Can the media spur startup activity?
Evidence from the television show "Shark Tank"

ANGELINO VICEISZA

SPELMAN, NBER, STANFORD HOOVER

🐦 @aviceisza

with David Robinson [Duke, NBER]

Motivation

Motivation

1. Literature 1: What stimulates entrepreneurship? E.g.:
   1.1 Behavioral characteristics (grit, risk) and demographics (age).
   1.2 Skills that can be taught (business management, soft skills).
   1.3 Constraints (finance, startup capital).
   1.4 Regulation (immigration, antitrust).
   1.5 Policies such as business training have had mixed effectiveness
       (McKenzie and Woodruff 2014 and Fairlie et al. 2015).

2. Literature 2: What are the impacts of the media? E.g.:
   2.1 Demand for content (Gentzkow et al. 2016).
   2.2 Demand for entertainment (DellaVigna and La Ferrara 2016).

3. This paper brings these literatures together. Towards the end,
   we will discuss where this work fits into select prior literature,
   particularly on media impacts.

Research question and context

1. Does watching entrepreneurs pitch their ideas to investors spur startup activity? Through what mechanisms? E.g.
   1.1 Seeing others who look like you (role models).
   1.2 Seeing others succeed (information, beliefs).

2. To address this question, we look at how lagged Nielsen ratings at the designated market area (DMA) level over time predict a variety of entrepreneurship outcomes.
   2.1 A DMA comprises a collection of US counties.

3. The show and its popularity
   3.1 Show in which entrepreneurs pitch to angel investors "sharks".
   3.2 First aired on August 9, 2009 and in its 12th season.
   3.3 Several Primetime Emmy and Critics Choice Awards.
   3.4 Average viewership at national level: 4.81-9.13 million viewers.
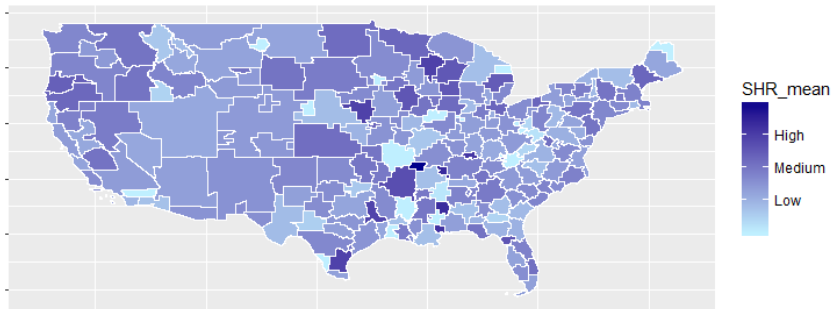   3.5 Geographic distribution of Nielsen ratings over time.
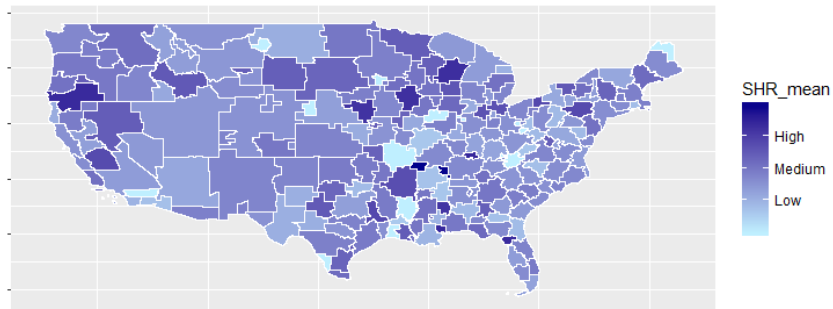
ST viewership (2010)
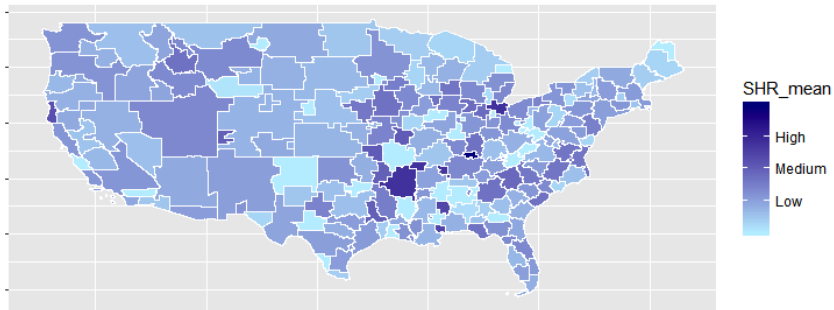
ST viewership (2011)
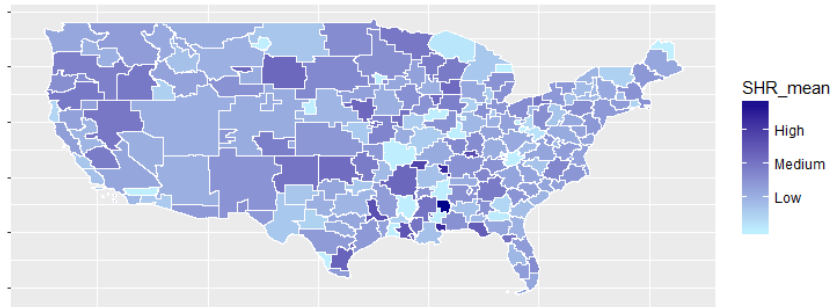
ST viewership (2012)

ST viewership (2013)

ST viewership (2014)
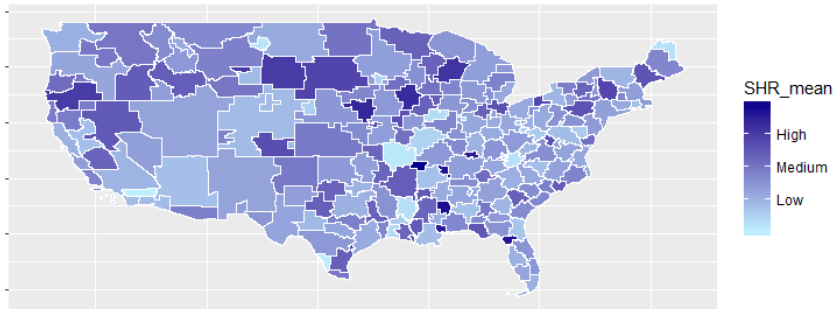
ST viewership (2015)
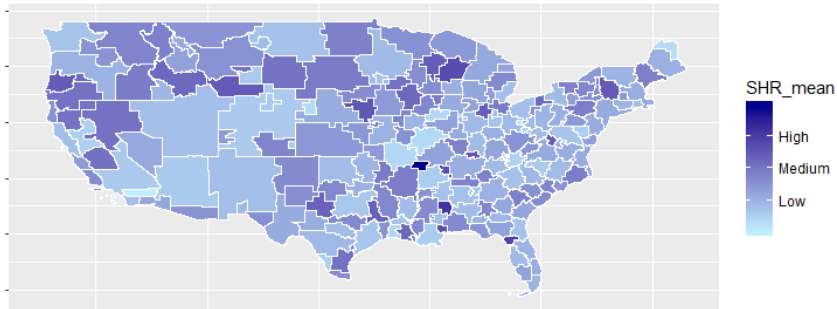
ST viewership (2016)
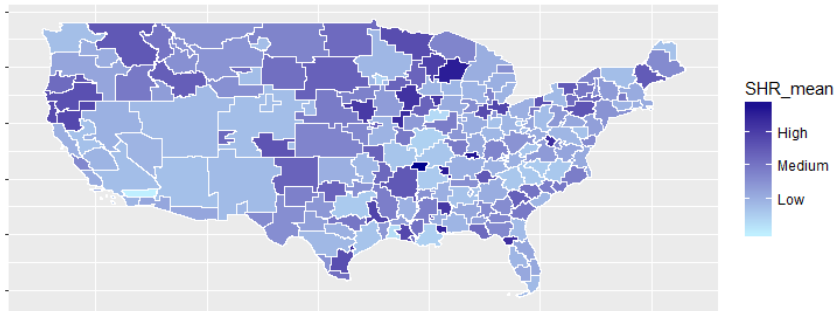
Empirical strategy

Empirical strategy

$$Y_{dt} = \beta_0 + \beta_1 \widehat{SHR}_{dt-1} + \gamma X_{d\tau} + \alpha_t + \alpha_d + \varepsilon_{dt} \qquad (1)$$

$$SHR_{dt-1} = \pi_0 + \pi_1 NBA_{dt-1} + \gamma X_{d\tau} + \alpha_t + \alpha_d + \epsilon_{dt-1} \qquad (2)$$

d	$=$	DMA
t	$=$	week
τ	$=$	year
Y	$=$	outcome variable of interest
SHR	$=$	Nielsen's SHR rating, which is the number of viewers scaled by the number of TV households watching TV at the time
NBA	$=$	number of ratings in a week where ST occurs on the same day as the NBA game for a DMA, where data come from basketball-reference.com
X	$=$	a set of (DMA,year)-level control variables
α_t	$=$	week fixed effects
α_d	$=$	DMA fixed effects

NBA games as an instrument

1. Under ideal conditions, an experiment would have randomly exposed viewers to the show. However, the show aired from one day to another across all of the US. Our instrument induces random variation in the number of viewers watching a ST episode.

2. Let us consider an example
   2.1 Suppose there are two DMAs, LA and DC.
   2.2 For a fixed week in which ST aired, suppose Lakers played on the day of the show, but Wizards did not.
   2.3 Less viewers in LA are going to watch ST than DC, thus lowering the ST rating in LA.
   2.4 This is the variation we are exploiting across DMAs and time.
   2.5 Recall that the DMA fixed effects control for fixed differences in ST popularity between LA and DC.→

Con/pro

1. Con
   1.1 Need to match on DMAs, so only applies "exactly" to a subsample of 27 DMAs.
   1.2 Cannot match on timestamp:
      1.2.1 Not available for all ST ratings.
      1.2.2 Given NBA games typically occur in primetime, seems reasonable to assume overlap.

2. Pro
   2.1 One of the IVs that has been employed in media impact studies such as Kearney and Levine (2015) is popularity of the network's slot in the region prior to the new show being offered.
   2.2 Relative to such IVs, we exploit variation across time and geography.

Outcomes and controls

Time period: 2010-2016.

Outcomes $\rightarrow$

$Y_t^1 =$ advice-seeking at SBA centers (week).

$Y_\tau^2 =$ firm counts from NETS (annual).

$Y_t^3 =$ patent applications and grants from USPTO (week, ..., annual).

Controls (ACS, annual)

$X_\tau^1 =$ weighted average of DMA-county's median income, weights based on # of HHs in a county.

$X_\tau^2 =$ DMA unemployment level.

$X_\tau^3 =$ DMA home ownership level.

Results

Advice-seeking and mechanisms

Outcome	Advice-seeking (e.g., in person)	Business creation (e.g., new firms)	Innovation (e.g., patents)
Source	*SBA*	*NETS*	*USPTO*

REQUIRES MORE EFFORT

1. 16% increase in those seeking startup assistance.
    1.1 **Type of counseling:** Impact is specific to the type of counseling, i.e., startup assistance versus finance, marketing, or business planning. $\rightarrow$
    1.2 **Role model:** Impact is more pronounced for women when the number of women entrepreneurs on the show is higher. $\rightarrow$
    1.3 **Information/beliefs:** Impact is largely driven by weeks in which the number of entrepreneurial teams that get offers is above the median. $\rightarrow$

Firm creation and patents

Outcome	Advice-seeking (e.g., in person)	Business creation (e.g., new firms)	Innovation (e.g., patents)
Source	*SBA*	*NETS*	*USPTO*

REQUIRES MORE EFFORT

1. No impacts on firm creation. $\rightarrow$
2. No impacts on patent applications/grants. $\rightarrow$

Conclusions

Conclusions

1. We find that ST viewership is:
   1.1 Positively associated with advice-seeking/startup counseling.
   1.2 This effect depends on the show's content, specifically:
      1.2.1 Women are more likely to seek counseling when a higher number of women entrepreneurs appear on the show.
      1.2.2 Advice-seeking is more likely when more entrepreneurial teams are successful (above median number of offers).
   1.3 Not associated with other counseling, firm creation, or patents.

2. Related literature
   2.1 Bjorvatn et al. (2020): Field experiment in Tanzania where youth entrepreneurs increased business interest ($\sim 21\%$) but no impacts on firm creation.
   2.2 Porter and Serra (2020): Field experiment in US on women choosing economics as a major after exposure to role models.
   2.3 Bennett and Chatterji (2018): Survey in US finds that $< 50\%$ of those who considered starting a business take even lowest cost steps (e.g., searching the Internet, speaking with a friend).

Extras

Outcome	Advice-seeking (e.g., in person)	Business creation (e.g., new firms)	Innovation (e.g., patents)
Source	*SBA*	*NETS*	*USPTO*

REQUIRES MORE EFFORT

Instrument in relation to additional media literature

1. DellaVigna and La Ferrara (2016): Demand for entertainment – "edutainment".

   1.1 Direct effect of ST on E&I.

   1.2 Indirect effect of ST on E&I, e.g., moving the audience away from what they would have been doing otherwise.

   1.3 Anecdotal evidence, e.g., from IMDB reviews, suggests that viewers watch ST at least partly for entertainment purposes.

   1.4 People were in principle watching ST or an NBA game.

   1.5 This is also why we restrict to ABC data. At CNBC:

      1.5.1 Viewers may be seeking out "financial" media for learning.

      1.5.2 Repeats of the show potentially at different times of the day.

      ↩

First stage of IV (weekly level)

	SHR_{dt-1}
NBA_{dt-1}	-0.1330***
	(0.0415)
FE: DMA	X
FE: week	X
Controls	X
Cluster	Week
N	6413
Mean	5.921
SD	2.321
F	10.163
R^2	0.698

1. Sample is restricted to 27 DMAs with associated NBA teams
2. Dependent variable: average of the ratings for DMA d in week $t-1$
3. Instrument: Ratings in week $t-1$ where ST occurs on the same day as the NBA game for DMA d
4. DMA-year level controls: median income, unemployment rate, home ownership rate

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Advice-seeking by primary counseling area (SBA) – IV

	All	Start-up Assist.	Business Plann.	Finan. Capital	Marketing
$\widehat{SHR}_{dt-1}$	0.0081	0.0073**	-0.0004	-0.0000	-0.0008
	(0.0094)	(0.0036)	(0.0020)	(0.0019)	(0.0020)
FE: DMA	X	X	X	X	X
FE: year					
FE: week	X	X	X	X	X
Cluster	Week	Week	Week	Week	Week
Controls	X	X	X	X	X
N	6413	6413	6413	6413	6413
Mean	0.165	0.044	0.022	0.020	0.020
SD	0.065	0.025	0.013	0.012	0.012

1. All = Counseling cases independent of primary assistance area per thousand HHs
2. Start-up Assist. = Counseling cases where primary area is 'Start-up Assistance' per thousand HHs
3. Business Plann. = Counseling cases where primary area is 'Business Plan' per thousand HHs
4. Finan. Capital = Counseling cases where primary area is 'Financing/Capital' per thousand HHs
5. Marketing = Counseling cases where primary area is 'Marketing/Sales' per thousand HHs
6. Instrument = Ratings in week $t-1$ where ST occurs on the same day as the NBA game for DMA d
7. DMA-year level controls: median income, unemployment rate, home ownership rate
8. 1 pp increase in SHR_{dt-1}, increases Startup Assistance by 0.0073/0.044=16%. 1 SD (increase) of SHR_{dt-1} is 2.32.

Advice-seeking by women depending on number of women entrepreneurs on ST – OLS

	Start-up counseling for women$_{dt}$
SHR_{dt-1}	-0.0000
	(0.0001)
X women$_{t-1}$	0.0001***
	(0.0000)
FE: DMA	X
FE: year	
FE: week	X
Cluster	Week
Controls	X
N	14758
Mean	0.023
SD	0.019
R^2	0.605

1. Start-up counseling for women$_{dt}$ = Counseling cases for women at DMA d in week t per thousand HHs
2. women$_{t-1}$ = the number of women entrepreneurs on ST in week $t-1$
3. X women$_{t-1}$ = interaction of women$_{t-1}$ and SHR_{dt-1}
4. DMA-year level controls: median income, unemployment rate, home ownership rate

$\longleftarrow$

Advice-seeking depending on number of offers on ST – OLS

	Start-up counseling$_{dt}$
$SHR_{dt-1}[\text{offers}_{t-1} < 2]$	-0.0003
	(0.0002)
$SHR_{dt-1}[\text{offers}_{t-1} = 2]$	0.0001
	(0.0002)
$SHR_{dt-1}[\text{offers}_{t-1} > 2]$	0.0002**
	(0.0001)
FE: DMA	X
FE: year	
FE: week	X
Cluster	Week
Controls	X
N	14758
Mean	0.055
SD	0.039
R^2	0.677

1. Start-up counseling$_{dt}$ = Counseling cases at DMA d in week t per thousand HHs
2. offers$_{t-1}$ is number of teams on ST in week $t - 1$ that receive at least one offer. 2 is the sample median of this variable
3. $SHR_{dt-1}[\text{offers}_{t-1} < 2]$ is the interaction of SHR_{dt-1} and a dummy variable that equals 1 if offers$_{t-1}$ is less than 2. Other interactions defined analogously
4. DMA-year level controls: median income, unemployment rate, home ownership rate

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New businesses (NETS) – IV

	New firms$_{d\tau}$	New proprietorships$_{d\tau}$	New firms growth$_{d\tau}$
$\widehat{SHR}_{d\tau-1}$	163.2098	20.5457	0.4083
	(553.7972)	(61.4868)	(1.3096)
FE: DMA	X	X	X
FE: year	X	X	X
FE: week			
Cluster	Robust	Robust	Robust
Controls	X	X	X
N	81	81	81
Mean	419.906	12.602	-0.404
SD	212.462	8.646	0.165

1. New firms = New firms per million HHs
2. New proprietorships = New sole proprietorships per million HHs
3. New firms growth = growth rate in the number of new firms, i.e., (new firms this year - new firms last year) / new firms last year
4. $SHR_{d\tau-1}$ = average of weekly ratings for DMA d in year $\tau - 1$
5. Instrument = Average of weekly instruments for DMA d in year $\tau - 1$
6. DMA-year level controls: median income, unemployment rate, home ownership rate

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Patents (USPTO) – IV

	New patents$_{dt}$	New applications$_{dt}$
$\widehat{SHR}_{dt-1}$	-0.6910	0.1507
	(0.4235)	(0.2555)
FE: DMA	X	X
FE: year		
FE: week	X	X
Cluster	Week	Week
Controls	X	X
N	6169	6169
Mean	1.458	1.323
SD	1.833	1.225

1. New patents = Newly granted patents per thousand HHs
2. New applications = New patent applications per thousand HHs
3. Instrument = Ratings in week $t-1$ where ST occurs on the same day as the NBA game for DMA d
4. DMA-year level controls: median income, unemployment rate, home ownership rate

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More details on select related literature

1. Bjorvatn et al. (2020)
    1.1 Field experiment in Tanzania, youth were encouraged to watch an entrepreneurship show.
    1.2 Some impact on business interest ($0.123/0.573 = 21\%$).
        1.2.1 Outcome: Dummy for participant choosing training in entrepreneurship as preferred free week-long training course.
    1.3 No impact on business ownership.
    1.4 Substitution away from education.
    1.5 The first two findings resemble ours.

2. Peter and Pierk (2020)
    2.1 Staggered introduction of ST across countries to assess impact. No Nielsen ratings data.
    2.2 14.6% increase in new firms in the short run.
    2.3 Viewers seem to learn how to pitch business ideas, where learning is proxied by initial level of education in a country.
    2.4 Their findings do not resemble ours. ↩