Advertising Exposure and Portfolio Choice: Estimates Based on Sports Sponsorships

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AFA: Households and Portfolio Choice
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Motivation

$200 billion spent annually on advertising by US-listed companies

- Main Interpretation: Firms advertise to signal product quality and convey the message that their type is high [Milgrom and Roberts (1986)]

Can advertising increase the demand for a company's stock?

- *Positive correlations* between the advertising expenditure of firms in Compustat and *aggregate retail stock investment* [Grullon et al. (2004), Lou (2014)]
- No micro-evidence, no causality

Identification Challenges for Advertising

1. Need for data on the **exposure of investors** to commercials
   - COMPUSTAT firm advertising expenditure is too crude
   - Advertising vs. Local Bias:
     Household portfolios are heavily loaded on stocks with headquarters near where they live
2. Need for an **instrument**: Firms *optimally* decide in which geographical regions to increase their marketing activities [Shapiro (2017), Sinkinson and Stark (2017)]

Importance of Advertising

1. A costly signal for stock valuation under adverse selection
   - Corporate Financing: IPOs, M&A's [Rock (1986)]
2. Familiarity heuristic [Heath and Tversky (1991), Huberman (2001)]
   - Product familiarity breeds investment
   - Yet, an outcome of latent exposure to advertising
3. Firm recognition [Merton (1987)]

This Paper: Identification Based on *Sports Sponsorships*

Sponsorships to major teams are a good *proxy* for *high local AD*

- 10% of Compustat's total AD is on sports every year [IEG]
- Firms engaging in sports marketing spend 30% of their total AD budget on sports sponsorships [Nielsen data from the SportsBusiness Journal]
  - That amount is typically allocated to 4-5 different cities

Construct a *new* dataset of **publicly traded sports sponsors** in the US and merge it with the **Odean retail investment data**

- Which firms sponsors which major team in which city
- Compare a household's investments in its *city's sports sponsors* vs. its investments in *other stocks*

+ NEW instrument for the firm AD expenses in local markets

Instrument for Firm AD Expenses in Local Markets

*Firms with a **large size** or **high industry advertising expenses** are inclined to spend more advertising money in **MSAs with a major professional sports team***

- San Antonio vs. Hampton Roads (similar demo's)
  - SATX has the Spurs, HR has no major prof. team
  - Firms with a high AD propensity are expected to utilize the Spurs' platform and spend more on AD
- Show with Balance Tests [Roberts and Whited ('13)] that other MSA features are not predicted by the presence of a major prof. sports team
- Exclusion Restriction: The Spurs in SATX do *not* change subjective expectations about stocks with certain features (e.g., high advertising propensity) for any reason other than the actual higher AD

Outline of Results

The sports sponsorships of a stock in a investor's MSA increase his portfolio weight on that stock by **46% relative to the average**

- Portfolio effects are **2-times higher than local bias**
- The **recognizability** of the stock from the brand matters
  - When it is not taken into account, the AD effect decreases by 1/3 and local bias becomes stronger
- **No higher returns** for the household portfolios
  [like the locas bias in Seasholes and Zhu (2010)],
  so advertising *raises households' latent subjective expectations*
- *Distant stocks* that sports sponsor could be preferred to *local stocks that do not* (holds for the threshold of 250 miles)

Constructing the *Sports Advertisement* Variable

Digitization of the Team Marketing Report's Sports Sponsorship Factbook, based on CRSP's *historic* CUSIP files

- Detailed description of sports marketing activities (*Sponsorship*, *Advertising*, *In Stadium-Signage*) of *every sponsor in every sports team* at the **brand-level**
- Focus on ***Primary Sports Sponsors*** ("the most significant and active sponsors") of teams in MLB, NBA, NFL, NHL
- Aggregate firm sports marketing activities **at the MSA level** $SportsAd_{j,c} = 1$ if firm j sponsors a major team in MSA c

Publicly Traded Sports Sponsors over Time

	1992-1993	1993-1994	1994-1995	1995-1996
Total Number of Stocks	198	207	219	215
Industry				
Rtail	32	37	36	39
Food	23	30	28	24
Finan	19	19	32	31
SvcOth	27	28	31	30
Oil	18	17	17	17
Trans	15	16	16	17
MSA Sponsorships per Stock				
Average Number	4.46	4.63	4.92	4.74
Median Number	3	3	3	3
Average Distance (miles)	756.31	714.14	785.34	748.7

Other Sources

- Household Investment Data:
  - Large national discount broker [Barber and Odean (2000)]
  - Unbalanced panel covering 1991-1996 at a monthly frequency
  - Portfolio weights on common stocks (based on CUSIP)
- MSA Demographics:
  - Traditional Demo's from BLS, BEA and FHFA
  - Start with 82 MSAs with Population $\geq 500,000$
- Stock Financial Characteristics:
  - Fama-French factors at a monthly frequency
  - Accurate ADDZIP's from EDGAR, WOW, COMPHIST
  - Focus on stocks *ever* being in Russell 1000

On average, in every month, 5,236 households (9,757 unique) living in 82 MSAs and choosing from 1,224 (1,397 unique) stocks

Advertising and Local Bias among Households

	Average % of HH Portfolio (A)	Average % of Market Portfolio (B)	Difference (A-B)
SportsAd	13.3	7.4	5.9
Local250	33	13.5	19.5
Local100	25.6	7.3	18.3
SportsAd $\times$ Local100	5.7	1.7	4
SportsAd $\times$ NoLocal100	7.6	5.7	1.9
SportsAd $\times$ Local250	6.8	2.6	4.2
SportsAd $\times$ NoLocal250	6.5	4.8	1.7

Model 1: Non-linear Factor-Based Portfolio Weights

Follow closely the work of Branikas, Hong, and Xu (2018)

- Household i, residing in MSA c, decides *how much* to invest in stock j according to a factor rule *censored at zero*:

$$w_{i,c,j} = (\alpha + \beta SportsAd_{c,j} + \boldsymbol{\gamma} \boldsymbol{X}_{i,c,j} + \epsilon_{i,c,j})^{+}$$

- $(\cdot)^{+} \equiv \max\{0, \cdot\}$: *extensive* and *intensive* margin
- $\boldsymbol{X}_{i,c,j}$: vector of controls including:
  - household-stock *distance* at the ZIP-code level
  - stock j's characteristics (e.g. Fama-French factors)
  - household i and MSA c's demographics
- $\epsilon_{i,c,j}$: household i's *latent* demand for stock j
  - like/dislike the stock's BOD or products?
  - normal errors conditional on all observables (Tobit)

Model 2: Linear Portfolio Under-diversification

Linear *excess* portfolio weights relative to the market [Goetzmann and Kumar ('08), Brandt, Santa-Clara, and Valkanov ('09)]

$$\frac{w_{i,c,j} - w_j^{VW}}{w_j^{VW}} = \alpha^{dev} + \beta^{dev} SportsAd_{c,j} + \boldsymbol{\gamma}^{dev} \boldsymbol{X}_{i,c,j} + \epsilon^{dev}_{i,c,j}$$

w_j^{VW}: stock j's weight in market's value-weighted portfolio

SportsAd's **endogeneity**: Companies choose *optimally* the MSAs where they will increase their AD – *catering* to regional investor or cumstomer bases

First-Stage Regression

- Linear probability model that predicts stock j's sports sponsorship in MSA c:

$$SportsAd_{c,j} = \kappa + \lambda\, Sportsteam \times LogPropAd_j + \boldsymbol{\mu}\boldsymbol{X}_{c,j} + \omega_{c,j}$$

where $PropAd_j \equiv Size_j \times InduAd_j$

- Focus on 38 selected MSAs
  1. MSAs which *had* a major professional sports team and population and less than 2M population
  2. MSAs which did *not* have a major team, but their local governments *attempted to negotiate* with the sports franchise owners a team relocation in their area [Euchner (1993) and Danielson (1997)]

On average, in every month, 1,526 households (2,806 unique)

Balance Test of MSA Demo's Based on *Sportsteam*

Panel A: Split of the Original 82 MSAs				
Averages	*Sportsteam* = 0	*Sportsteam* = 1	Difference	*t*-statistic
IncPerCap (thousand $)	21.67	23.98	2.31	3.27
HPI	98.84	98.53	-0.31	-0.28
Unemp	6.19	5.91	-0.28	-0.61
Pop (million)	0.85	3.21	2.36	4.83
Average Number of MSAs	44	38		
Panel B: Split of the Selected 38 MSAs				
IncPerCap (thousand $)	22.32	22.82	0.5	0.42
HPI	97.82	96.81	-1.01	-0.26
Unemp	5.43	5.41	-0.02	-0.05
Pop (million)	1.09	1.33	0.24	1.57
Average Number of MSAs	21	17		

Balance Test of Household Demo's Based on *Sportsteam*

	Original 82 MSAs		Selected 38 MSAs	
	Independ. Var. *Sportsteam*		Independ. Var. *Sportsteam*	
Depend. Var.	Coef. Est.	*t*-statistic	Coef. Est.	*t*-statistic
LogAge	0.011	0.83	-0.004	-0.21
LogFamSize	-0.005	-0.21	-0.016	-0.5
Male	-0.022	-1.98	-0.007	-0.51
Married	-0.035	-1.79	-0.008	-0.2
LogIncome	0.032	0.91	0.008	0.07
Professional	0.006	0.22	0.013	0.33
Managerial	-0.011	-0.56	-0.018	-0.72
SalesSvc	-0.011	-0.86	-0.002	-0.15
WhiteCollar	0.023	3.04	0.01	0.89
BlueCollar	-0.007	-0.72	-0.002	-0.14

First-Stage Linear Probability Model of *SportsAd*

Sportsteam × LogPropAd	0.002	0.002
	[4.93]	[5.13]
LogPropAd	0.123	0.09
	[3.62]	[0.96]
Sportsteam	-0.015	-0.013
	[-3.46]	[-3.68]
LogDistance	YES	YES
Stock Financial Char's	YES	YES
Stock Industry FE	YES	YES
Other MSA Demo's	YES	YES
Other MSA Demo's × LogPropAd	**NO**	**YES**

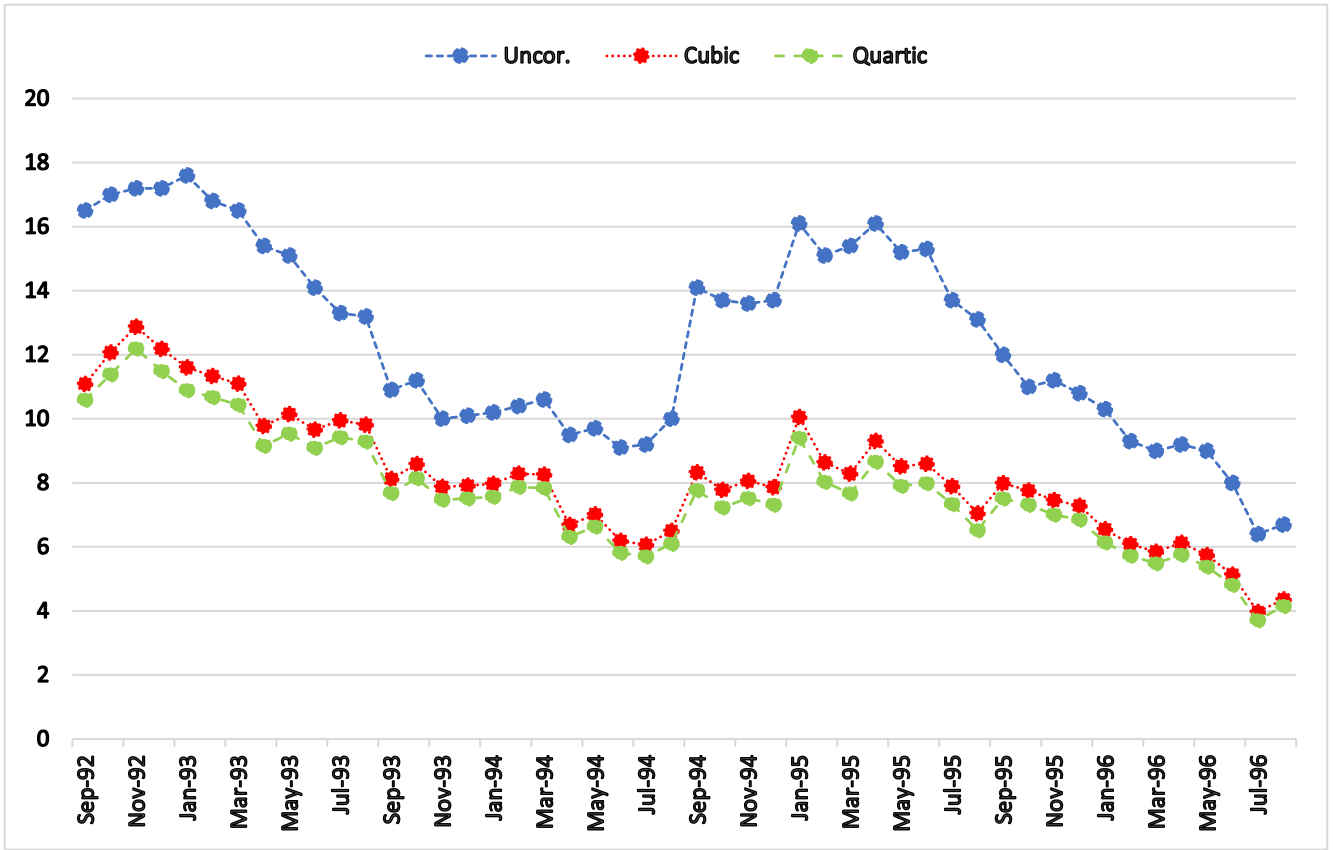
Average monthly coefficient estimates and *t*-stats based on 2-way clustered se's at the levels of the stock and the MSA

Tobit Estimation of Portfolio Choice with Control Function

	Uncor.	Cubic Ψ's	Quartic Ψ's
SportsAd	0.125	0.082	0.078
	[5.07]	[6.08]	[7.13]
LogDistance	YES	YES	YES
Stock Financial Char's	YES	YES	YES
Stock Industry FE	YES	YES	YES
HH Demo's	YES	YES	YES
LogPropAd	YES	YES	YES
Sportsteam	YES	YES	YES
Other MSA Demo's	YES	YES	YES
Other MSA Demo's × LogPropAd	YES	YES	YES

Average monthly coefficient estimates and *t*-stats based on 2-way clustered se's at the levels of the household and the MSA of the household

Coefficient Estimates of *SportsAd* Over Time in Tobit Regressions of Household Portfolio Weights



IV Regressions of *Excess* Portfolio Weights

	OLS	IV
SportsAd	2.313	1.408
	[5.28]	[2.91]
LogDistance	YES	YES
Stock Financial Char's	YES	YES
Stock Industry FE	YES	YES
HH Demo's	YES	YES
LogPropAd	YES	YES
Sportsteam	YES	YES
Other MSA Demo's	YES	YES
Other MSA Demo's $\times$ LogPropAd	YES	YES

Average monthly coefficient estimates and t-stats based on 2-way clustered se's at the levels of the household and the MSA of the household

Do the brands *display* the stock name (or logo)?

	Panel A: Non-linear Portfolio Choice Model			
	Uncor.	Corrected	Uncor.	Corrected
SportsAdRec	0.139	0.104		
	[5.61]	[8.2]		
SportsAdUnrec			0.075	0.037
			[1.06]	[1.46]
Full Controls	YES	YES	YES	YES
	Panel B: Linear Portfolio Under-Diversification Model			
	OLS	IV	OLS	IV
SportsAdRec	3.056	1.627		
	[5.7]	[3.3]		
SportsAdUnrec			0.322	0.139
			[0.71]	[0.38]
Full Controls	YES	YES	YES	YES

Portfolio Choice Regressions In *Finer* Subsamples of MSAs

Omit MSAs with high *political power*

- Might increase the chances for a major prof. team
- Certain stocks may contribute with donations to campaigns
- Households could respond by buing these stocks

	MSAs with Aggregate Campaign Contributions *Not* in the Top 10		MSAs with POP<1.5M	
	Panel A: Non-linear Portfolio Choice			
	Uncor.	Corrected	Uncor.	Corrected
SportsAd	0.168	0.086	0.149	0.065
	[4.19]	[7.4]	[3.96]	[5.28]
Full Controls	YES	YES	YES	YES

Average monthly coefficient estimates and *t*-stats based on 2-way clustered se's at the levels of the household and the MSA of the household

Advertising and Local Bias Interaction

- *Local* stocks have distance *less than 250 miles*
- Household's *location choice is taken as given* (no correction for selection)
- Advertising refers to directly to sports sponsorships where the stocks can be *directly* recognized

	Panel A: Non-linear Portfolio Choice	
	Uncor.	Corrected
DistNAd	-	-
	[-]	[-]
LocNAd	0.199	0.145
	[3.88]	[3.46]
DistAd	0.265	0.182
	[4.2]	[2.93]
LocAd	0.597	0.392
	[4.66]	[3.51]

Conclusion

Product advertising has a strong positive effect on household portfolio choice

- New dataset of publicly traded sports sponsors
- Identification from sports team presence and the advertising propensity of big firms in industries with big advertising expenses
- Larger portfolio effects than local bias