



Table 1  
Dynamic Smoking Transitions of the Sample

		<u>Cigarette Use in <math>t</math> (conditional on smoking)</u>			
		Smoke any	Smoke 1-5 cigs	Smoke 6-10 cigs	Smoke 11+ cigs
		<u><math>t = 1988</math></u>			
<u>Cigarette Use in 1986</u>					
0	cigs/day	4.60	66.45	17.20	16.35
		<u><math>t = 1990</math></u>			
<u>Cigarette Use in 1988</u>					
0	cigs/day	13.37	69.12	17.09	13.79
1-5	cigs/day	67.73	44.81	32.55	22.64
6-10	cigs/day	80.25	13.85	43.08	43.08
11+	cigs/day	68.83	18.87	30.19	50.94
Unconditional on prior use		15.98	62.14	20.55	17.31
		<u><math>t = 1992</math></u>			
<u>Cigarette Use in 1990</u>					
0	cigs/day	12.48	64.59	19.20	16.22
1-5	cigs/day	67.81	51.52	30.48	18.00
6-10	cigs/day	90.77	13.11	47.21	39.67
11+	cigs/day	90.11	8.63	17.65	73.73
Unconditional on prior use		22.69	47.80	26.06	26.14

Note: Table describes cigarette use per day. Sample size is 10,233 persons per year.

Table 2  
Descriptive Statistics of the Sample

Variable	Mean	Standard Deviation	Variable	Mean	Standard Deviation	Variable	Mean	Standard Deviation
<u>Student Characteristics</u>			<u>Household Characteristics</u>			<u>School Characteristics</u>		
Female *	0.54	0.50	Guardian born before 1940 *	0.10	0.30	Public school	0.82	0.39
Black *	0.09	0.28	Guardian born 1940-1955 *	0.79	0.41	(Private omitted)		
Hispanic *	0.12	0.32	Guardian's age missing *	0.03	0.17			
Other/Non-white *	0.08	0.28	(Born after 1955 omitted)			Suburban school	0.40	0.49
(White omitted)			Parents education *	14.20	2.48	Rural school	0.31	0.46
Baptist *	0.07	0.25	Parents education missing *	0.01	0.08	(Urban omitted)		
No religion *	0.09	0.29	Family socioeconomic status *	-0.06	0.77	Prop Black in school	0.10	0.18
Other/Non-Catholic *	0.54	0.50	Live with mom and dad	0.69	0.46	Prop Hispanic in school	0.09	0.19
Religion missing *	0.02	0.14	Live with mom only	0.15	0.35	Racial composition missing	0.04	0.19
(Catholic omitted)			Family composition missing	0.07	0.26	Prop on free lunch	0.19	0.21
No. of older siblings *	1.50	1.90	(Other composition omitted)			Free lunch info missing	0.06	0.23
Older siblings missing *	0.11	0.32	Income <10K	0.09	0.29	Prop with single parent	0.22	0.16
Sibling drop out *	0.10	0.31	Income 10K-25K	0.24	0.43	Single parent info missing	0.10	0.30
Sibling drop out missing *	0.03	0.18	Income 25K-50K	0.40	0.49	Percent who drop out	4.78	7.79
Previous smoker	0.10	0.30	Income missing	0.11	0.31	Drop out info missing	0.08	0.27
Previous intensity 6-10 cigs	0.20	0.14	(Income > 50K omitted)					
Previous intensity 11+ cigs	0.17	0.13						
Age as of January (months)	186.55	34.14	<u>Prices (inflation adjusted)</u>					
Age missing	0.02	0.14	Cigarette price (cents/pack)	141.47	20.05			
Standardized test score	52.1	9.79	Cigarette tax (per pack)	21.51	9.08			
Test score missing	0.08	0.29						
Dropout indicator	0.05	0.22						

Note: \* indicates that variable is non-time varying. All other variables vary across years.

Table 3  
Measures of Price Elasticity from Preliminary Models

Price vs. Price + \$0.25		Description	Smoke any		Smoke 1-5 cigs		Conditional on Smoking Smoke 6-10 cigs      Smoke 11+ cigs		
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<u>Model 1</u>		Sparse set of covariates & dropouts not included							
Overall			-0.87	**	0.43	**	-1.05	**	-0.26
By year:	1988		-1.21	**	0.70	**	-2.10	**	-0.65
	1990		-0.94	**	0.36	*	-0.89		-0.48
	1992		-0.44	**	0.42	*	-0.92	**	0.00
<u>Model 2</u>		Model 1 with more covariates & dropouts							
Overall			-0.78	**	0.72	**	-0.91	**	-0.21
By year:	1988		-1.02	**	0.64	*	-1.95	**	-0.28
	1990		-0.86	**	0.61	**	-0.96	*	-0.30
	1992		-0.45	**	0.81	**	-0.66	*	-0.13
<u>Model 3</u>		Model 2 with state fixed effects							
Overall			-0.04		1.12	*	-0.95		-0.92
By year:	1988		-0.61		0.68		-1.73	*	-0.66
	1990		0.02		0.91		-1.03		-1.05
	1992		0.47		1.37		-0.73		-0.89
<u>Model 4</u>		Model 3 with previous behavior & interaction with price							
Overall			-0.02		1.02		-0.95		-1.21
By year:	1988		-0.69		0.79		-1.74	*	-1.12
	1990		-0.02		1.02	*	-1.09		-1.42
	1992		0.65		1.07		-0.70		-1.08
Previous Non-Smokers			-0.05		0.78	*	-1.28		-1.23
Previous Smokers			0.41	**	1.46		-0.37		-1.19

Note: Bootstrapped standard errors ( $N = 1000$  replications) are calculated.  
 \*\* indicates significance at the 5% level; \* indicates significance at the 10% level.

Table 4  
Parameter Estimates from Model 5

	Smoke Any			Smoke 6-10 Cigs			Smoke >10 Cigs		
Cig price <sub>t</sub>	-0.008	( 0.007)		-0.031	( 0.015)	**	-0.029	( 0.017)	*
Cig price <sub>t</sub> × Year 1990	0.005	( 0.005)		0.009	( 0.012)		0.000	( 0.014)	
Cig price <sub>t</sub> × Year 1992	0.010	( 0.005)	*	0.014	( 0.012)		0.009	( 0.013)	
Cig price <sub>t</sub> × Previous smoker	0.005	( 0.004)		-0.005	( 0.006)		-0.011	( 0.007)	
Cig price <sub>t</sub> × Previous use 6-10 cigs	0.020	( 0.010)	**	0.024	( 0.011)	**	0.023	( 0.012)	*
Cig price <sub>t</sub> × Previous use 11+ cigs	0.014	( 0.011)		0.014	( 0.015)		0.021	( 0.014)	
Cig price <sub>t</sub> × Dropout	-0.009	( 0.006)		-0.016	( 0.009)	*	-0.031	( 0.009)	**
Cig price <sub>t</sub> × Female	-0.001	( 0.002)		0.004	( 0.005)		0.009	( 0.005)	
Previous smoker	0.671	( 0.701)		1.478	( 0.929)		2.224	( 1.081)	**
Previous intensity 6-10 cigs	-2.304	( 1.490)		-2.519	( 1.663)		-1.894	( 1.802)	
Previous intensity 11+ cigs	-1.670	( 1.626)		-1.792	( 2.253)		-1.415	( 2.146)	
Dropout indicator	0.871	( 0.988)		3.072	( 1.424)	**	5.273	( 1.468)	**
Female	0.182	( 0.354)		-0.916	( 0.701)		-1.959	( 0.809)	**
Black	-2.000	( 0.148)	**	-1.758	( 0.314)	**	-1.880	( 0.360)	**
Hispanic	-0.498	( 0.112)	**	-1.430	( 0.206)	**	-1.481	( 0.238)	**
Other/Non-white	-0.735	( 0.118)	**	-0.277	( 0.214)		-0.657	( 0.263)	**
Standardized test score	0.019	( 0.030)		-0.078	( 0.053)		-0.018	( 0.058)	
Test score squared	-0.001	( 0.000)	**	0.000	( 0.001)		0.000	( 0.001)	
Test score missing	-0.670	( 0.760)		-2.164	( 1.288)	*	-0.576	( 1.408)	
Baptist	-0.060	( 0.126)		-0.190	( 0.204)		-0.054	( 0.242)	
No religion	0.479	( 0.111)	**	0.323	( 0.163)	**	0.643	( 0.191)	**
Other/Non-Catholic	0.067	( 0.070)		0.071	( 0.117)		0.410	( 0.137)	**
Religion missing	-0.089	( 0.212)		0.546	( 0.338)		0.902	( 0.376)	**
No. of older siblings	0.032	( 0.019)	*	0.020	( 0.029)		0.030	( 0.033)	
Older siblings missing	0.282	( 0.095)	**	0.028	( 0.148)		0.169	( 0.165)	
Sibling drop out	0.526	( 0.105)	**	0.354	( 0.147)	**	0.061	( 0.177)	
Sibling drop out missing	1.538	( 0.182)	**	0.948	( 0.244)	**	0.652	( 0.278)	**

Table 4 — continued  
Parameter Estimates from Model 5

	Smoke Any			Smoke 6-10 Cigs			Smoke >10 Cigs		
Live with mom and dad	-0.413	( 0.074)	**	-0.397	( 0.120)	**	-0.359	( 0.136)	**
Live with mom only	-0.091	( 0.093)		-0.174	( 0.150)		-0.264	( 0.172)	
Family composition missing	-0.337	( 0.102)	**	-0.088	( 0.166)		0.042	( 0.182)	
Family socioeconomic status	0.142	( 0.075)	*	-0.218	( 0.117)	*	0.002	( 0.133)	
Parents education	-0.029	( 0.022)		-0.004	( 0.035)		-0.091	( 0.039)	**
Parents education missing	-0.594	( 0.475)		-0.379	( 0.778)		-1.694	( 0.927)	*
Parent's work	-0.361	( 0.173)	**	-0.339	( 0.243)		-0.309	( 0.280)	
Parent's work missing	-0.494	( 0.393)		0.195	( 0.553)		-0.315	( 0.712)	
Guardian born before 1940	-0.247	( 0.143)	*	0.393	( 0.218)	*	0.125	( 0.255)	
Guardian born 1940-1955	-0.213	( 0.106)	**	0.187	( 0.160)		0.166	( 0.182)	
Guardian's age missing	-0.192	( 0.195)		0.116	( 0.311)		0.251	( 0.344)	
Public school	-0.150	( 0.097)		0.126	( 0.163)		0.000	( 0.183)	
Prop on free lunch	0.034	( 0.179)		0.199	( 0.315)		-0.223	( 0.383)	
Free lunch info missing	-0.068	( 0.128)		0.167	( 0.247)		0.317	( 0.273)	
Prop Hispanic in school	-0.475	( 0.227)	**	0.055	( 0.441)		-0.898	( 0.612)	
Prop Black in school	-0.222	( 0.231)		-0.652	( 0.456)		0.054	( 0.519)	
Racial composition missing	-0.078	( 0.161)		0.194	( 0.296)		0.278	( 0.341)	
Prop with single parent	0.102	( 0.200)		0.219	( 0.381)		-0.025	( 0.441)	
Single parent info missing	-0.030	( 0.098)		0.118	( 0.185)		-0.183	( 0.223)	
Percent who drop out	-0.013	( 0.004)	**	0.014	( 0.008)	*	0.006	( 0.011)	
Drop out info missing	0.033	( 0.141)		0.092	( 0.266)		-0.141	( 0.323)	
Age as of January (months)	0.009	( 0.004)	**	-	( - )		-	( - )	
Age missing	1.581	( 0.792)	**	-	( - )		-	( - )	
Suburban school	-0.023	( 0.081)		-	( - )		-	( - )	
Rural school	-0.245	( 0.092)	**	-	( - )		-	( - )	
Year 1990	0.980	( 0.710)		-0.577	( 1.487)		0.287	( 1.729)	
Year 1992	0.347	( 0.753)		-0.658	( 1.517)		-0.206	( 1.745)	
Constant	-0.003	( 1.402)		5.675	( 2.443)	**	5.195	( 2.718)	*
$\rho_a$ (unobs. het. factor a)	-1.164	( 0.430)	**	-1.141	( 0.424)	**	-2.695	( 0.651)	**
$\rho_b$ (unobs. het. factor b)	-51.431	( 655.8)		-28.068	( 358.1)		-21.773	( 278.0)	

Note: Standard errors are in parentheses. \*\* indicates joint significance at the 5% level; \* 10% level.  
State fixed effects are also estimated.

Table 5  
Measures of Price Elasticity from Model 5 — Preferred model

Price vs. Price + \$0.25		Smoke any		Smoke 1-5 cigs		Conditional on Smoking Smoke 6-10 cigs		Smoke 11+ cigs	
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Calculations using observed previous behavior → immediate response									
Overall		-0.41	*	0.89	-1.42	**	-1.84	**	
By year:									
By year:	1988	-0.92	**	0.55	-2.14	**	-1.74	**	
	1990	-0.40		0.82	-1.58	*	-2.06	**	
	1992	0.10		1.02	-1.17		-1.70	**	
Previous Non-Smokers		-0.47	*	0.62	-1.76	**	-1.88	**	
Previous Smokers		0.42		1.38	-0.83		-1.77	**	
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Calculations using updated behavior from dynamic simulations → long-run response									
Overall		-0.46	*	0.87	-1.56	*	-1.96	**	
By year:									
By year:	1988	-0.92	**	0.55	-2.14	**	-1.74	**	
	1990	-0.44		0.76	-1.66	*	-2.12	**	
	1992	-0.02		1.01	-1.37		-1.88	*	
Previous Non-Smokers		-0.48	*	0.70	-1.68	**	-1.96	**	
Previous Smokers		-0.16		1.17	-1.34		-1.95	**	

Note: Our preferred model includes individual unobserved heterogeneity, endogenous controls for smoking history, and state fixed effects. Bootstrapped standard errors are calculated.  
\*\* indicates significance at the 5% level; \* at the 10% level.

Table 6  
Smoking Participation Predictions under Alternative Permanent Price Increases

<u>Smoking Participation Rates</u>				<u>Smoking Participation Rates</u>			
Price	Model 3	Model 4	Model 5	Price	Model 3	Model 4	Model 5
Overall				Year 1988 (8th graders)			
Original price	14.42	14.42	14.40	Original price	4.60	4.60	4.56
Price + 1 cent	14.35	14.44	14.38	Price + 1 cent	4.58	4.58	4.53
Price + 25 cents	14.73	14.85	13.73	Price + 25 cents	4.05	3.98	3.78
Price + 100 cents	15.92	16.14	11.93	Price + 100 cents	2.74	2.55	2.10
Previous Non-Smokers				Year 1990 (10th graders & dropouts)			
Original price	13.24	9.96	13.40	Original price	15.98	15.98	15.86
Price + 1 cent	13.25	9.97	13.37	Price + 1 cent	15.98	15.98	15.81
Price + 25 cents	13.48	10.08	12.74	Price + 25 cents	16.01	16.04	14.74
Price + 100 cents	14.45	10.81	10.97	Price + 100 cents	16.14	16.11	11.59
Previous Smokers				Year 1992 (12th graders & dropouts)			
Original price	30.47	74.98	28.04	Original price	22.69	22.69	22.79
Price + 1 cent	30.52	75.18	28.01	Price + 1 cent	22.75	22.77	22.78
Price + 25 cents	31.75	79.54	27.31	Price + 25 cents	24.14	24.52	22.68
Price + 100 cents	35.83	88.55	24.94	Price + 100 cents	28.86	29.76	22.09

Note: Model 3 includes state fixed effects and no controls for previous behavior.  
Model 4 is identical to Model 3 but includes (exogenous) controls for previous behavior.  
Model 5 includes individual unobserved heterogeneity, endogenous controls for smoking history and dropout behavior, and state fixed effects. These predictions are based on updating behavior.



Table 7  
Effect of Previous Behavior on Predicted Future Behavior

	Smoking Participation (%)	
	1990	1992
<u>Effect of forced previous behavior using Model 5 (pure effect)</u>		
Forced to not smoke in 1988	14.63	22.34
Forced to smoke lightly in 1988	29.50	26.94
Forced to smoke moderately in 1988	36.04	30.61
Forced to smoke heavily in 1988	32.62	28.71
Forced to not smoke in 1988 and 1990		17.76
Forced to smoke lightly in 1988 and 1990		35.26
Forced to smoke moderately in 1988 and 1990		48.13
Forced to smoke heavily in 1988 and 1990		42.62
<u>Effect of forced previous behavior using Model 4 (biased effect)</u>		
Forced to not smoke in 1988	13.57	21.60
Forced to smoke lightly in 1988	59.52	47.21
Forced to smoke moderately in 1988	75.81	61.89
Forced to smoke heavily in 1988	72.16	58.42
Forced to not smoke in 1988 and 1990		13.56
Forced to smoke lightly in 1988 and 1990		62.64
Forced to smoke moderately in 1988 and 1990		83.84
Forced to smoke heavily in 1988 and 1990		78.78