Basic cable network segmentation toward minorities and other niche audiences in the U.S.: An empirical study

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Motivations

- **Has multi-channel TV (cable/DBS…) realized its promised solution to the "Vast Wasteland" ?**
  - Price mechanisms
  - Targeted advertising
  - The radio and magazine models

- **What are limits to cable program segmentation to niche audiences, especially racial/ethnic minorities?**
  - Some obviously dramatic results: 100's of channels, many with sharply segmented content

but….

Motivations

- **Limited amounts of race/ethnic-oriented programming**
- **Many are cheaply produced**
- **Average basic cable CPMs well below those of broadcast networks**
  - 2011-12 prime time averages:
    - Broadcast networks: $19.48
    - Cable networks: $10.60
  - The CBS Cable experience
- **Potential of internet video?**

Research questions

- **Part I: The determinants of cable TV ad (CPM) rates**

  (Adv. is 2/3 of basic cable network revenues)

  (1) Do low ratings, or low audience reach, limit ad rates?

  (2) Are ad rates higher/lower for (a) blacks/Hispanics, (b) demographic segments (age, income, etc.), (c) demographic homogeneity?

- **Part II: The Distribution of race/ethnic audiences**

  (1) Is Black/Hispanic viewing isolated….or evenly distributed?

  (2) What explains the black/Hispanic viewing distribution: programming content, or production quality?

Some literature

- **Targeted advertising:** Athey & Gans (2010); Bergemann and Bonatti (2011); Evans (2009); Anderson (2012)
- **Print media advertising rates:** Chandra (2009); Chandra & Kaiser (2011)
- **Television/radio advertising/ad rates:** Fournier & Martin (1983); Chipty and Snyder (1999)
- **Race/ethnic minority viewing/advertising.:** Wildman & Karamanis (1998); McDowell & Dick (2005)
- **Preference externalities:** Waldfogel (2003)**:** George & Waldfogel (2003); Wang and Waterman (2011)
- **Media (ideological) isolation:** Gentzkow & Shapiro (2011)

Data

- **Audience/advertising data for 78 to 97 basic networks in 2010 (annual averages by network; AC Nielsen)**
  - Avg. HHs delivered, including: total, black, Hispanic, gender, age income ; HHs reached; CPM rates; project total advertising
- **9 primary genres; black/Hispanic-specific content (NCTA)**
- **Programming costs; launch dates (Kagan Research)**
- **Tier position (% subs reached by basic vs. extra price tiers) (calculated from TV & Cable Factbook)**

Part I: CPM rate determinants

Basic empirical model

- (1) $CPM = \beta_0 + \beta_1 reach + \beta_2 rating + \beta_3 \text{age18-34} +$

$$\beta_4 \%Black + \beta_5 \%Hispanic + \beta_6 \%male +$$

$$\beta_7 \%income + \beta_8 \text{male-hhi} + \beta_9 agehhi +$$

$$\beta_{10} racehhi + \beta_{11} Genre\ dummies + error$$

Key variables

CPM-narrow **= actual cost-per-thousand HH for 30 second spot**

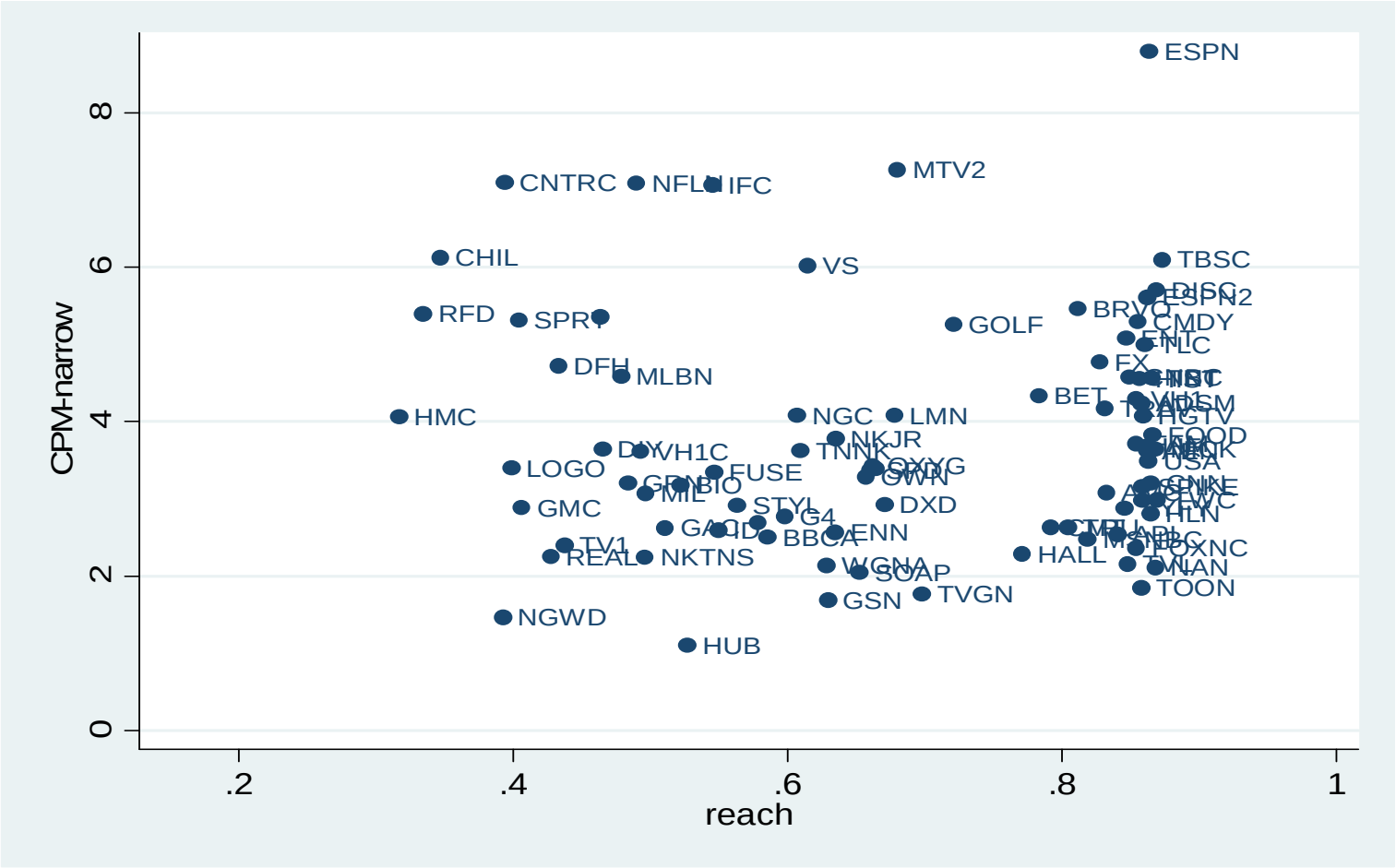
CPM-broad **= total adv revenue ($000)/average audience delivered**

reach **= HHs reached by the network/total TV HH**

rating **= average audience delivered/HHs reached by the network**

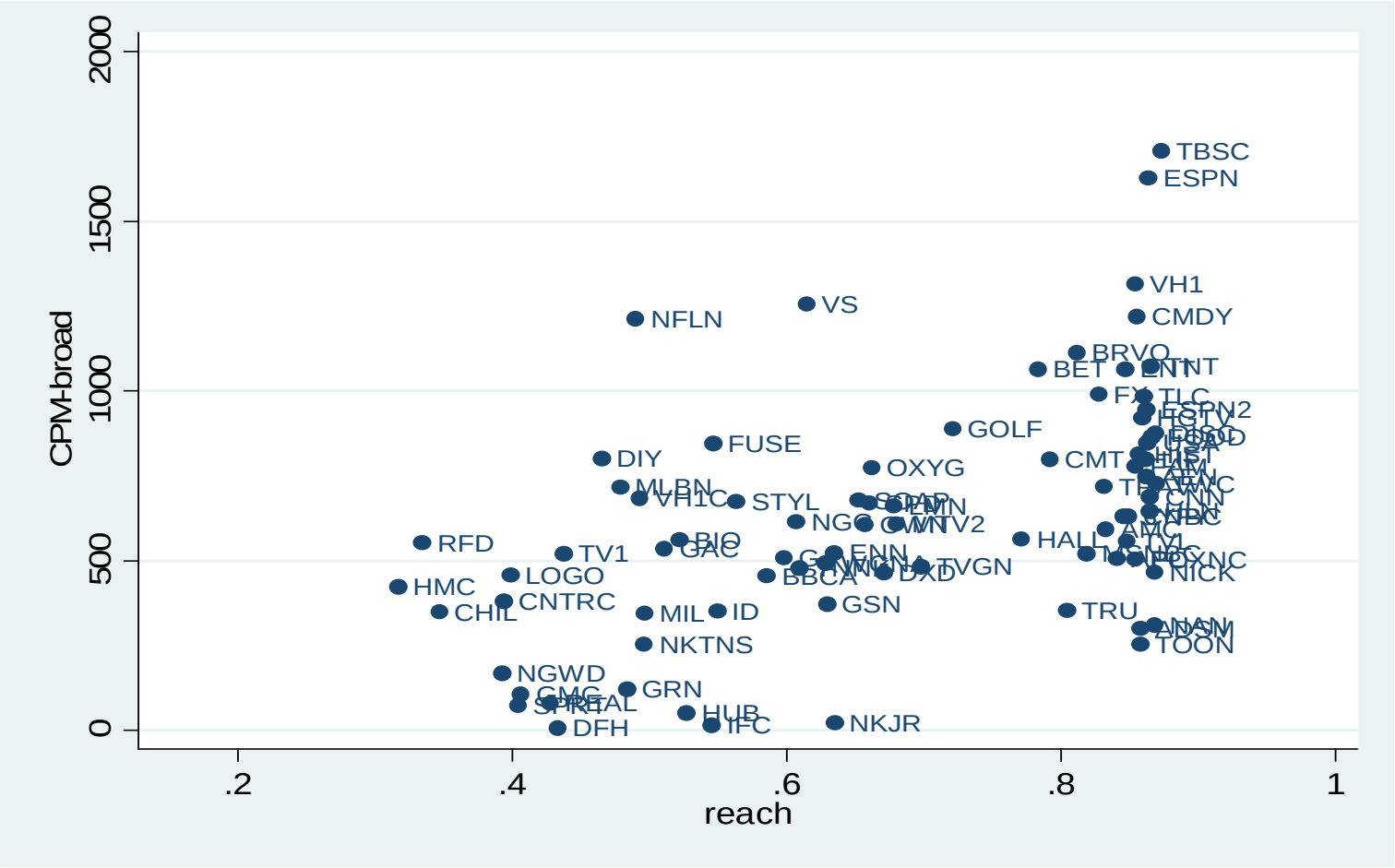
aatotal **= average total HHs delivered (*reach x rating*)**

Descriptive data; *CPM-narrow** v. *reach***



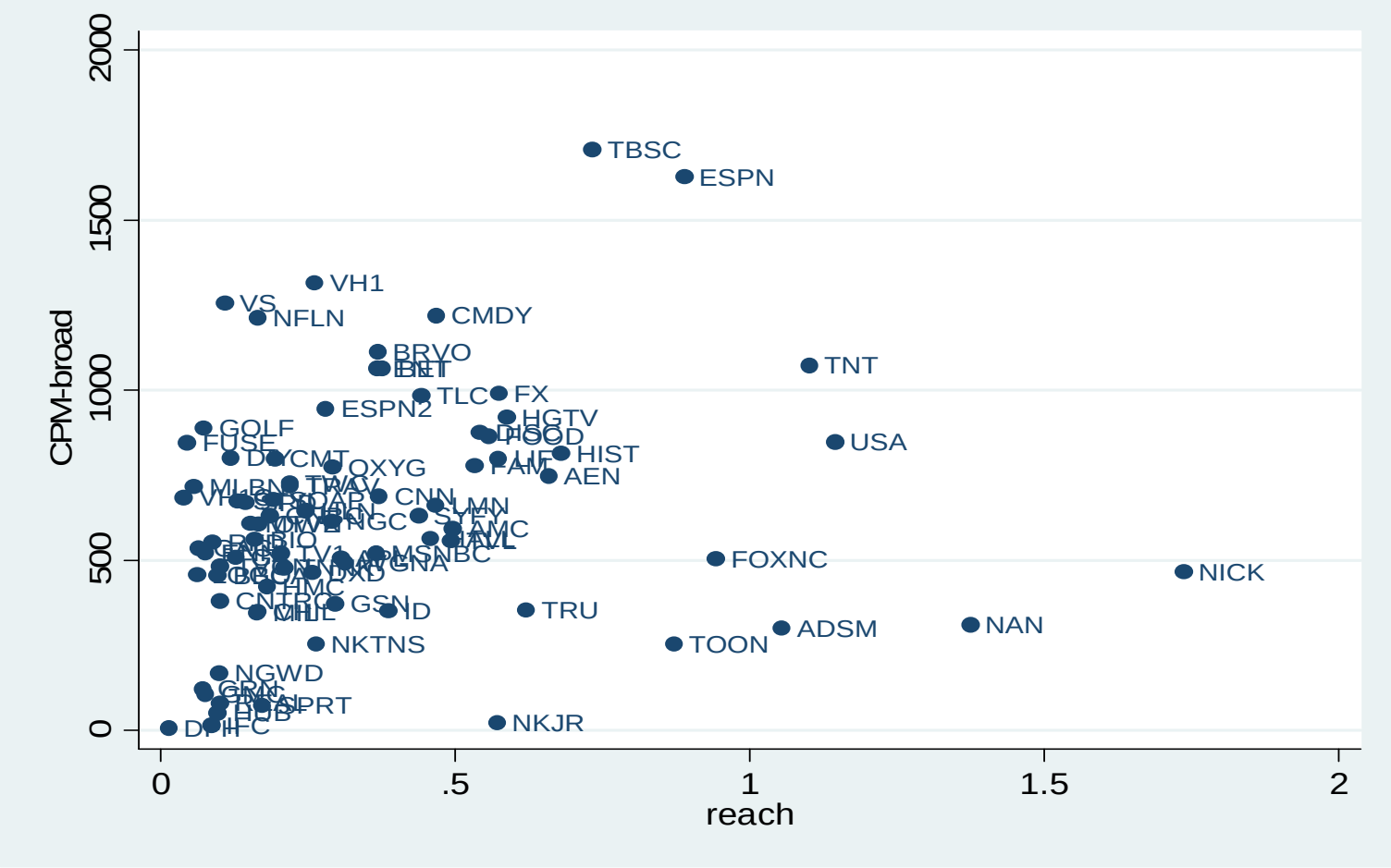
*** actual cost-per-thousand HH for 30 second spot ** % of TV HH that receive the network**

Descriptive data: *CPM-broad** v. *reach***



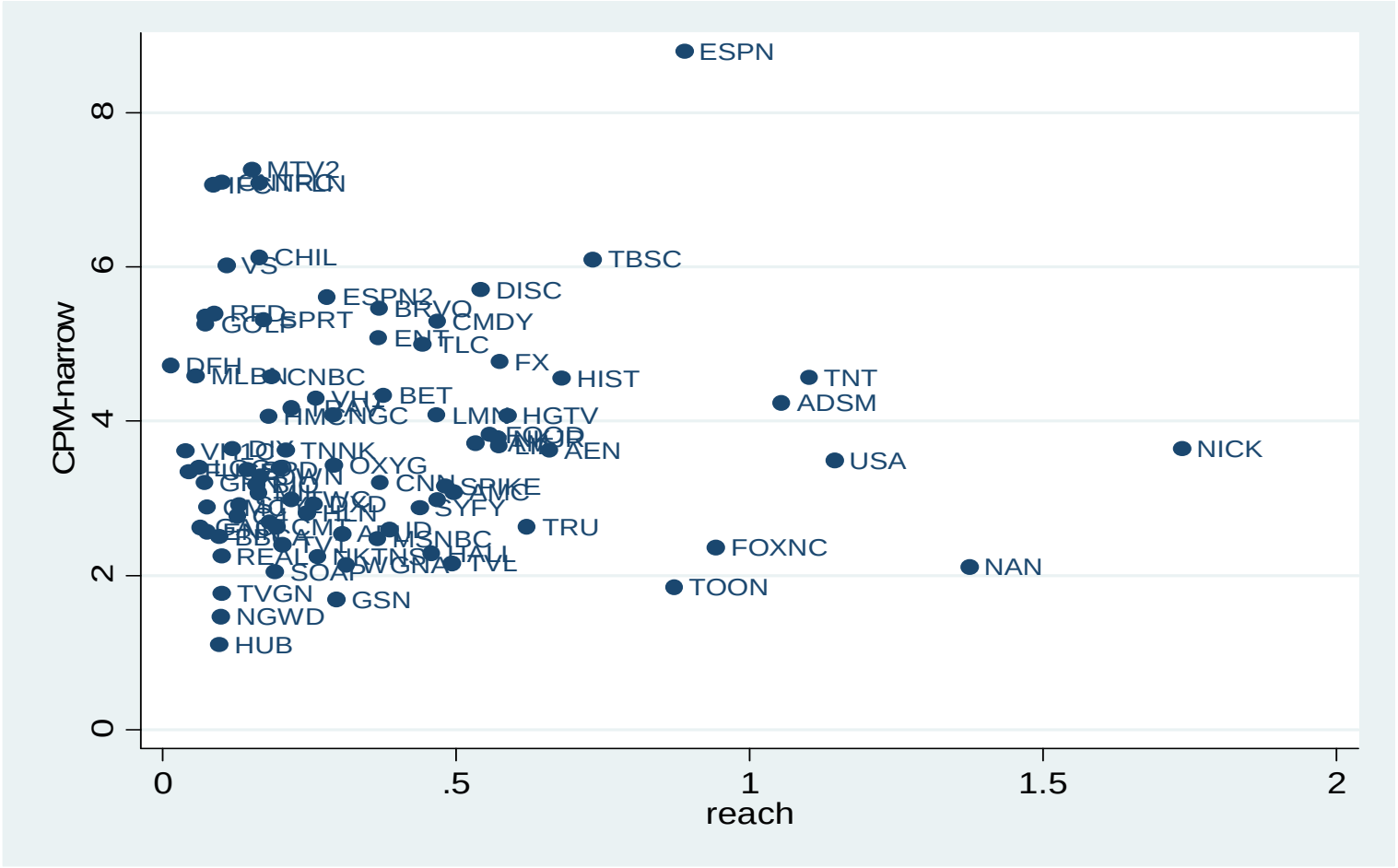
*** Total $ advertising sales/Avg. HHs delivered **HHs reached by the network/total TV HHs**

Descriptive data: *CPM-broad** v. *rating***



*** Total $ advertising sales/Avg. HHs delivered avg. ** % of HH reached that are watching**

Descriptive data: *CPM-narrow* v. rating***



*** actual cost-per-thousand HH for 30 second spot **avg. % of HH reached that are watching**

Estimation

❑ Models

- Dependent variables: *CPM-broad*; *CPM-narrow (log CPM-broad; log CPM-narrow).*
- Alternative forms of *reach* and *rating*: (*reach*, *reach*^{2}, *log reach*, *rating*, *rating*^{2}, *log rating; aatotal (reach* x *rating), log aatotal*
- Demographic variables, content dummies

❑ Methods

- OLS
- IV: *reach* and /or *aatotal* (*reach x rating*) instrumented on
  - *(a) progexp (programming cost), logage* (*network age*), *tier* (% of subs on widest available tier)
  - *(b) progexp, logage,*

CPM model results

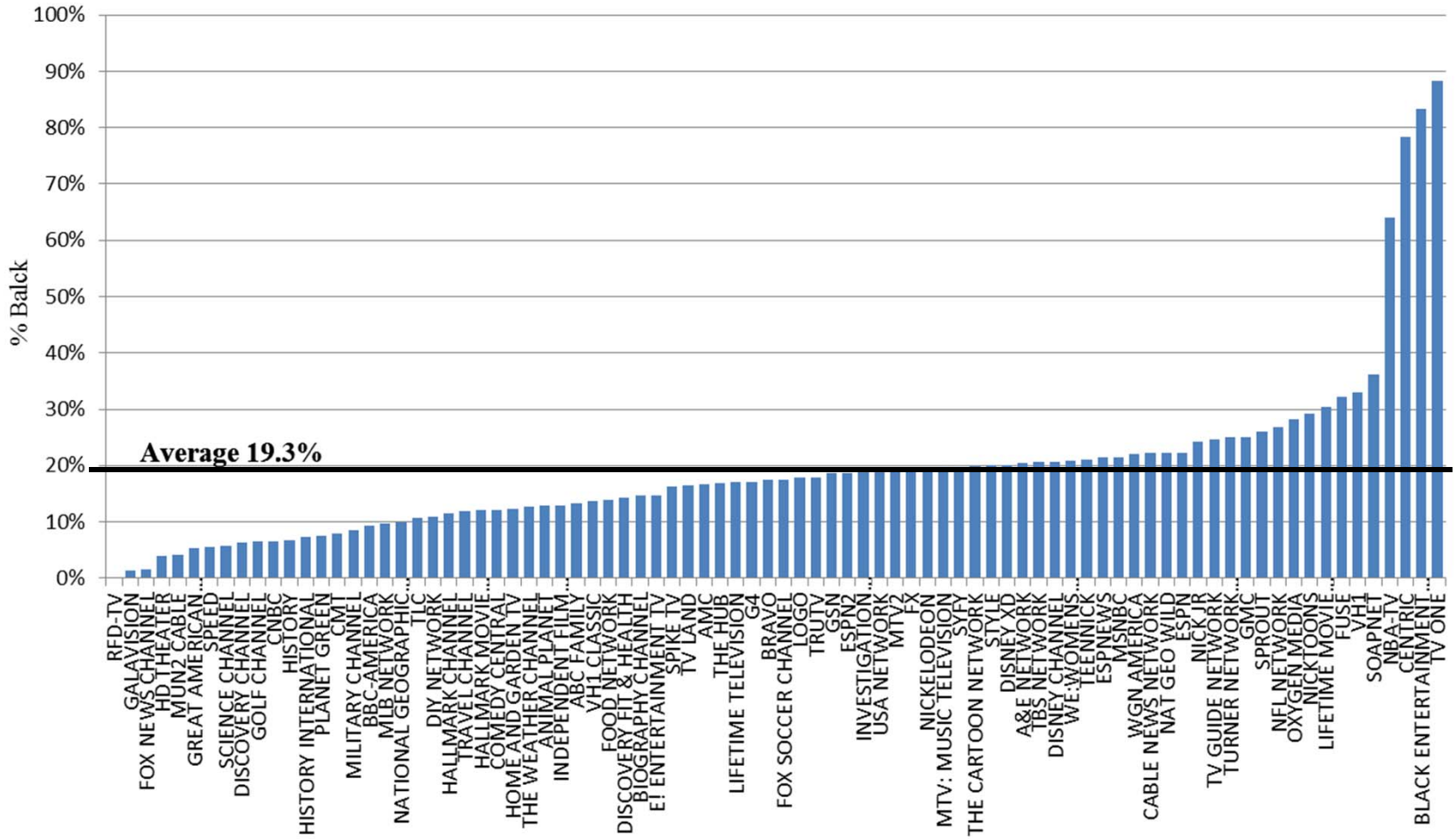
- CPMs consistently increasing in *aatotal* (total audience size)
- Inconsistent, but usually positive signs for *reach* and *rating*
- Insignificant or positive effects of *%black* and *%Hispanic*
- Other demos mostly in expected directions but often insignificant; little effects of demographic homogeneity
- CPMs higher for “sports”; lower for “kids and family”
- Lots of unexplained variance

Part II: Black/Hispanic audience composition

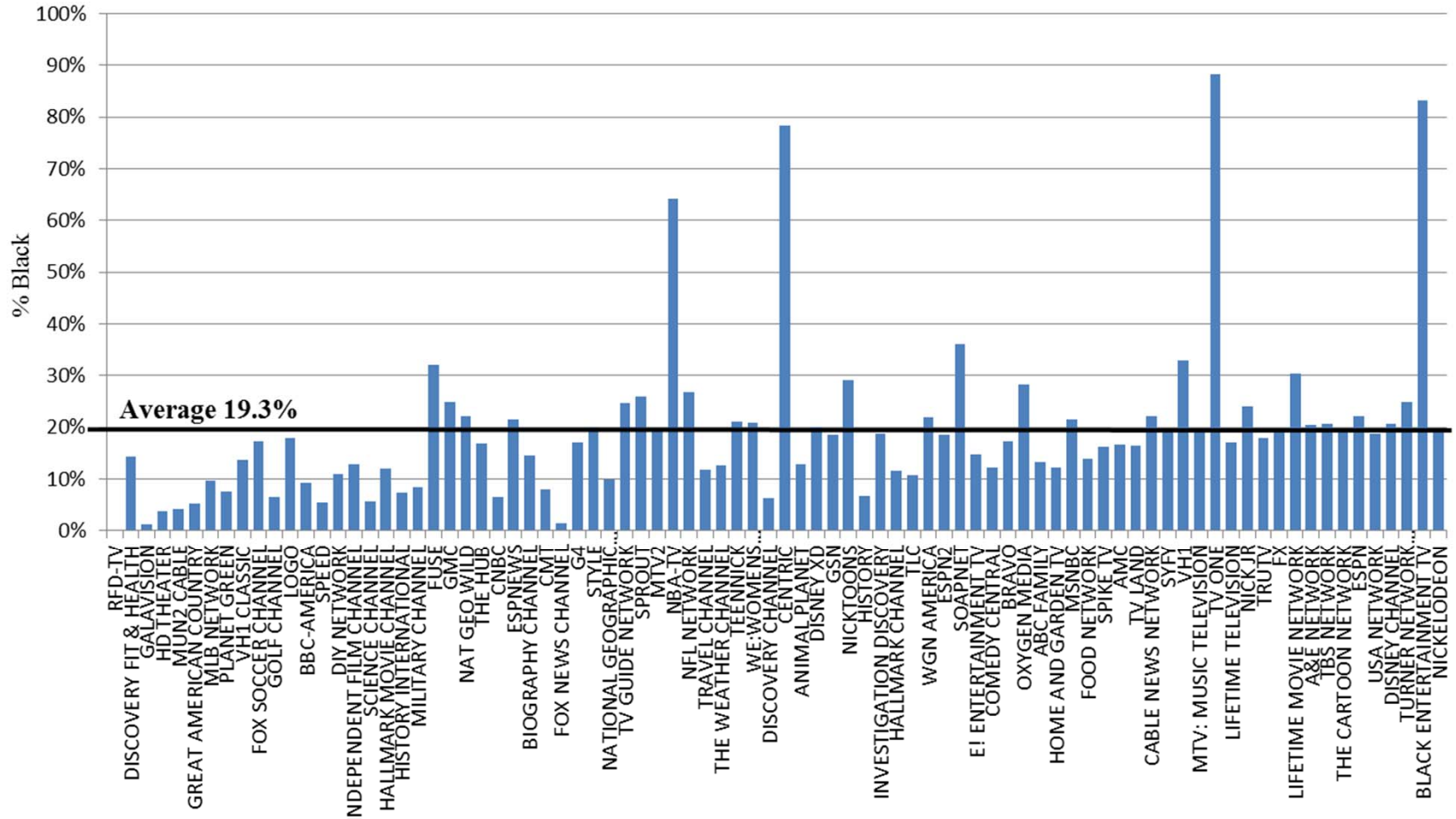
- **Questions**
  - How "isolated" is black/Hispanic viewing of cable networks?
  - What explains racial/ethnic audience composition: programming content or production values?

- **First…what the distributions looks like…**

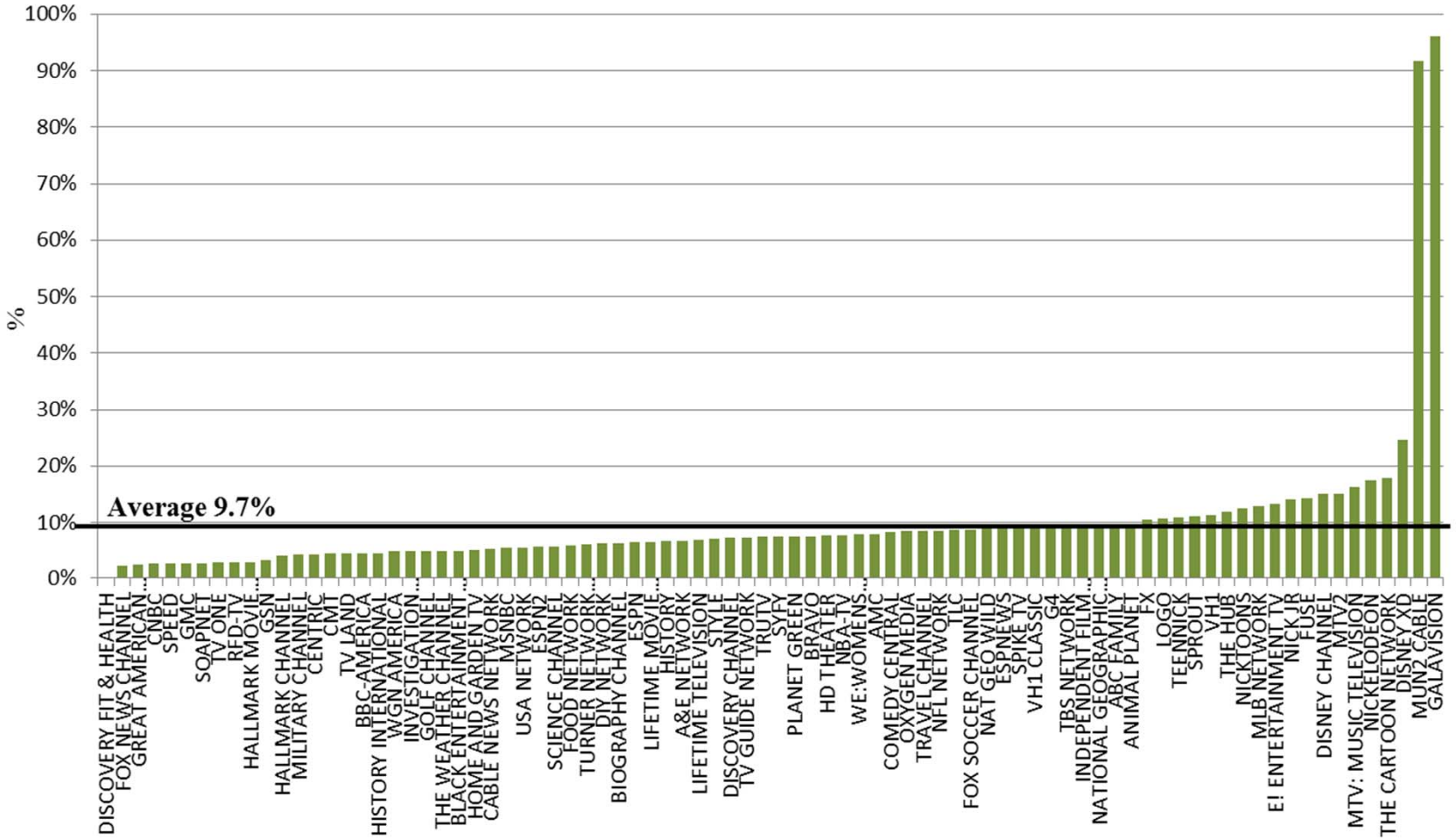
% Black audience composition ordered from low to high %



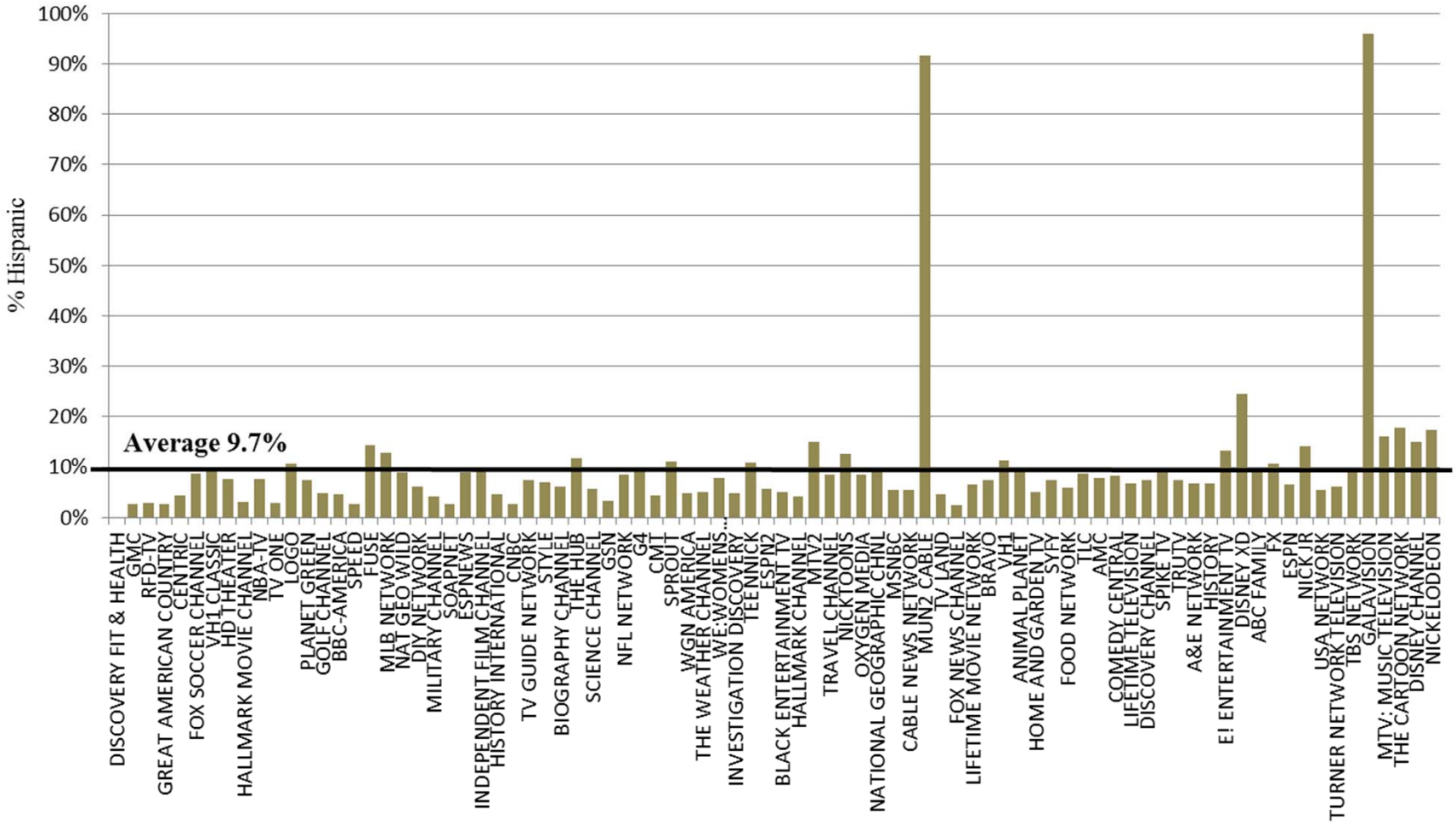
% Black audience composition ordered by black HHs delivered



% Hispanic audience composition ordered from low to high %



% Hispanic audience composition ordered by Hispanic HHs delivered



Definition of Isolation Index for Blacks

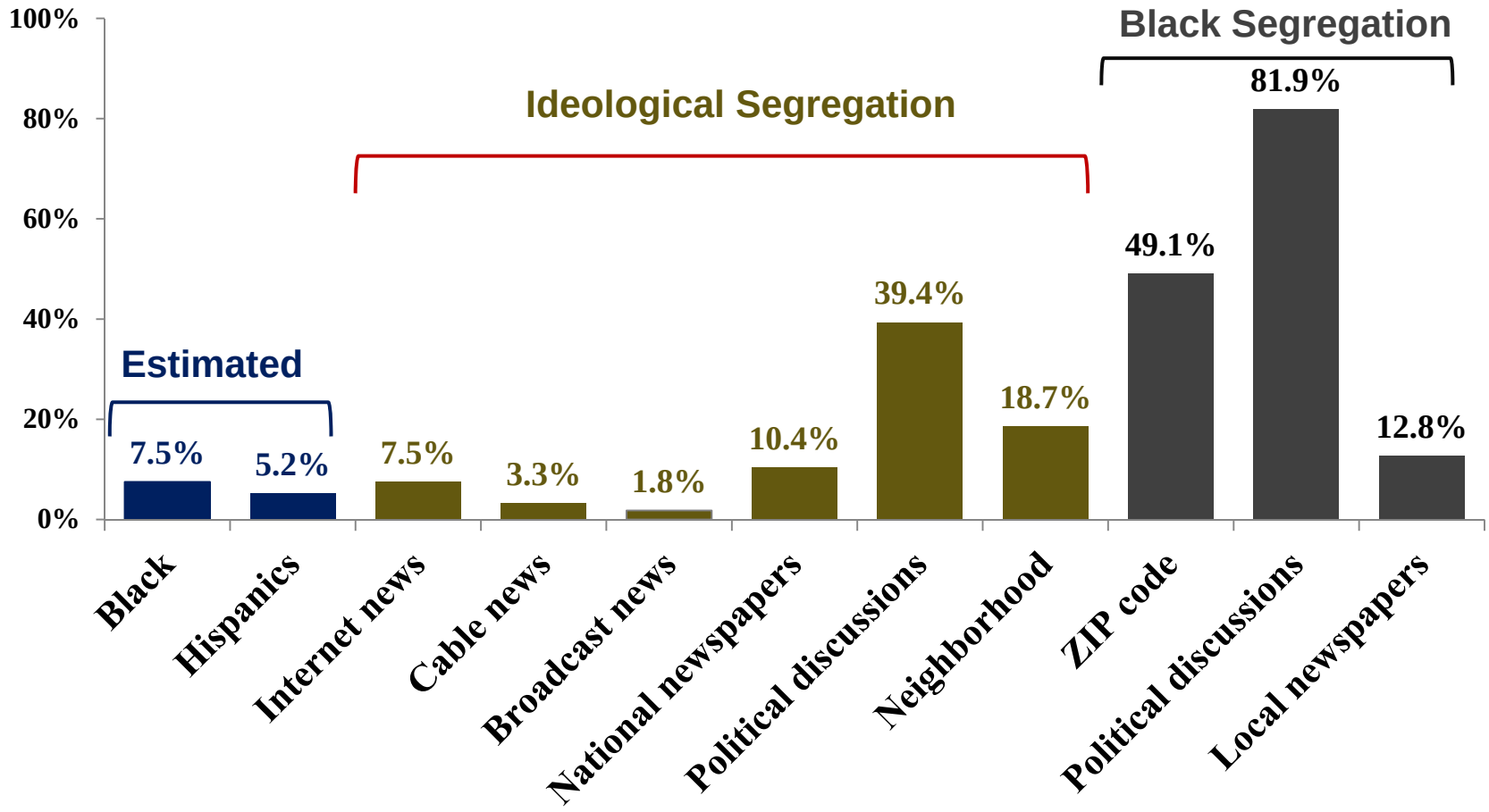
$$S_m =$$

$$\sum_{j \in J_m} \left(\frac{Black\ HH\ delivered\ by\ network_j}{Total\ Black\ HH\ delivered_m} \cdot \frac{Black\ HH\ delivered\ by\ network_j}{Total\ HH\ delivered_j} \right)$$

$$- \sum_{j \in J_m} \left(\frac{non - Black\ HH\ delivered\ by\ network_j}{Total\ non - Black\ HH\ delivered_m} \cdot \frac{Black\ HH\ delivered\ by\ network_j}{Total\ HH\ delivered_j} \right)$$

where J_m is all 97 networks in our sample.

Black/Hispanic Isolation index



Sources: Gentzkow & Shapiro (2011)

Determinants of Black/Hispanic audience composition

❑ Basic Models for Black, Hispanic, and White

For blacks/non-blacks:

- $aablack_i$ = a + b ($log\ age_i$) + c ($black/Hispanic\ content\ dummy_i$) + d ($genre\ dummies_i$) + e ($log\ progexp_i$) + e_i

- $\%black_i$ = a + b ($log\ age_i$) + c ($black/Hispanic\ content\ dummy_i$) + d ($genre\ dummies_i$) + e ($log\ progexp_i$) + e_i

Expectations : *progexp* (production investments) will significantly affect *aablack / aaHispanic / aawhite*, but not *%black / %Hispanic / %white*

Racial/ethnic audience composition models: % variance explained (adj. R2)

	Black/Hispanic content dummies only	Black/Hispanic Content dummies+ genre	Production cost only	Combined
% Black	47.4	53.3	0.1	52.8
Black HH	23.4	32.7	37.0	57.9
% Hispanic	91.1	93.4	0.5	93.6
Hispanic HH	9.2	28.1	20.4	42.7
% White	43.3	51.5	-1.4	51.1
White HH	22.0	27.3	50.8	63.8

**log age + a constant term also appear in all models

Conclusions

- CPMs inceasing in audience size suggest some limits to narrowcasting model
- Advertiser valuations of blacks and Hispanics do not limit segmentation toward these groups
- Vertical differentiation is a primary driver of black and Hispanic viewing, limiting the amount of programming focussed to these groups.
- Effectively a preference externality due to quality. Is this socially detrimental?
- Among limitations: simple models; one year sample with limited number of networks

Work in progress

- More work with Nielsen 2010 cross-sectional database

- New models using 2007-10 panel dataset, 65 to 83 networks (Kagan Research, MRI demographic data)

THANK YOU !

Basic Empirical Model

$$CPM = f(\underset{+}{reach},\ \underset{+/-}{rating},\ \underset{-?}{\%Black},\ \underset{-?}{\%Hispanic},\ other\ demos,\ demo\ concentration,\ program\ type)$$

CPM-narrow	=	actual cost-per-thousand HH for 30 second = spot
CPM-broad	=	total Adv. revenue ($000)/average audience delivered
reach	=	HHs reached by the network/total TV HH
rating	=	average HHs delivered/HHs reached by the network
inter	=	average HHs delivered (*reach* x *rating*)

Part I: CPM rate determinants

❑ Basic cable networking is a complex 2-sided media market

- Networks receive income from advertisers and subscriber fees
- For example: higher sub fees reduce cable/DBS carriage, reducing audience exposure, potentially affecting ad rates as well as ad revenues

❑ We employ single equation and IV models

CPM-broad IV Models (passed the weak instrument test)

Variables	(1) *CPM-broad* [a]	(2) *CPM-broad* [a]	(3) *CPM-broad* [b]	(4) *CPM-broad* [b]	(5) *log CPM-broad* [b]	(6) *log CPM-broad* [b]
inter	**1004.07*** **		**653.79*** **			
inter^2						
reach				**640.81** **		
reach^2						
rating				159.15		
rating^2						
log inter		0.63***			**0.26*** **	
log reach						0.41
log rating						0.20
%Black	-24.34	0.09	-94.29	16.69	-0.15	-0.09
%Hispanic	-353.53	**6.64** **	-416.98	-234.50	2.38	2.29
race-hhi	220.92	**2.24** **	134.98	158.57	0.92	0.92
Obs.	73	73	64	64	64	64
Adj. R^2	0.32	0.40	0.43	0.50	0.51	0.50

*^ p < .15; * p<.1; ** p<.05; *** p<.01,* [a] *progexp and log = instruments;* [b] *progexp, log netage, tier = instruments*

CPM-narrow IV Models (passed the weak instrument test)

Variables	(1) *CPM-narrow* [a]	(2) *CPM-narrow* [a]	(3) *CPM-narrow* [b]	(4) *CPM-narrow* [b]	(5) *log CPM-narrow* [b]	(6) *log CPM-narrow* [b]
inter	**2.61*** **		**2.19*** **			
inter^2						
reach				0.23		
reach^2						
rating				**1.36** **		
rating^2						
log inter		**0.16*** **			**0.15*** **	
log reach						0.07
log rating						0.15
%Black	**2.22** **	**0.55***	**1.81***	1.60	**0.51***	0.45
%Hispanic	-4.32	-0.75	4.48	4.98	1.54	1.54
male-hhi	1.75	-0.6	2.54	1.95	-0.21	-0.19
race-hhi	0.82	0.47	2.74	2.86	**1.04** **	**1.03** **
Obs.	78	73	65	65	64	64
Adj. R^2	0.19	0.22	0.31	0.31	0.33	0.33

*^ p < .15; * p<.1; ** p<.05; *** p<.01,* [a] *progexp and log = instruments;* [b] *progexp, log netage, tier = instruments*