Econometrica Supplementary Material

SUPPLEMENT TO "NASH EQUILIBRIA ON (UN)STABLE NETWORKS"

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CONTENTS

APPENDIX A: BACKGROUND ON TOBACCO SMOKING

TOBACCO IS THE SINGLE GREATEST PREVENTABLE CAUSE OF DEATH in the world today.[1] In the United States alone, cigarette smoking causes approximately 443,000 deaths each year (accounting for one in every five deaths) and imposes an economic burden of more than $193 billion a year in health care costs and loss of productivity. Approximately 1 million young people under 18 years of age start smoking each year; about 80% of adults who are smokers started smoking before they were 18 (Kessler et al. (1996), Liang, Chaloupka, Nichter, and Clayton (2001)). Despite an overall decline in smoking prevalence from 2005 to 2010, when the percentage of current smokers decreased from 20.9% to 19.3%, the reduction in teen smoking has been less pronounced. In fact, the proportions of 8th and 10th graders who smoke increased slightly in 2010. As with many human behaviors, social interactions (peer influence) have often been pointed to as a major driving force behind adolescent smoking choices.

APPENDIX B: IMPLEMENTATION DETAILS

This Appendix contains details about the data, the sample construction, the parametrization of the model, and the estimation. The website www.antonbadev.net/neks contains additional details including the implementation code.

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[1]The World Health Organization, *Report on the Global Tobacco Epidemic* (2008). The statistics for the U.S. are compiled from reports by the Surgeon General (2010), National Center for Health Statistics (2011), and Monitoring the Future (2011).

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B.1. *Add Health Data*

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due to Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01-HD31921 for this analysis.

B.2. *Sample Selection and Sample Statistics*

The estimation sample is based on Wave I of Add Health. The in-home questionnaire contains 44 sections collecting a wide array of information about adolescents including their friendship networks. In particular, each respondent is asked to nominate up to five of her best male and up to five of her best female friends. Importantly, that individual A has nominated individual B as a friend does not imply that B has nominated A. Because in the model being in a friendship presumes consent from both sides, the status of a friendship link is coded up as 1 when both individuals have nominated each other as friends.[2]

In addition to the data for adolescents' friendships, the estimation uses demographic data (age, gender, grade, and race), data for adolescents' home environments (presence of a smoker in the household, pupil's income and allowances, and mother's education), and data for their smoking behavior. The adolescent's smoking status is deduced from the question, "During the past 30 days, on how many days did you smoke cigarettes?" and if the answer was one or more days, the student's smoking status is set to 1. Because all of the students in the saturated sample were eligible for an in-home interview, for the students in this sample there is detailed information about their friends as well.

There are 16 schools in the saturated sample (out of total of 80 schools). Since the size of the schools from this sample ranges from 20 to more than 1500, the smallest and the largest schools are dropped. Also, a special needs school is dropped for having atypical smoking and friendship patterns. After this, the largest school in the remaining sample (SCID 058) enrolls more than 4 times more students compared to the second largest. To maintain sample observations of comparable size (each school is an observation), this school is split into grades 9, 10, 11, and 12 and, for this school, each grade is treated as a separate network of approximately 200 students. The reason for this transformation is also related to the asymptomatic framework for obtaining identification and consistency, which is in the number of schools growing (as opposed to the number of students in a single school).[3] Finally, schools with fewer than 100 students are discarded.[4] The estimation sample includes SCIDs: 003, 007, 008, 028, 058. Table I shows selected descriptive statistics for the estimation sample.

[2]In addition to the in-home interviews from Wave I, data on friendships are available from the in-school and Wave III interviews. However, the in-school questionnaire itself does not provide information on important dimensions of an individual's socio-economic and home environment, such as student allowances, parental education, and parental smoking behaviors. Also, during the collection of the Wave III data, the respondents were not in high school any more. For more details on the Add Health research design, see www.cpc.unc.edu/projects/addhealth/design.

[3]Less than 20% of all friendships involve students in different grades.

[4]Schools with fewer than 100 students feature very few friendships and very low smoking rates.

TABLE I

DESCRIPTIVE STATISTICS FOR THE ESTIMATION SAMPLE[a]

	Overall	Min	Max	Median
Students	1342	110	234	162
Smoking	0.41	0.12	0.54	0.44
Male	0.52	0.41	0.58	0.53
Whites	0.92	0.42	0.99	0.98
Blacks	0.05	0.00	0.45	0.00
As-Hi-Ot	0.03	0.00	0.13	0.02
Price	164.99	137.31	220.09	160.06
Avg income	83.90	47.25	145.85	71.55
Mom edu	0.73	0.56	0.84	0.74
HH smokes	0.48	0.25	0.61	0.51
Num friends	0.97	0.29	1.53	0.88

[a]*Note*: The final sample contains students from 8 high schools. Min, max, and median are reported at a school level.

B.3. *Parametrization and Reparametrizations*

In the empirical specification, selected parameters in payoff terms (1) and (3) are functions of the data. In particular, the exogenous utility of smoking is

$$\begin{aligned} v(X_i) = v_0 + v_{\text{price}} p_i &\\ &+ v_{\text{hhsmokes}}\chi(\text{HHS}_i) + v_{\text{momeduc}}\chi(\text{MOMEDUC}_i) \\ &+ v_{\text{black}}\chi(\text{BLACK}_i) + v_{\text{grade9+}}\chi(\text{GRADE9+}_i), \end{aligned}$$

the exogenous utility of a friendship is

$$\begin{aligned} w(X_i, X_j) = w_0 + w_{\text{diffsex}}\chi(\text{sex}_i \neq \text{sex}_j) &\\ &+ w_{\text{diffgrade}}\chi(\text{grade}_i \neq \text{grade}_j) + w_{\text{diffrace}}\chi(\text{race}_i \neq \text{race}_j), \end{aligned}$$

and $q_{ijk} = q(X_i, X_j, X_k) = q\chi(\text{grade}_i > 9)\chi(\text{grade}_j > 9)\chi(\text{grade}_k > 9)$ in the term $q_{ijk}g_{ij}g_{jk}g_{ki}$. In the above, χ is the characteristic (or indicator) function and returns the value of 1 whenever its argument is true, for example, $\chi(\text{GRADE9+}_i)$ is 1 whenever student i is in grade 9 or above and otherwise is 0. In addition to the above 11 parameters, there are three parameters for externalities ϕ, ϕ_S, and ϕ_N.

In Table II in the main text and Table VII below, the parameters have been transformed for ease of interpretation as follows. Instead of v_0 and w_0, the estimation reports the baseline probability of smoking $\frac{e^{v_0}}{1+e^{v_0}} \in [0, 1]$ and the baseline number of friends $(n-1)\frac{e^{w_0}}{1+e^{w_0}} \in [0, n-1]$, respectively ($n$ is the size of the network). Note that because $(n-1)\frac{e^{w_0}}{1+e^{w_0}}$ is constant across all networks, w_0 depends on the size of each network. The rest of the parameters are reparametrized either as marginal probabilities in ppt (superscript MP) or as relative marginal probabilities in pct (superscript MP%). Because this reparametrization is bijective, it does not affect the empirical analysis. Here are a couple of examples for parameter transformations:

$$\frac{e^{v_0+v_{\text{hhsmokes}}}}{1+e^{v_0+v_{\text{hhsmokes}}}} - \frac{e^{v_0}}{1+e^{v_0}} = \theta_{\text{HHsmokes}^{\text{MP}}},$$
$$\frac{e^{w_0+w_{\text{diffsex}}}}{1+e^{w_0+w_{\text{diffsex}}}} : \frac{e^{w_0}}{1+e^{w_0}} = 1+\theta_{\text{diffsex}^{\text{MP}\%}}.$$

B.4. *Priors and Parameters of the Estimation Algorithm*

All priors are normal distributions with means and standard deviations displayed in Table II in the main text (and Table VII below for the model with log income). The other parameters of the algorithm from Table I in the main text are as following. The size of the posterior sample T is 10^5 from which the first 20% are discarded. The size of the interior loop R is 10^3 for each network. In step 2, the proposal for θ' is a random walk. In step 3, the meeting size k is a mixture of two processes: k is small (i.e., $k=2$) with 75% and k is drawn from discrete uniform on $\{2, \dots, n-1\}$ with 25%. In step 6, the meeting $I_k = \{i\} \cup \{i_1, \dots, i_{k-1}\}$ is drawn from μ_k uniform on all possible meetings of size k. Finally, the state S' in step 7 is drawn from an uniform distribution on its support. In addition, with small probability (0.05) a large step is proposed where $S' = 1 - S$ and $A' = 1 - A$.

TABLE II

MODEL FIT[a]

Moment	Model	Data
Selected Moments		
Prevalence	0.410 (0.408)	0.408
Density	0.007 (0.005)	0.005
Avg degree	1.250 (0.966)	0.973
Min degree	0.275 (0.000)	0.000
Max degree	4.808 (4.568)	5.308
$a_i g_{ij} a_j / n$	0.543 (0.253)	0.256
$(1-a_i) g_{ij} (1-a_j)/n$	0.400 (0.396)	0.404
Two-paths$/n$	0.639 (0.490)	0.501
Triangles$/n$	7.686 (0.023)	0.066
Mixing Patterns		
HI	0.239 (0.231)	0.236
CHI	−0.300 (−0.299)	−0.303
FSI	0.665 (0.667)	0.662

[a]*Note*: Columns Data and Model compare selected moments of the estimation sample with those of synthetic data generated by the estimated model. For the latter mean and median are reported (median in parentheses). Two-paths is defined as $\sum_{i>j} g_{ij} g_{il}(1-g_{il})$. Triangles is defined as $\sum_{i>j>l} g_{ij} g_{il} g_{il}$. The Homophily index (HI), Coleman homophily index (CHI), and Freeman segregation index (FSI) are measures of the mixing patterns between students with the same smoking statuses (see also Table III). For more details about computing those indices, see Currarini, Jackson, and Pin (2010, Definitions 1 and 2 in the Supplemental Appendix).

TABLE III

FIT MIXING MATRIX (MODEL LEFT, DATA RIGHT)

		Nominee		Nominee	
		Smoker	Nonsmoker	Smoker	Nonsmoker
Nominator	Smoker	**65% (56.6)**	35% (30.1)	**63% (52.1)**	37% (30.4)
	Nonsmoker	29% (30.1)	**71% (74.0)**	29% (30.4)	**71% (75.4)**

B.5. *Model Fit*

Table II and Table III compare statistics from the data to statistics from a sample generated with the estimated model. More specifically, the simulated sample is with size 1000 where each draw is generated via a long-run (20,000 draws) of the kCD with random utility parametrized with a new draw from the posterior. In addition to statistics that are directly targeted by the model's parameters (overall prevalence, density, and average degree), statistics which are only indirectly governed by model's parameters are reported in Tables II and III, for example, minimum/maximum degree, two-paths, and mixing.

Overall the model fits well the smoking decisions and the friendship patterns in the data. The only caveat is the number of triangles as a fraction of the size of the network (Triangles/n). In the sample generated with draws from the posterior, the distribution of this metric is right-skewed (i.e., have a long tail to the right) with mean of 7.686 and median of 0.023, while in the data it is 0.066. This is due to the presence of a very few draws with very densely connected networks where the value of this metric is very high. Note that in the empirical specification, the presence of triangles of friends is governed by a single parameter q. While this parsimonious parametrization is dictated by the small sample size, the model permits richer specifications, that is, it is possible to estimate multiple parameters which differ depending on observables. This is left for the future.[5]

APPENDIX C: ADDITIONAL PLOTS AND TESTS

TABLE IV

COMPARING THE PRICE POSTERIOR UNDER DIFFERENT ESTIMATION SCENARIOS[a]

Estimation Scenarios	Model	Exog Net	No Net Data	No PE
Model	1.00 (1.00)			
Exog net	0.00 (0.00)	1.00 (1.00)		
No net data	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)	
No PE	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)

[a]*Note*: Each cell compares the posterior distribution of the price parameter between a pair of estimation scenarios. The two p-values are from testing a hypothesis of equal means and from testing a hypothesis of equal distributions (two-sample Kolmogorov–Smirnov test). Figure 3 in the main text plots the posterior distributions for the price parameter under different estimation scenarios.

[5]On a note related to presence of friendship triangles, see the remarks in footnote 11 from the main text for the possibility of meeting frictions.

TABLE V

COMPARING THE EFFECTS ON SMOKING FROM DIFFERENT INCREASES OF TOBACCO PRICES[a]

Policy Level (dP)	20	40	60	80	100	120
20	1.00 (1.00)					
40	0.00 (0.00)	1.00 (1.00)				
60	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)			
80	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)		
100	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)	
120	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)

[a]*Note*: Each cell compares the policy effects for a pair of price changes. The two p-values are from testing a hypothesis of equal means and from testing a hypothesis of equal distributions (two-sample Kolmogorov–Smirnov test).

TABLE VI

COMPARING THE EFFECTS ON SMOKING FROM DIFFERENT SAME-RACE CAPS[a]

Same-Race Cap (%)	None	90	80	70	60	50
None	1.00 (1.00)					
90	0.00 (0.00)	1.00 (1.00)				
80	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)			
70	0.00 (0.00)	0.00 (0.00)	0.62 (0.98)	1.00 (1.00)		
60	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)	
50	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.69 (0.69)	1.00 (1.00)

[a]*Note*: Each cell examines the change in overall smoking between a pair of same-race caps. The two p-values are from testing the hypothesis of equal means and from testing the hypothesis of equal distributions (two-sample Kolmogorov–Smirnov test). For example, both tests cannot reject the null hypotheses (of equal means and equal distributions of the overall smoking) between the same-race cap of 20% and the same-race cap of 30% (p-value 0.62 (0.98)). Similarly, the tests cannot reject these same hypotheses between the pair same-race cap of 40% and same-race cap of 50%. For all other pairs of same-race caps, the low p-values suggest that the change in the overall smoking is statistically significant.

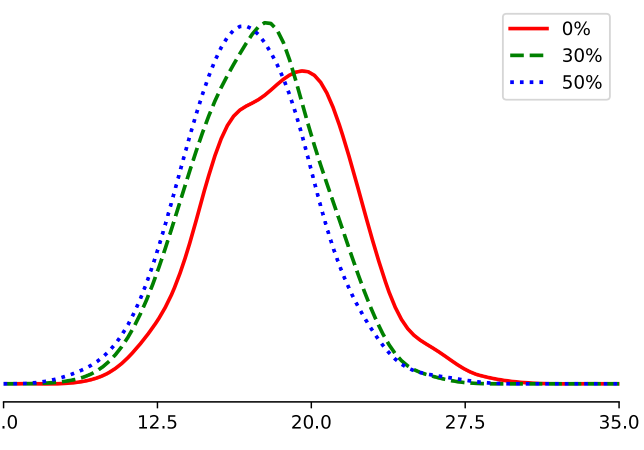

FIGURE 1.—Overall smoking for different student swaps. *Note*: A cap of $x\%$ same-race students is implemented with a swap of $(100 - x)\%$ students. The hypotheses of equal means/distribution is examined in Table VI.

APPENDIX D: ALTERNATIVE SPECIFICATION LOG INCOME/ALLOWANCES

This Appendix replicates the empirical analysis with an alternative specification where the price of tobacco is substituted with log income. The estimation sample is the same as the one from the model with tobacco price from the main text. Also, the parameters of the estimation algorithm and counterfactual simulations are unchanged.

D.1. *Priors and Estimates*

Table VII presents the posterior means and the shortest 90% credible intervals under different estimation scenarios. Figure 2 plots the posteriors for log income and Table VIII

TABLE VII

PARAMETER ESTIMATES (MODEL WITH LOG INCOME)[a]

Parameter	Prior	No Net Data	Exog Net	No PE	Model
			Utility of Smoking		
Baseline probability of smoking	0.20	0.13	0.17	0.24	0.21
	(0.10)	[0.10, 0.15]	[0.14, 0.21]	[0.22, 0.27]	[0.18, 0.26]
Log income ×10	1.00	1.00	0.99	1.07	1.03
	(1.00)	[0.69, 1.32]	[0.65, 1.30]	[0.73, 1.42]	[0.69, 1.36]
Mom edu (HS&CO)^{MP}	−0.05	−0.04	−0.05	−0.07	−0.06
	(0.05)	[−0.05, −0.02]	[−0.07, −0.03]	[−0.09, −0.05]	[−0.09, −0.04]
HH smokes	0.10	0.11	0.14	0.17	0.15
	(0.10)	[0.09, 0.14]	[0.11, 0.16]	[0.14, 0.20]	[0.12, 0.18]
Grade 9+^{MP}	0.20	0.15	0.14	0.20	0.13
	(0.20)	[0.11, 0.20]	[0.10, 0.18]	[0.16, 0.24]	[0.09, 0.17]
Blacks^{MP}	−0.20	−0.29	−0.30	−0.37	−0.32
	(0.20)	[−0.34, −0.25]	[−0.35, −0.24]	[−0.40, −0.33]	[−0.38, −0.27]
30% of the school smokes^{MP}	0.05	0.07	0.06		0.05
	(0.10)	[0.06, 0.08]	[0.04, 0.08]		[0.02, 0.07]
			Utility of Friendships		
Baseline number of friends	3.00			4.53	3.52
	(2.00)			[3.87, 5.15]	[3.00, 4.00]
Different sex$^{MP\%}$	−0.70			−0.71	−0.72
	(0.50)			[−0.78, −0.66]	[−0.78, −0.66]
Different grades$^{MP\%}$	−0.70			−0.89	−0.88
	(0.50)			[−0.92, −0.86]	[−0.92, −0.85]
Different race$^{MP\%}$	−0.50			−0.32	−0.45
	(0.50)			[−0.51, −0.10]	[−0.57, −0.30]
Cost/Economy of scale	0.00			−0.20	−0.22
	(0.50)			[−0.24, −0.17]	[−0.26, −0.19]
Triangles$^{MP\%}$	0.00			1.13	1.26
	(2.00)			[0.87, 1.42]	[1.01, 1.56]
ϕ^{MP}_{smoke}	0.05		0.05		0.06
	(0.05)		[0.03, 0.05]		[0.04, 0.07]
$\phi^{MP}_{nosmoke}$	0.05		0.03		0.04
	(0.05)		[0.02, 0.04]		[0.03, 0.05]

[a] *Note*: All priors are normal distributions with means and standard deviations displayed in the column Prior. The posterior sample contains 10^5 simulations before discarding the first 20%. Each cell displays the posterior mean and the shortest 90% credible set. MP stands for the estimated marginal probability in percentage points and MP% for estimated marginal probability in percent, relative to the baseline probability.

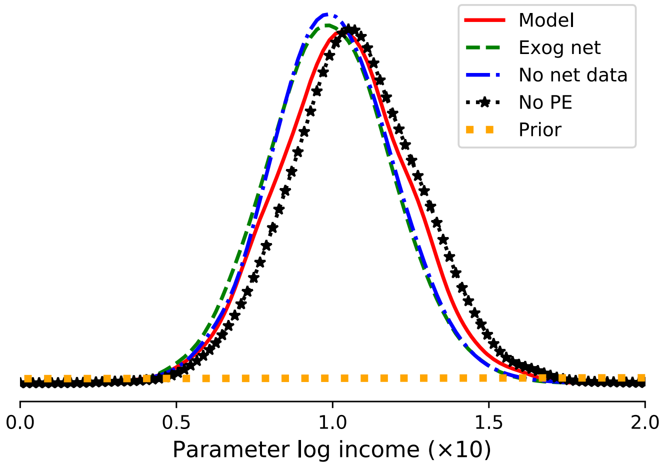

FIGURE 2.—Posterior distribution for the (log) income parameter. *Note*: The hypotheses for equal means between the model's posterior and each of the other posteriors on the plot are rejected with $p < 0.01$ by t-tests (see Table VIII).

TABLE VIII

COMPARING THE (LOG) INCOME POSTERIOR UNDER DIFFERENT ESTIMATION SCENARIOS[a]

Estimation Scenarios	Model	Exog Net	No Net Data	No PE
Model	1.00 (1.00)			
Exog net	0.00 (0.00)	1.00 (1.00)		
No net data	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)	
No PE	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)

[a]*Note*: Each cell compares the posterior distribution of the parameter (log) income between a pair of estimation scenarios. The two p-values are from testing a hypothesis of equal means and from testing a hypothesis of equal distributions (two-sample Kolmogorov–Smirnov test).

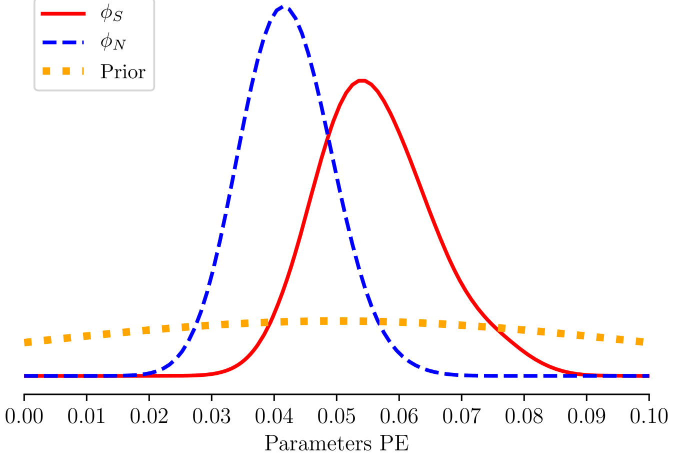

FIGURE 3.—Posterior distribution for the local PE parameters (model with log income). *Note*: The hypotheses for equal means and equal distributions between the parameters for peer effects among smokers ϕ_S and among nonsmokers ϕ_N are rejected with $p < 0.01$.

TABLE IX

MODEL FIT (MODEL WITH LOG INCOME)[a]

Moment	Model	Data
Selected Moments		
Prevalence	0.412 (0.411)	0.408
Density	0.007 (0.005)	0.005
Avg degree	1.232 (0.969)	0.973
Min degree	0.257 (0.000)	0.000
Max degree	4.784 (4.568)	5.308
$a_i g_{ij} a_j / n$	0.513 (0.253)	0.256
$(1 - a_i) g_{ij} (1 - a_j) / n$	0.400 (0.395)	0.404
Two-paths$/n$	0.627 (0.490)	0.501
Triangles$/n$	7.141 (0.023)	0.066
Mixing Patterns		
HI	0.242 (0.235)	0.236
CHI	−0.298 (−0.300)	−0.303
FSI	0.662 (0.665)	0.662

[a]*Note*: Columns Data and Model compare selected moments of the estimation sample with those of synthetic data generated by the estimated model. For the latter, mean and median are reported (median in parentheses). Two-paths is defined as $\sum_{i>j} g_{ij} g_{il} (1 - g_{jl})$. Triangles is defined as $\sum_{i>j>l} g_{ij} g_{il} g_{jl}$. The Homophily index (HI), Coleman homophily index (CHI), and Freeman segregation index (FSI) are measures of the mixing patterns between students with the same smoking statuses (see also Table III). For more details about computing those indices, see Currarini, Jackson, and Pin (2010, Definitions 1 and 2 in the Supplemental Appendix).

compares these posteriors under different estimation scenarios. Finally, Figure 3 compares the posteriors for the local peer effect parameters ϕ_S and ϕ_N.

D.2. *Model Fit*

Table IX compares selected statistics from the data to those from a sample simulated with the estimated model. Overall the model fits well the smoking decisions and the network features of the data. As in the model with tobacco price, the only caveat is the number of triangles as a fraction of the size of the network which in the data is 0.066 while in the sample generated by the model has mean 7.141 and median 0.023. The remarks from Appendix B.5 apply here as well.

TABLE X

FIT MIXING MATRIX (MODEL LEFT, DATA RIGHT)

		Nominee		Nominee	
		Smoker	Nonsmoker	Smoker	Nonsmoker
Nominator	Smoker	**63% (53.7)**	37% (31.1)	**63% (52.1)**	37% (30.4)
	Nonsmoker	29% (31.1)	**71% (75.3)**	29% (30.4)	**71% (75.4)**

TABLE XI

THE EFFECT ON SMOKING RATES FROM SAME-RACE STUDENT CAPS (MODEL WITH LOG INCOME)[a]

Same-Race Cap (%)	School White	School Black	Overall
None	33.5	5.0	19.3
90	30.2	7.2	18.7
80	26.6	9.9	18.3
70	24.8	11.6	18.2
60	19.4	16.3	17.9
50	18.3	17.6	17.9

[a]*Note*: A cap of $x\%$ same-race students is implemented with a swap of $(100-x)\%$ students. The last column shows the predicted changes in overall smoking under different same-race caps. The policy induces statistically significant changes in the overall smoking as suggested by the statistical tests in Table XII.

D.3. *Counterfactual Experiment: Changes in the Racial Composition of Schools*

Starting point of this experiment is two racially homogeneous schools: School White and School Black. Gradually the racial composition of these schools is changed via swapping of students. Table XI suggests that mixed-race schools smoke less.

D.4. *Counterfactual Experiment: Aggregate Effects of an Antismoking Campaign*

The final experiment examines the effect of a policy that is very efficient in terms of inducing individuals to stop smoking but can only target a small portion of the student population, say because it is very expensive. It is a quantitative question then to what extent the treated will influence their peers as opposed to their peers unfriending those who stop smoking. The simulations are carried out with medium size schools with relatively high (≈40%) smoking rates.

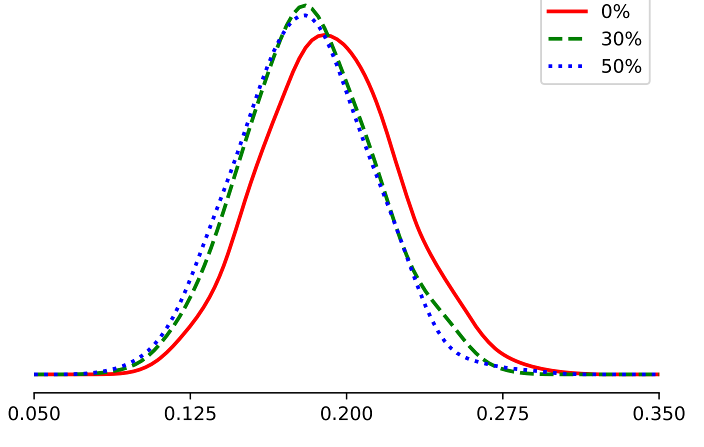

FIGURE 4.—Overall smoking for different student swaps (model with log income). *Note*: A cap of $x\%$ same-race students is implemented with a swap of $(100-x)\%$ students. The hypotheses of equal means/distribution is examined in Table XII.

TABLE XII

COPMARING THE EFFECTS ON SMOKING FROM DIFFERENT SAME-RACE CAPS (MODEL WITH LOG INCOME)[a]

Same-Race Cap (%)	None	90	80	70	60	50
None	1.00 (1.00)					
90	0.00 (0.01)	1.00 (1.00)				
80	0.00 (0.00)	0.00 (0.00)	1.00 (1.00)			
70	0.00 (0.00)	0.00 (0.00)	0.58 (0.47)	1.00 (1.00)		
60	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.00)	1.00 (1.00)	
50	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.04 (0.03)	0.68 (0.99)	1.00 (1.00)

[a]*Note*: Each cell examines the change in overall smoking between a pair of same-race caps. The two p-values are from testing the hypothesis of equal means and from testing the hypothesis of equal distributions (two-sample Kolmogorov–Smirnov test). For example, both tests cannot reject the null hypotheses (of equal means and equal distributions of the overall smoking) between the same-race cap of 20% and the same-race cap of 30% (p-value 0.58 (0.47)). Similarly, the tests cannot reject equality between the pair same-race cap of 40% and same-race cap of 50%. For all other pairs of same-race caps, the change in the overall smoking is statistically significant.

TABLE XIII

SPILLOVERS (MODEL WITH LOG INCOME)[a]

Campaign (%)	Smoking	Predicted Effect Proportional	Actual Effect	Multiplier
–	43.1	–	–	
3	40.7	1.3	2.4	1.9
5	39.3	2.2	3.8	1.8
10	35.7	4.3	7.4	1.7
20	29.8	8.6	13.3	1.5
30	24.5	12.9	18.6	1.4
50	15.8	21.5	27.2	1.3

[a]*Note*: The first column lists the alternative attendance rates. The second and third columns display the smoking rate and the change in smoking rate, respectively, if the decrease would be proportional to the intervention, that is, computes a baseline without peer effects. The last column computes the ratio between the percentage change in the number of smokers and the attendance rate.

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