

# Regression 4: Application

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# Introduction

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- Heyu Xiong "The Political Premium of Television Celebrity" *American Economic Journal: Applied Economics*
- Take-away
  - Research design with cross-sectional data.
  - Various falsification tests as a robustness check

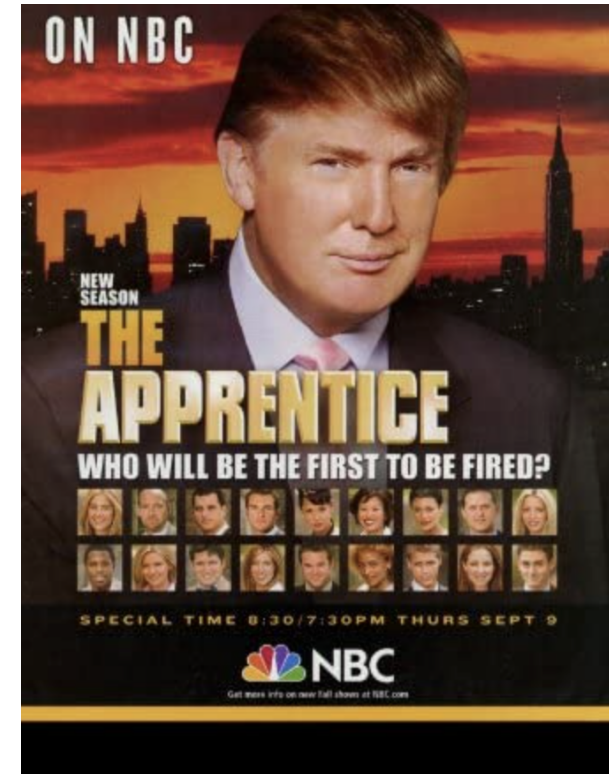
# Motivation and Research question

# Effect of TV Exposure on Political Support?

- **What influences voters** is of long-standing interest to social scientists.
- Political communication and media plays a prominent role in shaping political attitude and behavior.
- Political campaigns spend millions of dollars designing content for the express purpose of political persuasion.
- However, **whether candidate exposure through non-political content, such as entertainment programming, can affect voting decisions** is largely unexplored.

# Some Evidence from Donald Trump

- Donald Trump was a host of *The Apprentice*, a famous reality TV series run on NBC.
- An author conducts a survey and finds that political support for Trump's candidacy differed markedly between *The Apprentice* viewers and non-viewers. Viewers held more favorable opinions of him and discounted negative information.

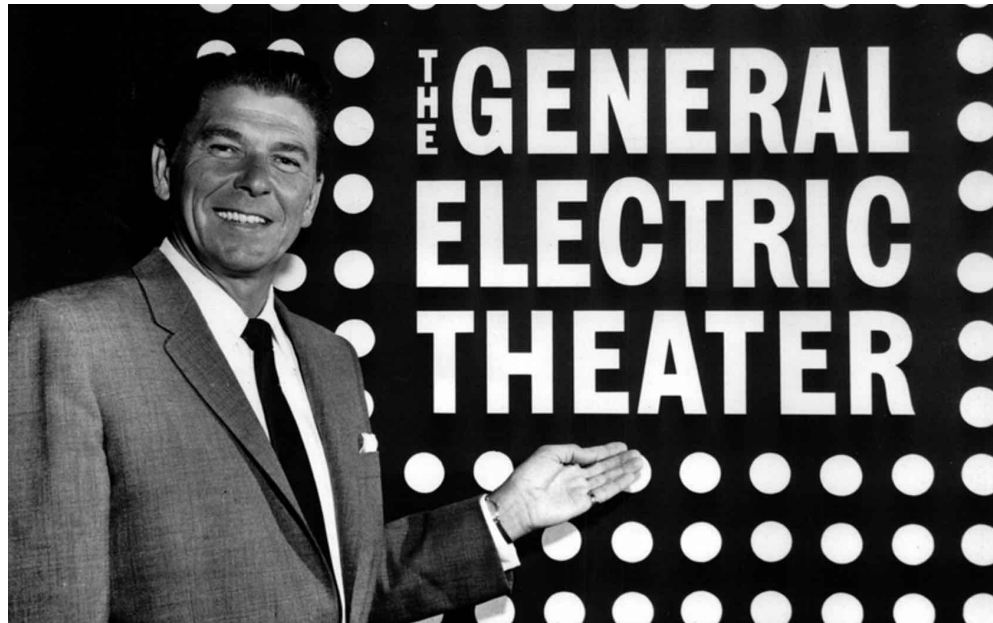


# Difficulty of Identification

- Such correlation may be due to **confounders**,
  - Correlation between media habits and underlying political preference.
- This paper: **focuses on a historical setting by exploiting the television broadcast infrastructure as a source of identifying variation.**

# Ronald Reagan hosting General Electric Theater

- Investigate whether **Ronald Reagan**'s host of a popular 1950s television program, **General Electric Theater** (G.E. Theater) affected electoral support for him.





# Research Design

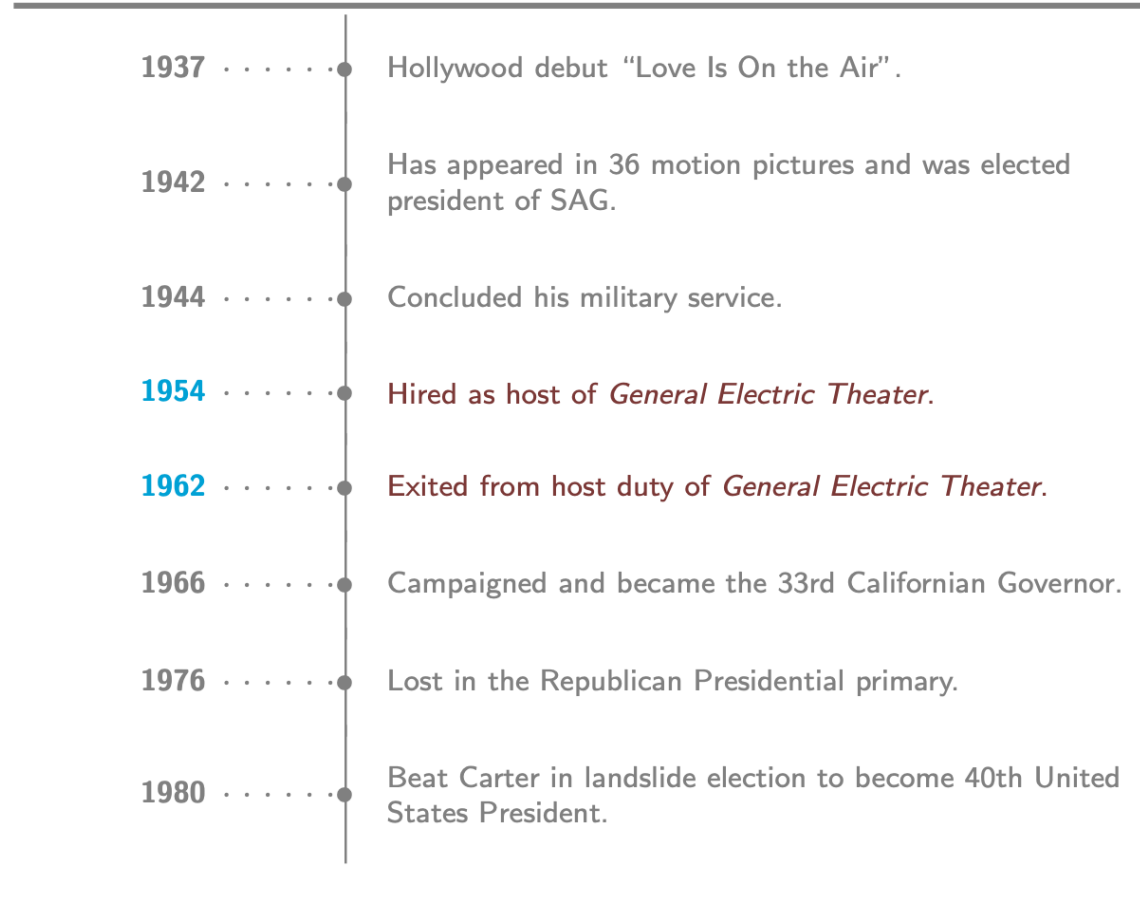
- Research design: utilize the differences in the coverage of the program, generated by the **locations and technological limitations of the broadcast stations in 1954.**
- Research question: **whether spatial variation in household's access to G.E. Theater predicts the variation in local political support for Reagan during his entries into national and state politics.**

# Background and Data

# Ronald Reagan and General Electric *Theater*

- Ronald Reagan as a cereblity:
  - Never a top billing star,
  - an extensive filmography of 52 movies from 1937 to 1950.
  - In 1952, Reagan transitioned to television; hosting G.E. *Theater*. During Reagan's tenure as the host of G.E. *Theater* from 1954 to 1962, he became a household name.
- G.E. *Theater*
  - a half-hour dramatic anthology series (not political)
  - aired by CBS on Sunday evenings from 1953 to 1962.
  - was enormously successful and the third-most-popular show at its peak.
- Reagan appeared each week at the start of the episode to introduce the theme and content.

# Chronology of Reagan's career



# History of Television Broadcasting in the U.S.

- Television was first licensed for commercial broadcasting in the United States on July 1, 1941.
- Available television content varied greatly across locations.
  - At the G.E. *Theater's* debut, at most **less than 50% of all U.S. counties received a television signal from CBS.**
- The quality of the signal received was governed by various factors
  - distance between transmitter and receiver
  - transmission power, broadcast frequency, height of towers,
  - the topographical features of the terrain.
- **The paper uses the signal strength as a proxy of a household's viewership of G.E. Theater.**

# Two Types of Signal Strength

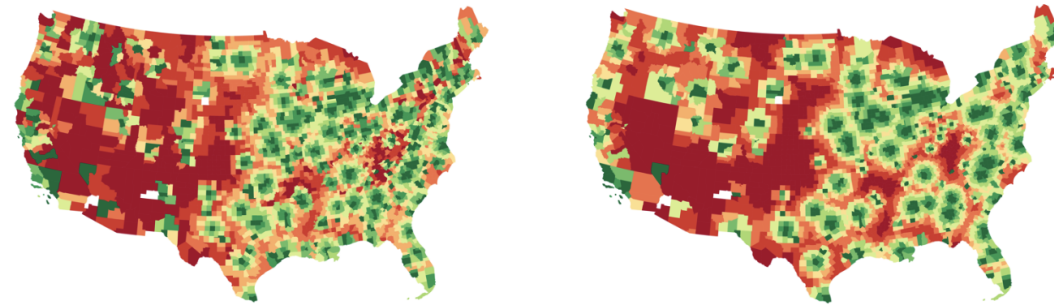
- 1: **CBS signal strength** (actual strength)
  - Use professional engineer-developed software
  - The software uses **the transmission specifications and locations of broadcast towers** and **topographical information** to predict the signal strength from each transmitter to any given receiver location.
- 2: Free-space signal (hypothetical signal strength)
  - it is only determined by the proximity of a location to broadcast stations
  - This reflects geographic factor of each location.
- The **difference between the actual and hypothetical signal intensity** within relatively small areas will be driven by idiosyncratic terrain characteristics that are **plausibly exogenous** to other determinants of voting.

# Spatial distribution of CBS signal strength in 1955

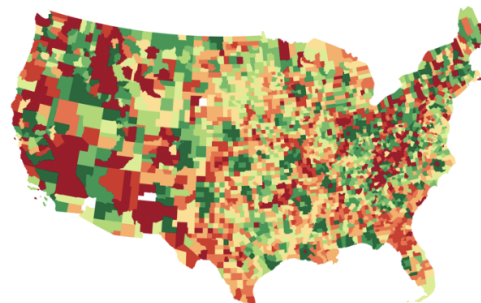
Figure 1. : Spatial distribution of CBS signal strength in 1955

(a) Signal Strength

(b) Free-Space Signal Strength



(c) Residualized Signal Strength



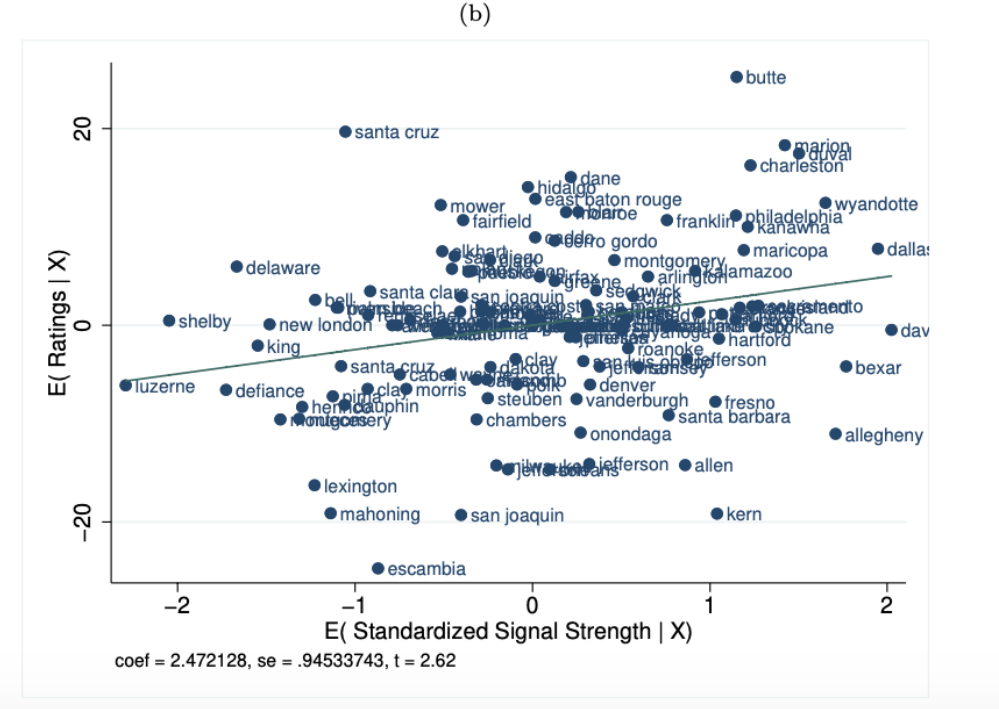
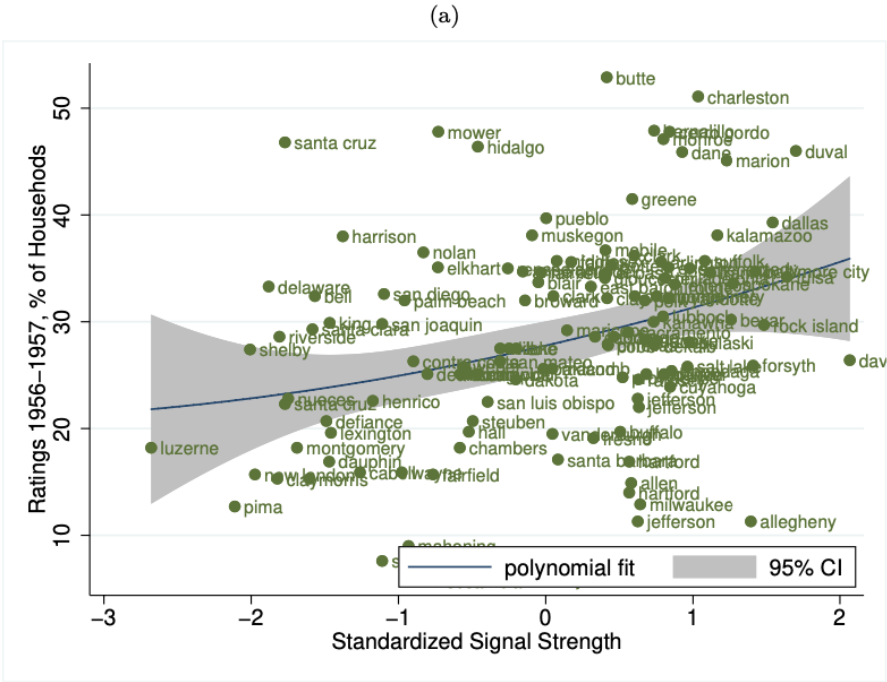
# Effect of signal strength on program viewership

- The viewership of G.E. theater is not observed at the detailed level.
- Here, the author uses **the strength of CBS signal** as a proxy.
- He validates this assumption by regression of local television ratings on signal strength.
  - The ratings are obtained from market reports conducting sampling researches among 130 distinct television markets.
- As magnitudes the one standard deviation increase in the signal strength is associated with a 2.47 percentage-point increase in the share of households that watch the program within the respective location.



# Relation between signal strength and ratings

Figure 2. : Visualization of First Stage Relationship



# Empirical analysis

# Effect of the exposure on electoral outcomes

- The model is:

$$y_{is}^t = \beta \text{Signal}_i + \alpha \text{SignalFree}_i + \gamma \mathbf{X}_i + \sigma_s + \epsilon_i$$

- $y_{is}^t$  : the share of votes cast for Reagan in county  $i$  of state  $s$  in election  $t$
- $\text{Signal}_i$  : the ITM algorithm predicted signal strength
- $\text{SignalFree}_i$  : the hypothetical signal strength assuming flat terrain
- $\mathbf{X}_i$  : a vector of geographic and socio-economic controls
  - county population, median household income, percentage of the population that is African-American, distance to the nearest CBS station, county
- $\sigma_s$  : state fixed effects

# Identification Strategy

- Concern: potential endogeneity in the location of the CBS stations.
- The author controls for the hypothetical signal intensity in the absence of any geomorphological obstacles, *SignalFree*.
- The parameter  $\beta$  is identified by the differences between the actual and hypothetical signal intensity within relatively small areas, which is driven by idiosyncratic terrain characteristics.
- The identification assumption requires only that conditional on *SignalFree<sub>i</sub>* and other controls, *Signal<sub>i</sub>* is unrelated to other determinants of Reagan support.

# Justification of Identifying Assumption

- The **free-space signal strength accounts for the endogenous component of reception.**
  - ex: proximity to urban area, which is likely to be correlated with political preference.
- The remaining variation in reception comes from a household's relative positioning with respect to geographic obstacles
  - e.g. whether one is located to the left or right of a mountain range.
- This **residual variation is assumed to be plausibly exogenous and thereby orthogonal to voting behavior.**

# Results

# Main Results

Table IV—: Reagan Elections 1966-1984

Elections:	Dep Var: Ronald Reagan Vote Share					
	Presidential: General		Presidential: Primary		California Governor	
	1980 (1)	1984 (2)	1976 (3)	1980 (4)	1966 (5)	1970 (6)
Signal Strength	0.0127 (0.0056) <i>[0.0050]</i>	0.0160 (0.0052) <i>[ 0.0048]</i>	0.0218 (0.0054) <i>[0.0054]</i>	0.0098 (0.0047) <i>[0.0041]</i>	0.0194 (0.0101) <i>[0.0083]</i>	0.0108 (0.0100) <i>[0.0080]</i>
Free-space signal	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes	–	–
State F.E.	Yes	Yes	Yes	Yes	–	–
Dep Var Mean	0.536	0.624	0.558	0.730	0.595	0.546
Observations	3058	3058	1044	1044	58	58
$R^2$	0.546	0.440	0.775	0.898	0.357	0.326

- In columns (1) ~ (4), the coefficient is **positive and statistically significant**.
- During the 1980 general presidential election, a one standard deviation shift in Signal Strength leads to a 1.37 percentage point increase in Reagan's vote share.
- The impact in governor elections (Columns (5) and (6)) is less precisely estimated, likely due to the smaller sample size.
- **robust to a number of alternative specifications:**
  - using population weights, controlling for the 1976 Republican presidential vote share to add controls for political and racial preferences, and excluding large metropolitan areas because rural areas are less subject to concerns about selection bias.



# Persuasion Rate

- The **persuasion rate** in the 1980 general presidential election is estimated to be **11.84%**.
  - See the paper for the detail.
- Interpretation: about 12% of the viewers who originally didn't support Reagan voted for him in the election by watching G.E. Theater.
- This value is comparable to those found in the existing literature.

# Potential Sources of Bias and Placebo checks

# Placebo check 1: Elections Reagan didn't participate in

- Concern: **the strength of the CBS signal could be related to unobservables that correlate with Republican political support**
- The historical setting makes this relatively unlikely since CBS was not a partisan station in the 1950s and did not strategically locate their affiliates for political purposes.
- To exclude this concern, estimate the same specification for a set of comparable elections in which **Reagan did not participate**.
  - These elections are **placebo outcomes**.
  - If there is an effect, the concern above is indeed the case.

Table VII—: Political Falsification Checks

Elections:	Dep Var: Republican Candidate Vote Share						
	Presidential: General Election					California Governor	
	1960 (1)	1964 (2)	1968 (3)	1972 (4)	1976 (5)	1958 (6)	1962 (7)
<i>Signal Strength</i>	-0.0027 (0.0070)	0.0042 (0.0068)	-0.0044 (0.0072)	0.0078 (0.0048)	-0.0012 (0.0060)	0.0031 (0.0122)	0.0092 (0.0113)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	–	–
Observations	3051	3056	3057	3056	3058	58	58
$R^2$	0.541	0.580	0.716	0.610	0.514	0.363	0.328

- *SignalStrength* coefficient are statistically insignificant across all placebo elections and the point estimates are also consistently small in magnitude.
- Signal strength did not systematically correlate with political preference.

# Placebo check 2 by NBC and ABC signal strength

- Another concern: the effect of **television consumption** itself (not G.E. theater).
- Perhaps Reagan was a better television candidate (he performed better in televised debates or coverage of the election.)
- Then **frequent television viewers could be more likely to vote for him regardless of whether they specifically watched G.E. Theater.**
- To address this possibility, he controls for the signal coverage of two other major broadcast networks operating at the time: NBC and ABC.
  - NBC and ABC coverages are **placebo treatment.**

Table VIII—: ABC and NBC Placebo Tests

Elections:	Dep Var: Ronald Reagan Vote Share					
	General Presidential		Republican Primaries		Governor Elections	
	1980 (1)	1984 (2)	1976 (3)	1980 (4)	1966 (5)	1970 (6)
<i>CBS Signal Strength</i>	0.0120 (0.0063)	0.0157 (0.0055)	0.0180 (0.0055)	0.0059 (0.0052)	0.0121 (0.0130)	0.0045 (0.0126)
ABC Signal Strength	-0.0084 (0.0056)	-0.0052 (0.0058)	-0.0034 (0.0085)	0.0017 (0.0057)	-0.0110 (0.0161)	-0.0058 (0.0204)
NBC Signal Strength	0.0019 (0.0051)	0.0003 (0.0051)	0.0080 (0.0066)	0.0073 (0.0048)	0.0183 (0.0144)	0.0124 (0.0155)
Baseline Controls	Yes	Yes	Yes	Yes	–	–
State Fixed Effects	Yes	Yes	Yes	Yes	–	–
Observations	3058	3058	1044	1044	58	58
$R^2$	0.552	0.444	0.779	0.899	0.382	0.355

- The ABC and NBC estimates are statistically insignificant and small in magnitude, while the coefficients on the CBS signal strength remain stable in magnitude.

**Additional analysis (to be skipped)**

- The celebrity exposure effect is consistent regarding **political donations**. The effect holds both at the extensive (the donation probability) and intensive (the donation amount) margin.
- In terms of **heterogeneous effect**, the effect is larger in states having fewer restrictions on who can vote and where non-registered Republican voters can participate.
- Besides, the effect is concentrated in historically Democratic counties. The impact of the program on voting appears to be due, at least in part, to the mobilization of voters who were not traditionally Republican.
- When an analysis is restricted only for California, where Reagan had previously served as governor, the effect is insignificant.
- The results indicate **the political premium of media exposure is partially tied to the voters' lack of prior knowledge of the candidate. The effect declined as the candidate was regarded more as a politician**. This is consistent with rational learning.



# Mechanism exploration via individual-level data

- To examine the underlying mechanisms of the effect of celebrity exposure, the author uses individual-level data from the American National Election Studies.
- The individual-level data allows to use not only **locations** but also **birth cohorts** as a proxy of exposure to G.E. Theater. Because G.E. Theater was an evening program targeted toward adults, individuals who were born relatively later serve as a control group since they were children or unborn when it broadcast.
- The **county-cohort treatment** lets the empirical framework be analogous to a **difference-in-differences** strategy.
- The effect of celebrity exposure on political support could stem from the channel of **name recognition** alone or through persuasion based on other factors.

# Results

- The significance of name recognition depends on voter characteristics. For politically uninformed voters, *G.E. Theater* raised Reagan's name recognition, whereas the effect is not significant for politically informed voters.
- For both groups, exposure to *G.E. Theater* led to a **more favorable evaluation** of Reagan. This suggests *G.E. Theater* had the capacity to induce a positive assessment of Reagan, independent of name recognition alone.
- Voters who were more likely to watch the program than not tend to attribute their decision to vote for Reagan to his **personal characteristics** not to his political ability, or standing within the party.