Banks' Images: Evidence from Advertising Videos

Xugan Chen *Yale*

Allen Hu *UBC Sauder*

Song Ma *Yale & NBER*

Fall 2025

Community Banking Research Conference

Motivation

- Banks actively advertise to communicate with consumers and cultivate loyalty
  - Mullainathan et al. 08; Bertrand et al. 10, Gurun et al. 16; Honka et al. 17; ...
- This is partially driven by the banking business model:
  - Financial products (e.g., deposits and mortgages) are often perceived as fairly homogeneous
  - Banks are thus motivated to communicate about their advantages or persuade

Motivation

- Banks actively advertise to communicate with consumers and cultivate loyalty
  - Mullainathan et al. 08; Bertrand et al. 10, Gurun et al. 16; Honka et al. 17; ...
- This is partially driven by the banking business model:
  - Financial products (e.g., deposits and mortgages) are often perceived as fairly homogeneous
  - Banks are thus motivated to communicate about their advantages or persuade
- **Open Question:** how do banks strategically build their brand images—does it work?

Motivation

- Banks actively advertise to communicate with consumers and cultivate loyalty
  - Mullainathan et al. 08; Bertrand et al. 10, Gurun et al. 16; Honka et al. 17; ...
- This is partially driven by the banking business model:
  - Financial products (e.g., deposits and mortgages) are often perceived as fairly homogeneous
  - Banks are thus motivated to communicate about their advantages or persuade
- **Open Question:** how do banks strategically build their brand images—does it work?
- **This Paper:** uses financial ad videos to study how banks communicate with customers
  - **Research Q #1:** How do banks strategically craft their images to boost value?
  - **Research Q #2:** ... implications for demand, pricing, and monetary policy transmission?

This Paper: Establishing Banks' Images

- **Financial Advertising As A Setting:** Crucial in bank operations (**9.5%** of annual budget)
  - **Advertising creatives**: ~**51,000** unique video clips from ~**2,700** institutions
  - Comprehensive, dynamic, and multimodal (Hu and Ma, 24)

This Paper: Establishing Banks' Images

- **Financial Advertising As A Setting:** Crucial in bank operations (**9.5%** of annual budget)
  - **Advertising creatives**: ~**51,000** unique video clips from ~**2,700** institutions
  - Comprehensive, dynamic, and multimodal (Hu and Ma, 24)
- **Method:** Video Embedding to Cluster Advertising Videos
  - An unsupervised method to separate products and cluster contents

This Paper: Establishing Banks' Images

- **Financial Advertising As A Setting:** Crucial in bank operations (**9.5%** of annual budget)
  - **Advertising creatives**: ~**51,000** unique video clips from ~**2,700** institutions
  - Comprehensive, dynamic, and multimodal (Hu and Ma, 24)
- **Method:** Video Embedding to Cluster Advertising Videos
  - An unsupervised method to separate products and cluster contents
- **Banks' Images:** Projected to three themes (unsupervised, but highly interpretable)
  - **Pricing advantages:** *we give you the best price*
  - **Superior service:** *we give you the best service*
  - **Trust and emotions:** *we are your best friends and bring you the best life*

Findings: Image-Building Behaviors and Implications

- **Market Power, Competition, and Trust**
  - High local market shares: high on service or emotion; low on pricing
  - FinTech Entry: incumbents shift to build an image related to service
  - Ads are tailored to local demographics

Findings: Image-Building Behaviors and Implications

- **Market Power, Competition, and Trust**
  - High local market shares: high on service or emotion; low on pricing
  - FinTech Entry: incumbents shift to build an image related to service
  - Ads are tailored to local demographics
- **Banks' images and demand and pricing**
  - Use a border discontinuity design for identification (Shapiro 18; 20)
  - Ad intensity and themes strongly impact deposit quantities, spreads, and loan origination

Findings: Image-Building Behaviors and Implications

- **Market Power, Competition, and Trust**
  - High local market shares: high on service or emotion; low on pricing
  - FinTech Entry: incumbents shift to build an image related to service
  - Ads are tailored to local demographics
- **Banks' images and demand and pricing**
  - Use a border discontinuity design for identification (Shapiro 18; 20)
  - Ad intensity and themes strongly impact deposit quantities, spreads, and loan origination
- **Financial ad affects how banks respond to monetary policy**
  - Consistent with the notion of bank deposits channel (Drechsler et al. 17)
  - Advertising as a micro-foundation of bank market power and franchise value

Connection To the Literature

- **Advertising, Persuasion, and Communication in Financial Markets**
  - Financial Advertising: Chen et al. 22; Roussanov et al. 21 Kim et al. 23; Jiang and Kim 24; Celerier and Tak 25; + papers cited earlier
  - Customer Capital: He, Mostrom, Sufi, 25; Gourio and Rudanko, 14
- **Banking**
  - Bank Heterogeneity: d'Avernas et al. 23; Zhang et al. 24
  - Bank Market Power and Franchise Value: Drechsler et al. 17; 21
- **Use of ML, AI, and Unstructured Data in Economics and Finance**
  - Video as Data: Hu and Ma 24; Huang et al. 23
  - Unstructured Data and ML: Gorodnichenko el al. 23; Guenzel et al. 24

Establishing Banks' Images

Data: Financial Advertising

- **Data source: Nielsen Ad Intel**
  - Most comprehensive, covering 60% of total ad spending (Shapiro et al. 21)
  - National and local TV commercials from 2003 to 2020
- **Advertising creatives:** ~51,000 unique video clips from ~2,700 institutions
  - Measure video content using ML (Hu and Ma 24)
- **Advertising airtime schedules:** each video (v) airs **when** (weekly), **where** (i.e., designated marketing areas, DMAs), and **how much** is spent
- **Our sample:** merge to construct a bank (b)-county(c)-video (v)-year (t) panel
- **Bank data:** Deposit from Summary of Deposits and Ratewatch; Mortgage from HMDA; Small business loan from CRA; Bank balance sheet from Call Reports

Method: Clustering with Video Embeddings

Goal: Measure banks' images using advertising videos

Unsupervised Clustering with Video Embeddings

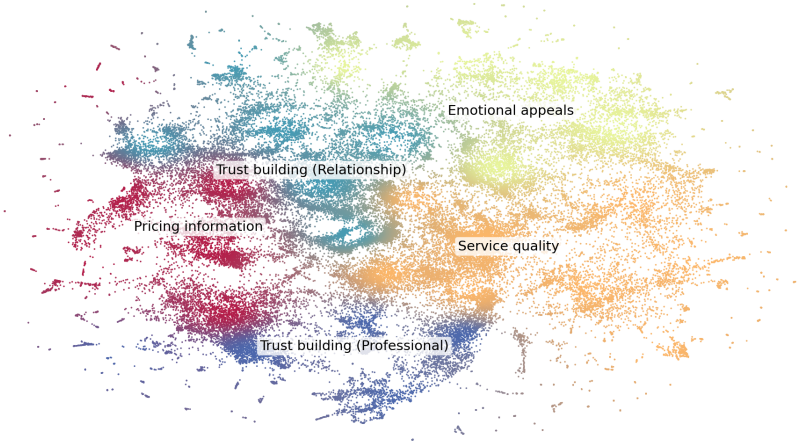
Video Embeddings $\rightarrow$ Clustering and Image Categorization $\rightarrow$ Aggregation

- **Step 1:** Represent unstructured video data with 3,584-dimensional embeddings
- **Step 2:** `PaCMAP` dimension reduction and Hierarchical Agglomerative Clustering
- **Step 3:** Interpret clusters via the most frequent keywords (TF-IDF weighted)

Three banks' images: Pricing advantage; service quality; emotional appeal/trust-building

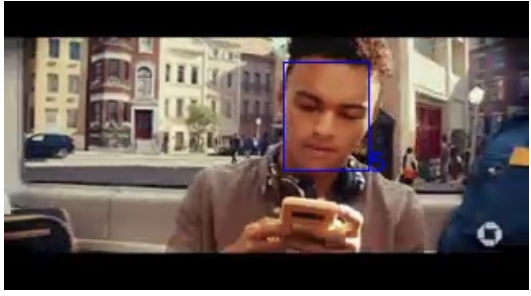
▸ Keywords

Clusters by Bank Images



Example: Chase – Banking

- **Airtime Schedule**
  - Duration: 30 sec
  - Time Span: Oct 20' to Mar 21'
  - Coverage: ~1,300 counties
  - Spending: $50M
- **Ad Content**
  - Product: Banking (100%)
  - Theme: Service (100%)
- **Ad Decomgraphics**
  - # Faces, Avg. Age, Race, Gender



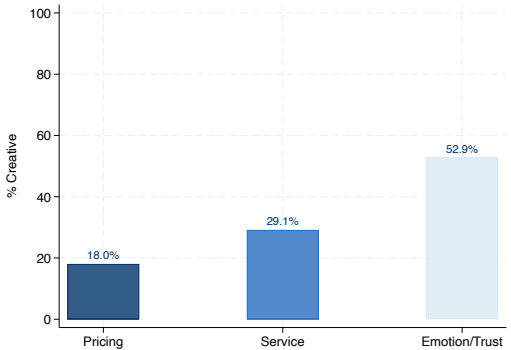
"Anywhere convenience. Everyday security. Banker's here to help. For wherever you want to go. Chase. Make more of what's yours."

▸ Chase: Banking

More examples: ▸ Republic First Bank ▸ PNC Bank ▸ Spirit of Texas Bank

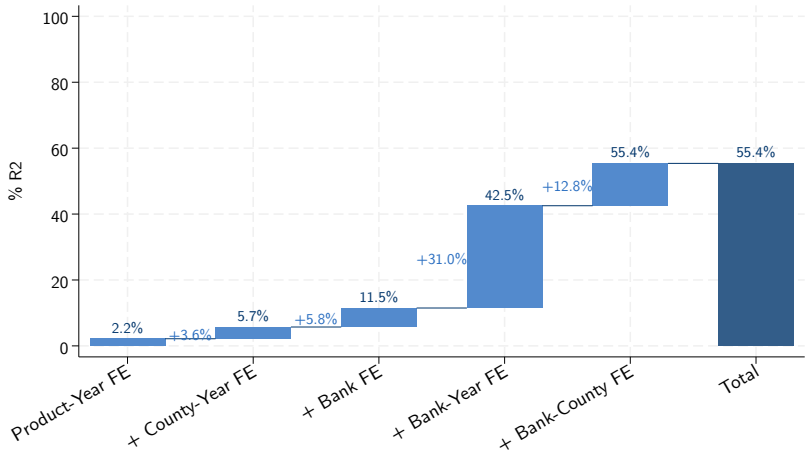
Distribution of Advertising Themes

- A significant part of image-building efforts focus on trust-building and emotional appeals
  - Consistent with Bertrand et al. 10; Thakor and Merton 24
  - We might be under-counting pricing and services (considering alternatives)



What Explains Variations in Financial Advertising?

R^2 Decomposition of Advertising Theme



Banks' Image-Building Behaviors

Empirical Setup

- **Question:** What do financial ads tell us about bank heterogeneity and differentiation?

$$BankImage_{b,c,t} = \beta \cdot D_{b,c,t-1} + \eta_{c,t} + \epsilon_{b,c,t},$$

- Panel data of bank b in county c in year t
  - $BankImage_{b,c,t}$: Advertising themes
  - $D_{bc,t-1}$: Lagged bank heterogeneity measures, such as high vs. low market shares
  - η_{ct}: County-year FEs, account for local market characteristics
  - ϵ_{bct}: Standard errors clustered at the county level
- Separately consider advertising strategies for the deposit and lending businesses

Banks' Local Market Power

- Banks' market power is a central topic in the literature
  - Market power in banking: ability to set rates above competitive levels
  - Sources: market concentration, relationship lending, switching costs...
- How can image building help banks maintain market power?
  - Creates product differentiation and brand capital (Bagwell 07)
  - Reduces price sensitivity, increases consumer inertia (Klemperer 87)
  - Advertising may attract risk-averse or low-info clients (Honka et al. 17)

▸ Pricing/Service Banks

Results

	(1)	(2)	(3)	(4)	(5)	(6)
Product Market	SOD Deposit			HMDA Mortgage		
Ad Category	Deposit			Mortgage		
% BankImage$_{b,c,t}$	Pricing	Service	Emotion/Trust	Pricing	Service	Emotion/Trust
Large (Market Share)$_{b,c,t-1}$	-0.412***	2.506***	-2.095***	-1.257***	-0.286***	1.542***
	(0.072)	(0.117)	(0.097)	(0.037)	(0.062)	(0.059)
Observations	922,811	922,811	922,811	706,796	706,796	706,796
R-squared	0.054	0.068	0.068	0.064	0.067	0.067
No. of Institutions	937	937	937	721	721	721
Mean of Y	13.44	36.16	50.40	14.51	34.60	50.89
County-Year FE	Y	Y	Y	Y	Y	Y

- High market power banks do not talk about pricing.
- MP in deposit: focus on service quality; MP in mortgagee: emotion/trust.

Advertising and Customer Demographics

- Do banks adjust their advertising to better connect with the specific customer base?
  - Racial groups: White, Black, Latino/Hispanic, Asian
  - Other data: County population data from Census (2003-2020)
- **Our Design:** Compare actor race in ads across counties *within* the same bank-year
  - Control for bank $\times$ year fixed effects
- **Visual Features:** Extract facial attributes of the actors from ad videos

Banks Ads Cater to Local Market Demographics

	(1)	(2)	(3)	(4)	(5)	(6)
Ad Category	Deposit			Asset		
% Ad Actors$_{b,c,t}$	Black	Hispanic	Asian	Black	Hispanic	Asian
Large (County w/ % Black)$_{b,c,t-1}$	0.129***			0.082**		
	(0.040)			(0.041)		
Large (County w/ % Hispanic)$_{b,c,t-1}$		0.102***			0.117***	
		(0.010)			(0.011)	
Large (County w/ % Asian)$_{b,c,t-1}$			0.108***			0.121***
			(0.017)			(0.019)
Observations	775,701	775,701	775,701	642,864	642,864	642,864
R-squared	0.843	0.900	0.883	0.840	0.775	0.859
Mean of Y	17.58	1.628	6.236	18.82	0.912	5.558
Bank-Year FE	Y	Y	Y	Y	Y	Y

- Increase minority representation in ads targeted at counties with larger minority populations
- Banks adjust their advertising to better connect with the specific customer base

Response to Fin-tech Entry

	(1)	(2)	(3)
Ad Category	All		
% BankImage$_{b,c,t}$	Pricing	Service	Emotion/Trust
Post(Fintech Entry)$_{c,t}$	−0.544***	0.615***	−0.071
	(0.052)	(0.094)	(0.079)
Observations	2,786,104	2,786,104	2,786,104
R-squared	0.477	0.480	0.449
No. of Institutions	2,401	2,401	2,401
Mean of Y	13.97	36.61	49.41
County FE	Y	Y	Y
Bank-Year FE	Y	Y	Y

- Incumbent banks respond to Fintech entry by increasing their service-focused image

Response to Wells Fargo Scandal

	(1)	(2)	(3)	(4)	(5)	(6)
Ad Category	All			All		
% BankImage$_{b,c,t}$	Pricing	Service	Emotion/Trust	Pricing	Service	Emotion/Trust
Post(Scandal)$_t$	−2.781***	−4.915***	7.697***			
	(0.102)	(0.159)	(0.188)			
Post(Scandal)$_t$ ×1(Wells Fargo Presence)$_c$				−0.079***	−0.055	0.133***
				(0.027)	(0.047)	(0.044)
Sample	Wells Fargo	Wells Fargo	Wells Fargo	Other Banks	Other Banks	Other Banks
Observations	55,612	55,612	55,612	2,730,492	2,730,492	2,730,492
R-squared	0.067	0.046	0.059	0.483	0.485	0.452
No. of Institutions	1	1	1	2,400	2,400	2,400
Mean of Y	12.77	33.86	53.37	14	36.67	49.33
County FE	Y	Y	Y	Y	Y	Y
Bank-Year FE	N	N	N	Y	Y	Y

- 2016 Wells Fargo scandal as a severe adverse shock to trust in the banking sector
- Wells Fargo itself and other banks in affected counties increased trust messages

Banks' Images and Implications

Empirical Design: Border Discontinuity Design

- **Question:** How does ad affect demand, pricing, and transmission of monetary policy?

$$Y_{bct} = \beta \ln(\text{Ad})_{bct} + \eta_{bc} + \eta_{bd(c)t} + \epsilon_{bcd(c)t}$$

- **Identification Challenge:** Advertising decisions are, as shown earlier, endogenous to
  - local economic conditions; bank and bank-region characteristics; among others

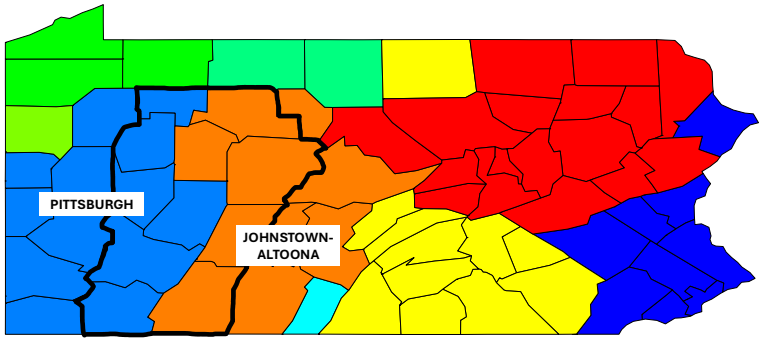
Empirical Design: Border Discontinuity Design

- **Question:** How does ad affect demand, pricing, and transmission of monetary policy?

$$Y_{bct} = \beta \ln(\text{Ad})_{bct} + \eta_{bc} + \eta_{bd(c)t} + \epsilon_{bcd(c)t}$$

- **Identification Challenge:** Advertising decisions are, as shown earlier, endogenous to
  - local economic conditions; bank and bank-region characteristics; among others
- **Identification Strategy:** ▸ More Details
  - Design: Uses discontinuities in advertising features at geographic TV market (DMA) borders
  - Key Insight: Consumers on either side of a DMA border see different ad but have similar characteristics and product options
  - Widely used in marketing: Shapiro 18, 20; Tuchman 15; Spenkuch and Toniatti 18

Identification Idea: Example of DMA Border Region



Results: Deposit Flows and Rates

$Y_{b,c,t}$	Δ ln(Deposits)		Δ(Deposit Spread)	
$\ln(\text{Ad})_{b,c,t}$	0.0009**		0.0017***	
	(0.0004)		(0.0006)	
$1(\text{Pricing})_{b,c,t}$		−0.0190		−0.1706***
		(0.0139)		(0.0220)
$1(\text{Service})_{b,c,t}$		0.0131*		0.0194**
		(0.0080)		(0.0087)
$1(\text{Emotion/Trust})_{b,c,t}$	Omitted			
Mean of Y	0.0375	0.0375	-0.0072	-0.0072
Bank-County FE	Y	Y	Y	Y
Bank-Border-Year FE	Y	Y	Y	Y

- Ad spending increases deposit flows and spreads
- "Service banks" have higher deposit flows/spreads $\Longrightarrow$ higher franchise value/market power

Results: Deposit Flows and Rates

$Y_{b,c,t}$	Δ ln(Deposits)		Δ(Deposit Spread)	
$\ln(\text{Ad})_{b,c,t}$	0.0009**		0.0017***	
	(0.0004)		(0.0006)	
$1(\text{Pricing})_{b,c,t}$		−0.0190		−0.1706***
		(0.0139)		(0.0220)
$1(\text{Service})_{b,c,t}$		0.0131*		0.0194**
		(0.0080)		(0.0087)
$1(\text{Emotion/Trust})_{b,c,t}$	Omitted			
Mean of Y	0.0375	0.0375	-0.0072	-0.0072
Bank-County FE	Y	Y	Y	Y
Bank-Border-Year FE	Y	Y	Y	Y

- Ad spending increases deposit flows and spreads
- "Service banks" have higher deposit flows/spreads $\Longrightarrow$ higher franchise value/market power

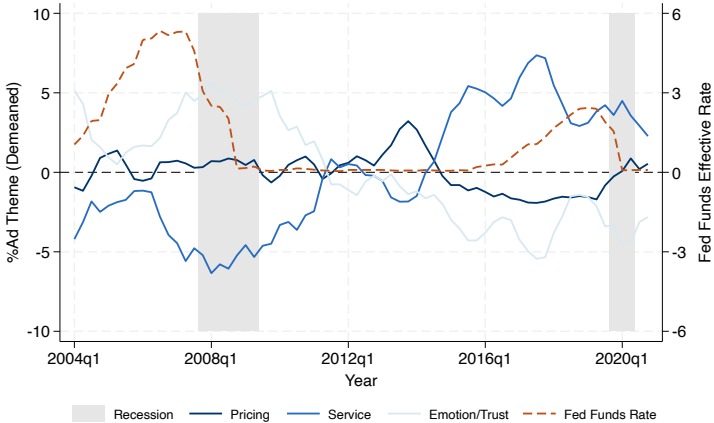
Results: Loan Origination

$Y_{b,c,t}$	ln(Mortgage)		ln(Small Business Loan)	
$\ln(\text{Ad})_{b,c,t}$	0.010**		0.007***	
	(0.004)		(0.001)	
$1(\text{Pricing})_{b,c,t}$		−0.847***		−0.067**
		(0.099)		(0.028)
$1(\text{Service})_{b,c,t}$		−0.810***		−0.018
		(0.060)		(0.017)
$1(\text{Emotion/Trust})_{b,c,t}$	Omitted			
Mean of Y	11.64	11.64	12.35	12.35
Bank-County FE	Y	Y	Y	Y
Bank-Border-Year FE	Y	Y	Y	Y

- Ad spending increases loan origination
- "Emotion/trust banks" have higher loan demand

Bank Images and Monetary Policy Cycles

Bank Images and Monetary Policy Cycles



- When FFR rises, so are the uses of service and emotion/trust themes.

Bank Images and Monetary Policy Transmission

$Y_{b,c,t}$	Δ(Deposit Spread)	$\Delta \ln$(Deposits)	$\ln$(Mortgage)	$\ln$(Small Business Loan)
$\ln(\text{Ad})_{b,c,t-1}$	0.0004	0.0001	0.0064***	0.0009
	(0.0004)	(0.0002)	(0.0018)	(0.0008)
$\Delta\text{FF}_t \times \ln(\text{Ad})_{b,c,t-1}$	0.0086***	−0.0002*	−0.0077***	−0.0042***
	(0.0007)	(0.0001)	(0.0012)	(0.0007)
Mean of Y	0.140	0.0567	11.89	12.48
$\text{HHI}_{b,t-1}$ and $\Delta\text{FF}_t \times \text{HHI}_{b,t-1}$	Y	Y	Y	Y
County-Year FE	Y	Y	Y	Y
Bank-County FE	Y	Y	Y	Y

- When FFR rises, banks with higher ad spending increase deposit spread more and experience larger deposit outflows and balance sheet contraction

Bank Images and Monetary Policy Transmission

$Y_{b,c,t}$	Δ(Deposit Spread)	$\Delta \ln$(Deposits)	$\ln$(Mortgage)	$\ln$(Small Business Loan)
$1(\text{Pricing})_{b,c,t-1}$	-0.0544^{***}	0.0020	-0.1071^{**}	0.2939^{***}
	(0.0128)	(0.0039)	(0.0479)	(0.0182)
$1(\text{Service})_{b,c,t-1}$	0.0411^{***}	0.0078^{***}	-0.3597^{***}	0.1268^{***}
	(0.0060)	(0.0025)	(0.0293)	(0.0101)
$\Delta FF_t \times 1(\text{Pricing})_{b,c,t-1}$	0.0753^{***}	0.0078^{**}	-0.2371^{***}	-0.1610^{***}
	(0.0250)	(0.0038)	(0.0449)	(0.0193)
$\Delta FF_t \times 1(\text{Service})_{b,c,t-1}$	0.0991^{***}	-0.0088^{***}	-0.3645^{***}	-0.0660^{***}
	(0.0106)	(0.0023)	(0.0241)	(0.0102)
$1(\text{Emotion/Trust})_{b,c,t-1}$ and $\Delta FF_t \times 1(\text{Emotion/Trust})_{b,c,t-1}$ Omitted				
Mean of Y	0.140	0.0567	11.89	12.48
$HHI_{b,t-1}$ and $\Delta FF_t \times HHI_{b,t-1}$	Y	Y	Y	Y
County-Year FE	Y	Y	Y	Y
Bank-County FE	Y	Y	Y	Y

- When FFR rises, banks highlighting service increase deposit spread more, consistent with bank market power and deposits channel of monetary policy (Drechsler et al. 17)

Concluding Remarks

Concluding Remarks

- **Research Question:**
  - How do banks strategically craft their image ?
  - What are the implications for banking and monetary policy?
- **What We Do:**
  - Analyze 50K TV commercial videos with a 3V framework (Hu and Ma 24)
  - Establish banks' image quantitatively
- **Main Findings:**
  - **#1:** Banks establish "good service" and "emotional connections" to maintain market power
  - **#2:** Banks establish their images to cater to specific demographics
  - **#3:** Banks' image building efforts affect product demand and monetary policy transmission

Banks' Images: Evidence from Advertising Videos

Xugan Chen *Yale*

Allen Hu *UBC Sauder*

Song Ma *Yale & NBER*

Fall 2025

Community Banking Research Conference

Bank Images and Keywords

Back

Main Image Category	Detailed Image Category	Related Keywords
Financial Information	Interest Rates	rate, month, lowest, APR, fixed
	Payment Plans	deposit, payment, debt, foreclosure, cash
	Cashback Rewards	free, earning, refund, earn
Service Quality	Online Service	mobile, online, mobile banking, easy, App
	Local Service	location, local, community, service, team
	Daily Convenience	ATM, traveling, send money, wallet, easy
Emotional Appeal and Trust Building	Future Goals	financial, life, help, business, plan, goal
	Financial Management	money, credit, save, retirement, debt
	Life Fulfillment	life, dream, love, feel, happy, moment
	Family Focus	dad, kid, like, house, family, mom
	Sports & Entertainment	game, got, win, official, fan, team
	Holiday Greetings	holiday, happy, Christmas, merry, wish
	Professional Expertise	financial, client, advisor, wealth, business, management
	News Updates	news, day, brought, week, morning, fox
	Market Information	trade, stock, gold, market, trading, investor

Example: Republic First Bank – Money Market Account

Back

- **Airtime Schedule**
  - Duration: 15 sec
  - Time Span: Sep 07' to Nov 07'
  - Coverage: 76 counties
  - Spending: $23K
- **Ad Content**
  - Product: Banking (100%)
  - Theme: Pricing (100%)
- **Ad Decomgraphics**
  - # Faces, Avg. Age, Race, Gender

"A great rate and peace of mind. Who says you can't have it all? Open Republic First Bank Money Market Accounts today. Currently 4.75 APY guaranteed through December 2007."

Republic First Bank: Banking

Example: PNC Bank – Mortgages

Back

- **Airtime Schedule**
  - Duration: 30 sec
  - Time Span: June 06' to Nov 06'
  - Coverage: 10 counties
  - Spending: $280K
- **Ad Content**
  - Product: Banking (20%); Mortgages (80%)
  - Theme: Emotional Appeal (100%)
- **Ad Decomgraphics**
  - # Faces, Avg. Age, Race, Gender

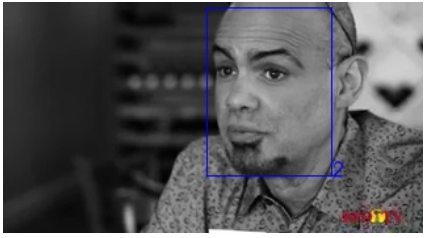
"We just got the keys to our new house. We got the keys! Woo! Woo-hoo-hoo-hoo! This is exciting! We've got our own house! Yay! I'm sorry. You like it here, Maddie? I love you. I love you, too."

PNC Bank: Mortgages

Example: Spirit of Texas Bank – Small Business Loan

Back

- **Airtime Schedule**
  - Duration: 30 sec
  - Time Span: May 20' to June 21'
  - Coverage: 16 counties
  - Spending: $820K
- **Ad Content**
  - Product: Loan (100%)
  - Theme: Service (20%); Emotional Appeal (80%)
- **Ad Decomgraphics**
  - # Faces, Avg. Age, Race, Gender



"When COVID hit, it was one of the hardest things I've ever done in my career...The Spirit of Texas Bank coming through with the payroll protection plan was huge. They live by their motto, Texans helping Texans. They really walk the walk in helping us get through this crazy situation. Thank you, Spirit of Texas Bank."

Spirit of Texas Bank: Small Business Loan

Information Provision Or Deceptive Marketing, Or Both? Back

- Do banks use advertising to provide useful information or deceive customers?
  - Information provision to facilitate search and match (Nelson, 1974)
  - Deceptive information to steer customer into bad choices (Thaler and Sunstein, 2008; Gurun et al., 2016; Celerier and Tak 25)
- **Our Design:** We explore if banks' images align with their actions in pricing and services
  - Pricing activities: deposit rate
  - Service: scaled number of complaints from CFPB

Results: Price vs. Service Banks

Back

	(1)	(2)	(3)	(4)	(5)	(6)
Ad Category	Deposit			Deposit		
% BankImage$_{b,c,t}$	Pricing	Service	Emotion/Trust	Pricing	Service	Emotion/Trust
High Deposit Rate$_{b,c,t-1}$	3.129***	-2.219***	-0.910***			
	(0.039)	(0.070)	(0.054)			
High Service Quality$_{b,c,t-1}$				-0.488***	2.448***	-1.960***
				(0.081)	(0.169)	(0.141)
Observations	665,019	665,019	665,019	987,169	987,169	987,169
R-squared	0.078	0.073	0.078	0.053	0.059	0.060
No. of Institutions	922	922	922	1,120	1,120	1,120
Mean of Y	13.63	35.98	50.38	13.30	36.41	50.28
County-Year FE	Y	Y	Y	Y	Y	Y

Empirical Strategy: Border Discontinuity Design

Back

- **Question:** How does ad affect demand, pricing, and transmission of monetary policy?

$$Y_{bct} = \beta \ln(\text{Ad})_{b,c,t} + \eta_{b,c} + \eta_{b,d(c),t} + \epsilon_{b,c,d(c),t}$$

- Panel data of bank b in county c, belonging to border $d(c)$, in year t
  - Y_{bct}: Outcome variables for financial products (demand, pricing, etc.)
  - $\ln(\text{Ad})_{bct}$: Log product-specific ad spending, by bank b
  - $1(Image)_{bct}$: Dummy variables for bank images
  - η_{bc}: Bank-county FEs, account for level differences for a bank across counties
  - $\eta_{bd(c)t}$: Bank-border-year FEs, account for time-varying bank-specific local demand shocks
  - $\epsilon_{bcd(c)t}$: Standard errors clustered at bank-county and border-year levels