Web Appendix

Was Television Responsible for a New Generation of Smokers?

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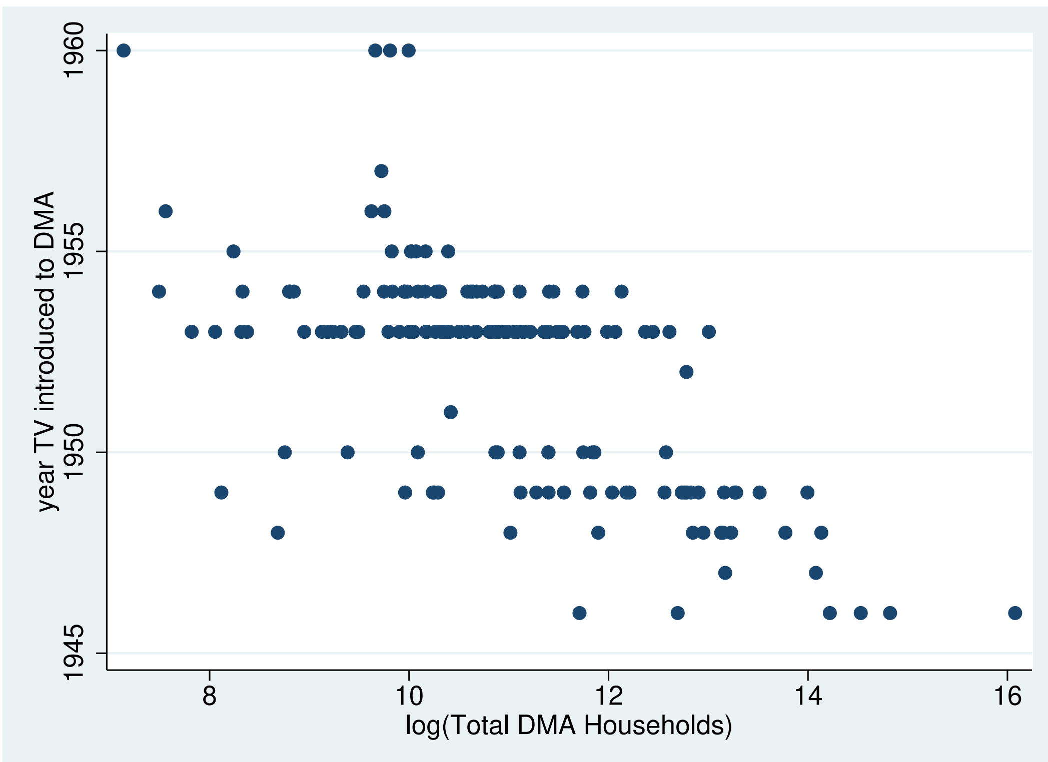
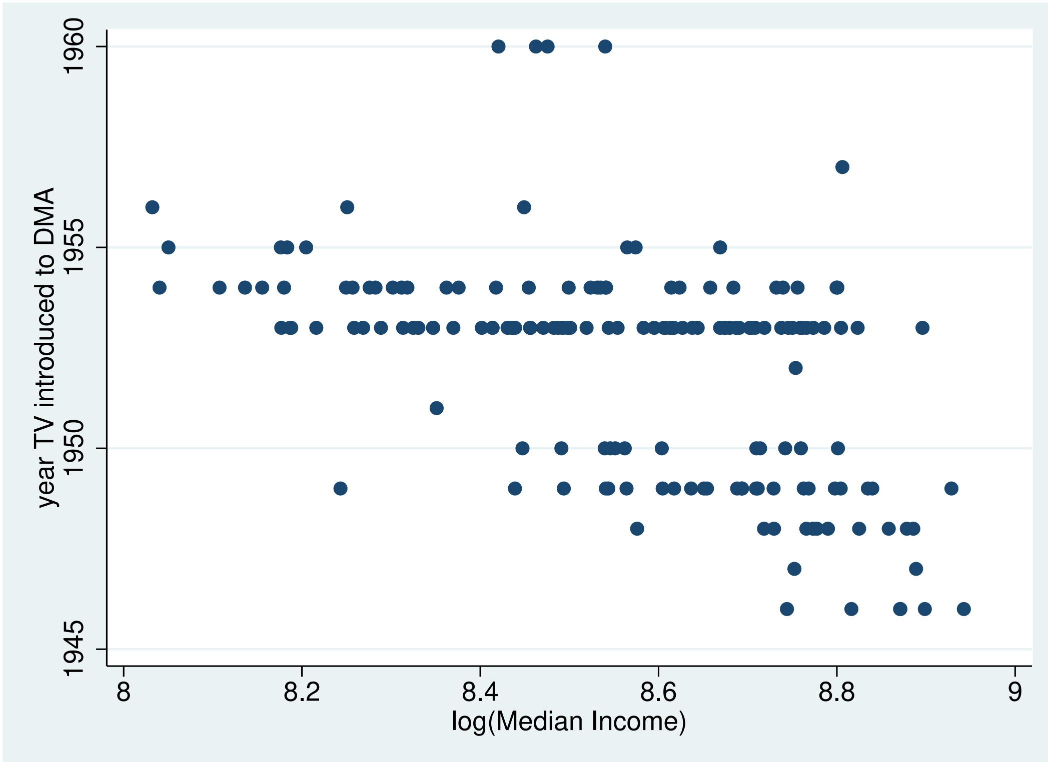
Web Appendix A: TV Entry Year Variation

Because TV entry dates correlate with DMA size and median income, as can be seen in table 1, we check whether TV entry dates vary conditional on these values. We find that significant variation in TV entry dates remains after controlling for the log of DMA size (population) and the log of DMA median income. Plots of the relationship between these values are shown in appendix figures 1 and 2.

WEB APPENDIX FIGURE 1
TV ENTRY YEAR VARIATION CONDITIONAL ON DMA SIZE



WEB APPENDIX FIGURE 2
TV ENTRY YEAR VARIATION CONDITIONAL ON DMA INCOME



Web Appendix B: Veterans and TV Entry Order

To test whether there are differences in veteran concentrations across DMAs that are related to TV entry order, we run regressions using these and other DMA characteristics to predict TV entry year. These estimates are reported in appendix table 1. The first column presents a baseline regression using only DMA size and wealth to predict TV entry dates. These characteristics are highly predictive of TV entry order, as reported by Gentzkow (2006). Alternatively, the second shows that WWII and Korean War veteran DMA shares are weak predictors, although WWII shares are marginally predictive of earlier TV entry dates. When conditioning the regression on DMA size and wealth in the third column, WWII shares are no longer significant, but Korean War shares are associated with later TV entry dates at the 1% level.

Web Appendix Table 1
TV entry order using veteran concentration of DMAs

	(1)	**(2)**	**(3)**
Log of DMA number of households	-1.57***		-1.51***
	(.16)		(.16)
Log of DMA median income	-2.28**		-2.46***
	(.80)		(.90)
Share of WWII veterans in DMA		-22.61**	-7.07
		(11.53)	(8.21)
Share of Korean War veterans in DMA		29.29*	30.59***
		(16.71)	(12.61)
Constant	1989.78***	1952.17***	1989.83***
	(6.01)	(1.66)	(6.44)
Number of Observations	113	115	113
F-statistic	102.31	4.28	52.46

NOTE.—DMA-level regressions of TV-entry date on DMA characteristics. *** indicates $p<.001$, ** indicates $p<0.05$ and * indicates $p<0.1$ for individual hypothesis tests.

Web Appendix C: Migration Rates Across Ages

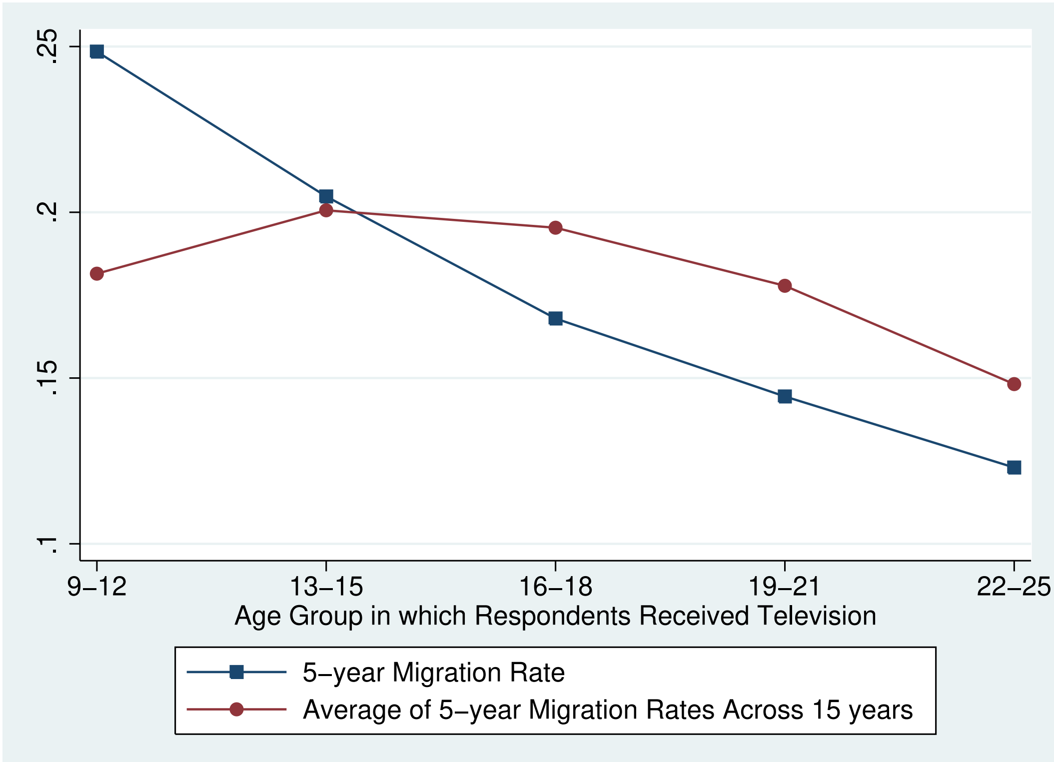
We approximate how the estimated TV effects across different age groups in our article may have experienced different levels of attenuation using data from the 1960 U.S. Census.[1] Differential attenuation would result from differential migration rates across ages, and the census data allow us to make some useful approximations of these differences. The migration data represent a 1% sample of the census data and include information on the respondents' age and state and county information, along with whether they had moved across state lines in the past five years. We match the census location data to DMAs and calculate the age at which individuals would have gained access to television in the absence of migration, just as we did for the NHIS data in our main analysis.

Despite the richness of the census data, we must rely on approximations of differences in migration rates for a couple of reasons. First, our TV estimates are affected by cross-DMA migration, and the closest approximation to this in the census data is information about migration across states. Second, we are interested in migration that occurred between the time an individual first received access to TV and the time of their 1965–66 NHIS interview. However, the census offers information about migration between 1955 and 1960. As a result, we cannot estimate migration over the period of interest without very strong assumptions, so we focus on approximating differences in migration rates across the ages of interest. To approximate these differences, we assume that the age dependence of the 5-year migration rates observed for 1955–1960 approximates the age dependence of migration between 1946 and 1966. Additionally, we assume that differences across ages in a respondent's migration probability between TV introduction and the 1965–66 NHIS is approximated by the average of the 5-year migration rates associated with their age at the time of the census, 6 years in the past and 11 years in the past. (On average, the time between TV introduction and the 1965–66 NHIS was 16 years.) This average clearly understates the migration probability over 15 years, but our interest is in the differences in migration probabilities across ages, not levels.

These average migration rates are presented in appendix figure 3, labeled "Average of five-year

[1] Ruggles, Steven, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas, and Matthew Sobek. IPUMS USA: Version 8.0 1960 Census. Minneapolis, MN: IPUMS, 2018. https://doi.org/10.18128/D010.V8.0

WEB APPENDIX FIGURE 3
MIGRATION RATE ACROSS AGE GROUPS



Migration Rates across 15 years". The age groups presented in this figure are the same as those defined for equation (1), but on this graph the groups define census respondents that gained access to television at similar ages. The rate reaches its peak for ages 13–15 at about .2 and is lowest for 22–25 year-olds at about .15, suggesting that the differences should contribute a relatively small amount of the noise in our analysis of the response to television by age group. In fact, the percentage difference between the migration rates should be lower than we see here because the actual 15-year migration rates will be higher than the values reported here. Additionally, because the rates for ages 16–18 and 19–21 are among the highest on the plot, differential migration rates should work against the TV effects we find. Finally, the differences in "Average of 5-year Migration Rates across 15 years" are especially small relative to the simple averages of the "5-year migration rates" for each age group, which demonstrates the "compression" effect that was mentioned in the paper, which results from averaging migration rates over a wider range of ages.

Web Appendix D: Estimating the Increase in the Share of Smokers with the Hazard

This Appendix derives an estimate for the change in the share of smokers as a result of television, using estimates of the change in the hazard of becoming a smoker upon television entry. Start with the definition of the hazard, which is

$$h(t) = \frac{f(t)}{1-F(t)},$$

where $h(t)$ is the hazard of person i becoming a smoker at time t, $f(t)$ is the probability density of becoming a smoker at time t, and $F(t)$ is the cumulative distribution at time t. We can then define the cumulative hazard function as

$$H(t) = \int_0^t h(u)du = \int_0^t \frac{f(u)}{1-F(t)}du = -\log\{1-F(t)\}.$$

It follows that the probability of being a smoker at time t is $F(t) = 1-\exp\{-H(t)\}$. We can then express how the share of smokers (at age t) changed in the presence of television as:

$$\Delta S_{\text{TV}} \equiv F(t \mid \text{TV}) - F(t \mid \text{no TV}) = \exp\{-H_0\} - \exp\{-H_1\},$$

where we define $H_0 = H(t \mid \text{no TV})$ and $H_1 = H(t \mid \text{TV})$. To estimate H_0, we use the share of individuals who became smokers by age 36 without being exposed to television since nearly all smokers start by this age. To estimate H_1, we use the estimates of Δh from equation (10) and calculate $\hat{H}_1 = H_0 + \sum_{k=0}^{5} \Delta\hat{h}^r$. Inserting this into the expression for ΔS_{TV} above produces equation (12).

Web Appendix E: Odds Ratio Calculation

We calculate the odds ratio associated with being "treated" with TV for comparison with estimates from the medical literature. The logit parameters in table 2 have direct implications for this value and can be calculated in a similar manner to equation (11), using α_j in place of $\tilde{\alpha}_j$:

$$\text{Odds Ratio} = \exp\left(\sum_{j \in \{16\text{–}18,\ 19\text{–}21\}} n_j \alpha_j\right).$$

This provides an odds ratio estimate of 1.50.