24 ± 0.02	0.38 ± 0.03
DEG	Var:0.07	Var:0.2	Var:0.2
	ES:96%	ES:89%	ES:84%
	0.064 ± 0.01	0.22 ± 0.02	0.37 ± 0.03
DG	Var:0.05	Var:0.1	Var:0.2
	ES:96%	ES:90%	ES:79%

Table 26: Information Erased Experiment Needle In Haystack

	TS	DEG	DG
	0.29 ± 0.03	0.44 ± 0.03	0.52 ± 0.03
TS	Var:0.2	Var:0.2	Var:0.2
	ES:92%	ES:87%	ES:81%
	0.19 ± 0.02	0.35 ± 0.03	0.42 ± 0.03
DEG	Var:0.1	Var:0.2	Var:0.2
	ES:91%	ES:81%	ES:71%
	0.15 ± 0.02	0.27 ± 0.02	0.35 ± 0.02
DG	Var:0.1	Var:0.1	Var:0.2
	ES:90%	ES:75%	ES:63%

Table 27: Reputation Erased Experiment Uniform, X = 500

	TS	DEG	DG
	0.14 ± 0.02	0.18 ± 0.02	0.26 ± 0.03
TS	Var:0.09	Var:0.1	Var:0.2
	ES:90%	ES:88%	ES:87%
	0.26 ± 0.02	0.26 ± 0.02	0.34 ± 0.03
DEG	Var:0.2	Var:0.1	Var:0.2
	ES:81%	ES:79%	ES:75%
	0.25 ± 0.02	0.27 ± 0.02	0.34 ± 0.03
DG	Var:0.1	Var:0.1	Var:0.2
	ES:79%	ES:77%	ES:73%

Table 28: Information Erased Experiment Uniform, X = 500

	TS	DEG	DG
	0.24 ± 0.02	0.2 ± 0.02	0.26 ± 0.02
TS	Var:0.1	Var:0.1	Var:0.2
	ES:88%	ES:86%	ES:85%
	0.37 ± 0.03	0.29 ± 0.02	0.31 ± 0.02
DEG	Var:0.2	Var:0.1	Var:0.1
	ES:85%	ES:75%	ES:70%
	0.35 ± 0.03	0.27 ± 0.02	0.3 ± 0.02
DG	Var:0.2	Var:0.1	Var:0.1
	ES:84%	ES:68%	ES:62%