

Media as a Money Doctor: Evidence from Refinancing Decisions*

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Abstract

We argue that business TV helps households avoid costly mistakes in mortgage refinancing. We use three sources of variation in TV exposure: (1) staggered entry of business networks into zip codes, (2) channels' ordinal positions in the cable lineup, and (3) channel regroupings from system upgrades that alter their salience to the viewer. Exposure to business TV is associated with a higher refinancing propensity, faster response, and fewer incomplete applications. These behaviors generate large economic savings. The effects are driven by general-audience networks—Fox Business and CNBC—and do not arise for the professionally oriented Bloomberg TV.

JEL Codes: G50, G51, G53, R20, R21

Key words: media, television, financial literacy, financial awareness

* For helpful comments, we thank Shashwat Alok, Darwin Choi, Oleg Chuprinin, Mengqiao Du, Benjamin Keys, Cameron LaPoint, Nick Li, Paolina Medina, Kasper Nielsen, Tarun Patel, Jialan Wang, and Yu Wang as well as conference participants at the Western Finance Association (WFA) Conference, Financial Intermediation Research Society Conference, European Finance Association (EFA) Annual Meeting, China International Conference in Finance, Northern Arc Foundation-Dvara Trust Field Workshop on Household Finance, Consumer Financial Protection Bureau Research Conference, Boca Corporate Finance and Governance Conference, FDIC Consumer Research Symposium, Swedish House of Finance Consumer Behavior in Financial Markets Conference, Asia-Pacific Corporate Finance Online Workshop, and Australasian Banking and Finance Conference, and seminar participants at the Australian National University, Monash University, University of Adelaide, University of Massachusetts at Amherst, University of Melbourne, University of Technology at Sydney, and University of Sydney.

There is extensive evidence that households make costly financial mistakes. Given the large costs of these mistakes, much of recent policy effort has focused on improving financial literacy and offering assistance with key economic decisions, ranging from education programs and counselling to increased disclosure and optimal default. Yet, changing household behavior has proven difficult, and the efficacy of most proposed policies has been modest despite their significant costs (see DellaVigna (2009) for a review).

Given the difficulty with eliciting households' participation in education programs, television could serve as an auxiliary, privately funded resource for delivering simple guidelines on key economic decisions or raising the viewers' awareness of available financial options. TV networks are experienced in producing engaging content and have a wide reach into people's homes, since the average U.S. household spends half of its leisure time watching TV (Aguiar, Hurst, and Karabarbounis 2013).

This paper argues that business TV can help households manage their main financial liability—home mortgage—and avoid some of the costliest mistakes by improving their refinancing behavior. We conjecture that business TV helps inform borrowers about refinancing options and serves as a salient nudge against inertia. This hypothesis is motivated by prior work in experimental economics (Lusardi et al. 2017), which singles out short videos with actionable suggestions as one of the most effective formats for improving financial decisions. To test this hypothesis, we hand-collect data on local cable programming from historical TV & Cable Factbooks and combine them with data from the Nielsen Company to construct a panel of local cable systems and their channel offerings in 1990–2017.

Using historical TV transcripts, we find that business TV alerts viewers to refinancing options when they become attractive and offers general advice on home refinancing. After large interest rate declines (100+ bps), discussions of refinancing appear on 16.6% of primetime TV episodes (5–10 pm on weekdays) and reach average quarterly highs of 36–38% at the beginning of low interest rate cycles, a sharp increase relative to years with low refinancing incentives (5.5%). When refinancing becomes financially attractive for many households, some business networks launch programs dedicated exclusively to refinancing, such as the series Refi-Nation aired in primetime on Fox Business Network (FBN) in 2011–2013.

A significant share of refinancing borrowers heed media advice. Using micro data from the National Survey of Mortgage Originations (NSMO), we find that 15.6% of all refinancing applicants and 20.3% of minorities rely on guidance from financial media, a source more important than real estate agents (14.8%) or housing counsellors (3.5%). Households who use information from the media are more likely to initiate the refinancing process, evaluate multiple lenders, and submit several applications in search for the best loan terms. They are also more willing to refinance in the future.

To study the link between access to business TV and households' refinancing behavior, we exploit the high granularity of the cable market, characterized by over 9,000 local cable systems with sharp boundaries in geographic coverage and distinct channel offerings. We rely on three sources of variation in households' exposure to financial channels: (1) channel availability; (2) channel's ordinal position in the cable lineup assigned by the local cable system, and (3) channel reshufflings after system upgrades.

Our first analysis exploits a staggered entry of financial channels into select zip codes. While the introduction of channels into regional media markets is related to economic fundamentals, the penetration into zip codes within the same county contains an idiosyncratic component driven by the historical cable grid established at the launch of cable TV in 1950–1970. By comparing neighborhoods in the same county, but on the opposite sides of the cable system boundaries, we exploit variation in the timing of channel entry into select zip codes. We verify that the entry of business TV into zip codes within a given county is driven by the technical attributes of the cable infrastructure, while being uncorrelated with demographics, economic fundamentals, and prior refinancing activity. This pattern parallels the evidence in DellaVigna and Kaplan (2007) that the availability of Fox News across towns within the same county is quasi-random.

Our first finding is that exposure to business TV is associated with an increase in mortgage refinancing during periods of low interest rates. This outcome emerges only for the mainstream business channels—CNBC and FBN—but not for the professionally oriented Bloomberg TV. Exposure to FBN and CNBC is associated with a 5.1–6.5% greater increase in local refinancing volume after a 100+ basis point drop in mortgage interest rates. In contrast, the staggered introduction of Bloomberg TV has no effect on local refinancing, consistent with its focus on financial experts already aware of the refinancing options.

The association between exposure to business TV and refinancing behavior is stronger for government-protected borrower groups with traditionally moderate savings and tighter credit constraints. Such borrowers are often left out from the refinancing market (Campbell 2006) and rely more on financial media in refinancing decisions (NSMO 2018). The media effect is also stronger for applicants with fewer alternative sources of financial advice—those located further away from mortgage counseling offices.

To reinforce the link between exposure to business TV and refinancing, we add a second source of variation in a channel's viewership—its ordinal position in the cable lineup assigned by the local system's allocation rules. A lower ordinal position makes a channel more likely to enter a household's opportunity set via channel surfing, which accounts for 20% of viewership time (Ericsson Consumer Lab 2016). We show that the same channel reaches 17% more households in a zip code if it appears as, say, channel 15 rather than channel 59 in the cable lineup (a one standard deviation move of 44 positions).

In support of using a channel's ordinal position in the local cable lineup as a source of variation in viewership, we find that a channel's position is typically determined by the institutional rules of the local cable provider. For example, Cable Provider A assigns channel numbers based on how recently a channel was added to its lineup. Provider B groups channels by content, and Provider C allocates new channels in the vicinity of their sister channels (e.g., FBN and Fox News). As a result, as FBN is gradually introduced into local markets, some providers, such as Cablevision's Optimum, allocate FBN to the lowest available slot. Others, such as Time Warner Cable's Spectrum, pair FBN with its sister channel Fox News. Yet other providers, such as AT&T, allocate FBN a position in the vicinity of news and information channels. These institutional rules produce persistent variation in a channel's ordinal position across zip codes, which we exploit to study the link between channel viewership and financial outcomes.

Our analysis compares zip codes in the same county that obtain access to the same channel in the same year but from distinct cable providers, so that the network of interest enters at different ordinal positions in the cable lineup in the neighboring zip codes. Using this research design, we find that the rise in local refinancing activity associated with the entry of a new business channel into a zip code is about twice as large when this channel is assigned a slot in the top half of the lineup rather than in the bottom half of the lineup. These estimates are robust to accounting for unobservable factors affecting a county in a given year, such as changes in its economic activity, migration, and demographics (captured by county \times year fixed effects), as well as granular controls for economic fundamentals at the zip code level.

The combined evidence from the staggered entry of business channels and the variation in their ordinal positions indicates a positive association between exposure to business TV and refinancing activity. The distinct sources of variation in TV viewership set a high bar for a possible omitted variable that could explain the simultaneous increase in refinancing while being unrelated to business TV. Such a variable must vary with cable grid boundaries and channel allocation rules, produce an increase in refinancing only after a channel's entry into specific zip codes and only during periods of low interest rates, and increase in intensity with the salience (channel's position) and novelty of the TV content.

To address the possibility of an omitted variable, we exploit a novel discrete shock to channels' ordinal positions resulting from a staggered switch from analogue to digital TV required by the Digital Transition and Public Safety Act of 2005. Such system upgrades produce a one-time reshuffling of the cable system's lineup in select markets, resulting in a discontinuous shift in channels' ordinal positions for reasons unrelated to refinancing. Consider the following example from Colbert County in Alabama, a market served by one cable provider, Xfinity, where a system upgrade resulted in a regrouping of channels

by genre. Prior to the upgrade, channels had been added to the lineup in chronological order, and CNBC was assigned to slot 78, next to Hallmark Channel, Oxygen, and Galavision. After the upgrade, CNBC was grouped with other information channels, such as MSNBC, CNN, and Fox News, moving to slot 41 and placing within the surfing vicinity of some of the most-watched channels. Following this 37-position upward move, the weekly viewership of CNBC in Colbert County went up by 10 minutes per household, while most other county attributes remained unchanged.

Using channel regroupings from 1,286 local system upgrades in 3,661 zip codes, we confirm that an increase in the viewership of business TV is associated with an economically significant increase in refinancing volume during periods of low interest rates. A one standard deviation move (49 slots) in a business channel's position closer to the top of the lineup due to channel regrouping is associated with a 3.3% greater increase in local refinancing after a 100+ basis point decline in mortgage interest rates.

After establishing a link between business TV and refinancing, we provide micro evidence on the mechanisms underlying the changes in borrowers' behavior. We conjecture that business TV serves as a nudge against inertia or a source of information for less sophisticated borrowers. Consistent with the role of media as a nudge against inertia, exposure to business TV increases households' propensity to complete their refinancing applications, resulting in a decline in the number of abandoned applications. Consistent with a contribution of media to a more informed approach to refinancing, exposure to business TV is associated with an increase in comparison shopping across lenders, as measured by local Google searches.

The increase in refinancing activity appears value enhancing for the participating households. Exposure to business TV increases refinancing activity only during periods when refinancing is likely to be financially advantageous. In a subsample of borrowers matched on observable refinancing incentives, such as personal credit score, geographic location, prior mortgage interest rate, loan amount, and loan origination and maturity dates, we find that exposure to business TV is associated with an increase in the refinancing propensity during low interest rate periods. For the average household, mortgage refinancing reduces the monthly payment by \$218 and generates nominal savings of \$63,220 over the remaining loan life. In contrast, there is virtually no change in the refinancing propensity between the treatment and control borrower groups during periods of weak refinancing incentives.

In addition to the effect on refinancing activity on the extensive margin, we document two other outcomes for borrowers on the intensive margin. First, exposure to business TV is associated with a quicker response to refinancing opportunities, consistent with a greater salience of the opportunities featured on TV. Within the sample of borrowers who face similar refinancing incentives (i.e., the same credit score,

loan amount, interest rate, and maturity), those with exposure to business TV tend to refinance their loans about four months earlier. Second, refinancing borrowers with exposure to business TV obtain 13 basis points lower refinancing rates than do their unexposed peers with similar loan and credit characteristics. This effect, consistent with exposure to multiple lenders and their offers on TV, generates an additional \$3,190 in nominal savings over the remaining loan life.

Overall, our evidence suggests that exposure to business TV encourages borrowers to refinance their homes when doing so is financially advantageous. The refinancing decisions are associated with substantial economic savings, particularly for the less privileged households—those for whom such savings are likely most important for solvency and disposable spending.

The central contribution of this article is to establish the first link between exposure to financial media and refinancing decisions. Our evidence suggests that business TV can serve as a channel of education and a nudge against inertia, helping households avoid costly financial mistakes. We add to research on (i) the role of TV in the modern society, (ii) media and financial decisions, and (iii) household economics.

Our paper is part of the literature in economics that studies the role of TV as an information intermediary and examines its effects on individuals' behaviors (reviewed in DellaVigna and La Ferrara 2015). Prior work shows significant effects of TV on non-pecuniary outcomes, such as voter turnout (Gentzkow 2006), voting preferences (DellaVigna and Kaplan 2007; Martin and Yurukoglu 2017), cognitive scores (Gentzkow and Shapiro 2008), domestic violence (Jensen and Oster 2009; Card and Dahl 2011), and fertility choices (La Ferrara, Chong, and Duryea 2012; Kearney and Levine 2015).

Our paper departs from most of the prior work in two ways. First, in complement to prior work's focus on non-pecuniary outcomes, we provide the first evidence on the role of TV in one of the most important financial decisions faced by U.S. homeowners linked to the most valuable asset and the largest liability for the average household (Iacoviello 2011). Second, we conduct a novel investigation of business TV, a previously less explored segment of the TV market with potential for financial education—a topic of broad societal impact and a focus of extensive policy effort.

We also add to the research on mass media and financial decisions. This literature, reviewed in Tetlock (2015), has focused primarily on print media and investors' trading behavior. Most of this prior work finds a negative effect of the media on financial decisions. The media contributes to excessive trading (Barber and Odean 2008; Engelberg and Parsons 2011), trading on stale news (Tetlock 2011), short-term mispricing (Engelberg, Sasseville, and Williams 2012), and the projection of media biases onto investors (Gurun and Butler 2012; Ahern and Sosyura 2015). Our paper differs from this work on two dimensions.

First, we provide evidence on a relatively understudied news medium with broad coverage—business TV—and focus on the decisions of homeowners rather than investors. Second, in contrast to the mostly negative financial consequences of print media in prior work, we uncover significant positive effects, thus contributing to a more balanced perspective on the benefits and pitfalls of financial media.

Finally, our paper extends the literature in household economics, which singles out the refinancing decision as “one of the biggest financial decisions a household makes” (Campbell 2006). Given the importance of this decision, a surprisingly large number of households fail to refinance, foregoing large monetary savings. After accounting for various rational explanations for the failure to refinance, such as financial constraints and negative home equity, the literature estimates that up to 30% of U.S. households make a financial mistake by not refinancing their mortgage (Campbell 2006). Such mistakes are more prevalent among moderate-income borrowers and borrowers with less experience and education (Agarwal, Rosen, and Yao 2016). The main drivers of mistakes are information gathering costs, inattention, and inertia (Andersen, Campbell, Nielsen, and Ramadorai 2020). To address these challenges, much policy effort is dedicated to financial education, including government-sponsored mortgage counseling. Yet the efficacy of counseling remains modest (Agarwal et al. 2020).

We highlight an alternative mechanism of financial education that could help households overcome inaction and avoid costly mistakes. Prior work highlights reaching the target audience as one of the key challenges in financial education (Willis 2011). Compared to other methods of altering financial behavior, business TV has a unique capability of reaching people at home, with the average borrower four times more likely to use refinancing advice from the media than from mortgage counselors (NSMO 2018). Heinberg et al. (2014) and Lusardi et al. (2017) show that short video narratives with actionable suggestions have the highest impact on improving financial behaviors. Our findings highlight business TV as one mechanism of delivering this type of financial advice into people’s homes via brief TV episodes.

Gennaioli, Shleifer, and Vishny (2015) show analytically that access to a trusted financial expert, someone familiar and knowledgeable, is critical for households to overcome inaction and anxiety in financial decisions. Yet the groups of households needing a financial expert are often the ones unable to afford it. For these groups, financial advice from a familiar and trusted TV host could act as an alternative stimulus to overcome inaction in financial decisions. Our evidence suggests that business TV could serve as an auxiliary mechanism to improve financial behaviors, particularly for the less sophisticated borrowers often left out from the refinancing market and lacking other sources of financial advice.

1. Motivation: The Role of Media in Refinancing Decisions

1.1. Survey Evidence

We begin by offering motivating evidence on the role of financial media in refinancing decisions, using data from NSMO. Conducted quarterly by the Consumer Financial Protection Bureau since 2014, this survey covers a nationally representative sample of first-lien residential mortgages. For each borrower, the survey includes over 100 data points, combining demographic and financial information with questions about the borrower's decisions, information sources, and behaviors. We focus on the respondents who originated or refinanced their mortgage in 2014–2017 (earliest available data), a sample of 8,315 borrowers.

Table IA.1 in Internet Appendix A shows the fraction of borrowers who report relying on a given information source (other than their lender) in their mortgage decisions. The legend of the table details the survey design, and Columns 1 and 2 focus on all mortgages and refinancing mortgages, respectively. The results show that the media is an important information source for a significant fraction of borrowers, but even more so for refinancing decisions. In particular, 15.6% of refinancing borrowers rely on information from the media in their refinancing decisions. This fraction is even higher for refinancing groups with fewer alternative sources of financial advice, such as minorities (20.3%) and seniors (18.1%). Relative to other information sources, the role of the media is smaller than that of mortgage brokers (40.3%) and bankers (30.4%), but greater than that of real estate agents (14.8%) and housing counsellors (3.5%).

The role of the media is also sizable relative to the effect of formal programs of borrower education, such as mortgage counseling. Over the past decade, policy efforts in mortgage education have focused on funding counseling programs, such as the Department of Housing and Urban Development's Home Ownership Counseling Program, which provides free advice to over 500,000 mortgage borrowers a year via a network of 2,100 authorized counseling agencies. Government-sponsored counseling produces sizable local effects on mortgage activity (Sackett 2016), and it is heavily promoted by state and federal housing agencies. Yet, according to the survey, refinancing borrowers are four times more likely to obtain information from the media than from a housing counselor. This comparison underscores the importance of studying the role of financial media as a high-penetration, privately funded information source.

1.2. Reliance on Media in Refinancing Decisions across Borrower Groups

Figure IA.1 in Internet Appendix A shows how the reliance on media as an information source in refinancing decisions varies across borrower characteristics. Panel A focuses on financial experience and general education. The left pane shows that the media plays a more important role for borrowers who report

less experience with the mortgage process. This relation is unique to financial experience, rather than general education, as can be seen from the right pane, which shows that a borrower's reliance on media is unrelated to their educational attainment.

Panel B examines borrowers' financials. The media plays a more important role for financially constrained borrowers with lower incomes and lower credit scores. For example, 18.1% of lower-income refinancing borrowers (with annual incomes below \$50,000) rely on the media, compared to 13.9% of high-income borrowers (with annual incomes over \$100,000). This difference, statistically significant at 1% (t -statistic = 3.55), is consistent with the pattern that low-income borrowers are less able to afford alternative sources of financial advice, such as the services of financial planners and professional advisers (a result we confirm in untabulated tests based on the survey responses).

Panel C studies borrowers' demographics and shows a more significant role of the media in the refinancing decisions of minorities and seniors. For example, 20.3% of minority borrowers report relying on the media in their refinancing decisions, as compared with 14.8% of their white peers (t -statistic for this difference = 4.98). Similarly, 18.1% of senior borrowers (age 60 or above) report using information from the media, several percentage points higher than their younger counterparts.

While the current survey data suggest an economically important role of the media in refinancing decisions, its average effect is likely greater over a longer historical horizon. For example, the NSMO data suggest that nearly half of borrowers supplement their decisions with online research. Since the Internet emerged as a relatively recent alternative to business TV, the current survey estimates likely indicate a lower bound of the media effect on refinancing decisions over a longer period, such as our sample of 1990–2017.

In summary, about one in six borrowers relies on information from the media in the refinancing process. The media plays a more significant role for borrowers who have less experience with financial products. The media is also more important for moderate-income borrowers, seniors, and minorities.

2. Media Coverage of Refinancing and Possible Mechanisms

This section reviews potential mechanisms through which business TV could affect refinancing decisions. Using historical TV transcripts, we study the media coverage of refinancing across interest rate cycles and provide micro evidence on how a borrower's reliance on media is associated with refinancing outcomes.

2.1. Financial Awareness and Education

Financial media can increase borrowers' awareness of refinancing opportunities and educate the viewers about the refinancing process. As part of their programming, business TV networks include a variety of

programs aimed at financial education and mortgage refinancing in particular. This subsection provides examples of such programs across all business TV networks, and Internet Appendix B offers more detail.

The amount of programming dedicated to refinancing is counter-cyclical and increases during periods of low interest rates. A representative example of network programming dedicated exclusively to refinancing is a series of informational programs, titled Refi-Nation, which aired on FBN in 2011–2013. The Refi-Nation segments review a variety of refinancing topics, such as “How to refinance your home” and “When should I refinance my home?” Such segments inform viewers on the basics of refinancing, include interviews with mortgage experts, and offer financial advice.

Internet Appendix B.1 shows transcripts of some of these programs. They explain the refinancing process in simple terms, discuss the qualification criteria, and offer refinancing tips. Most segments feature popular hosts and appear as short episodes under 5–10 minutes, a format that aligns well with empirical evidence on the efficacy of financial education. Heinberg et al. (2014) find that short videos with actionable suggestions have the highest impact on viewers’ financial decisions, and subsequent work confirms this finding across a variety of financial behaviors (see Lusardi 2019 for a review). Busse and Green (2002) show that popular TV anchors enhance the viewers’ response to financial information.

Other networks offer similar programming. During the same period as Refi-Nation, CNBC ran a series of informational programs covering various aspects of refinancing, including government assistance for mortgage modifications. Internet Appendix B.2 illustrates the breadth of program content by providing references to sample segments, such as “How to Refinance your Home” and “What to Know before You Refinance.” Similarly, Bloomberg TV offers a variety of informational programs aimed at sophisticated viewers, emphasizing the nuances and pitfalls of refinancing (referenced in Internet Appendix B.2).

In addition to the dedicated programming tailored to mortgage refinancing, business TV networks offer personal finance shows that inform the viewer on various aspects of household finance, including refinancing decisions. A salient example is *The Suze Orman Show*, which ran in primetime on CNBC in 2002–2015. Hosted by Suze Orman, a financial advisor and book author on personal finance, the show dedicated most of its time to answering viewers’ questions, including those on home refinancing. Another example is *The Dave Ramsey Show*, which aired every weeknight in primetime on FBN and focused on managing household debt.

In summary, business TV offers a variety of programs aimed at financial education, including those dedicated to refinancing decisions, interest rates, and household debt. The education channel posits that such programs increase the viewers’ awareness of refinancing opportunities when they become attractive.

2.2. Nudge against Inertia

Financial media can increase the salience of refinancing opportunities and serve as a reminder to home owners who are already aware of refinancing options, but fail to exercise them due to inattention or inertia. Keys, Pope, and Pope (2016) find that the majority of households who fail to respond to a pre-approved, zero-cost refinancing offer attribute their decision to inattention (25%) or procrastination (33%).

Business TV increases the salience of refinancing opportunities in several ways. First, the average 30-year mortgage interest rate (or other interest rate indicators) is often included with key market data displayed throughout most programming as a running ticker tape. In this case, regardless of the program, business TV reminds the viewer of the current interest rates in a salient way, making it easy to compare the available market rates with the interest rate being paid on one's outstanding mortgage.

Second, business TV covers significant developments in the refinancing market as a part of general market news. For example, the rise in refinancing activity after a drop in interest rates often gets prominent coverage by all business networks, with salient headlines such as “Mortgage Refinance Applications Spike 79%” (CNBC) or “Plunge in Mortgage Rates Sparks Refinancing” (Bloomberg).¹ This news coverage can serve as a reminder about the option to refinance and induce the viewers to follow the example of other refinancing borrowers, acting as a nudge against inertia.

In summary, business TV reminds its viewers of their refinancing options by displaying current mortgage interest rates, covering substantial developments in refinancing activity, and featuring refinancing offers. This nudge increases the salience of refinancing options to financially aware households and helps them overcome inattention and inertia.

2.3. TV Coverage of Refinancing: Evidence from Broadcast Transcripts

Figure IA.2 shows the frequency of refinancing coverage on primetime business TV in 2000–2017. The dotted line (which corresponds to the left scale) plots the average fraction of primetime TV episodes aired on CNBC from 5 to 10 pm that mention the word ‘refinancing’ and its variations. The figure focuses on CNBC because its broadcast transcripts are available for the longest time series. The data on TV transcripts and their airing times come from The Internet Archive, a digital repository of media content, and Factiva.

The solid line in the figure plots the average interest rate on a 30-year fixed rate mortgage (FRM), shown on the right scale. Agarwal, Driscoll, and Laibson (2013) find that an interest rate drop of over 100

¹ CNBC: <https://www.cnn.com/2020/03/11/mortgage-refinance-applications-spike-79percent-as-interest-rates-sink.html>

Bloomberg: <https://www.bloomberg.com/news/videos/2019-08-08/plunge-in-mortgage-rates-sparks-refinancing-rush-video>

bps makes refinancing optimal under conservative assumptions for the majority of borrowers. Following this estimate, we construct an indicator *Beneficial to Refinance* to identify periods when the average interest rate on a 30-year FRM drops by least 100 bps from its peak over the trailing three years. These years (shown as shaded regions) include 2002, 2003, 2004, 2009, 2010, and 2011.

Figure IA.2 shows that TV coverage of refinancing increases sharply in response to large declines in interest rates that create profitable refinancing opportunities. During periods after interest rate drops, refinancing is discussed on 16.6% of primetime episodes, a three-fold increase relative to regular periods (5.5%). Put differently, one in six primetime episodes mentions refinancing during periods with strong refinancing incentives. This frequency is even higher at the start of the low interest rate cycles when attractive refinancing opportunities first become available. The TV coverage of refinancing peaks at 38.4% of primetime episodes in early 2002 and then again rises to 36.2% in mid-2009, the start of the next low-interest rate cycle. After several years in the low interest rate cycle, the coverage of refinancing declines, as this information likely becomes less novel and less relevant to the viewers who already refinanced.

In summary, business TV dedicates prominent primetime coverage to refinancing opportunities when they become profitable for a significant number of viewers. The strong temporal variation in media coverage in response to mortgage rates suggests that business networks follow refinancing incentives and alert the viewer when such incentives become attractive.

2.4. Micro Evidence from Borrowers' Refinancing Decisions

This section offers motivating evidence on how borrowers' reliance on media is correlated with their approach to refinancing. We study the aspects of refinancing related to the hypothesized role of the media in (1) increasing financial awareness, such as comparison shopping across lenders and understanding the option to refinance again in the future, and (2) borrowers' ability to overcome inertia, such as self-driven initiation of the refinancing process. These mechanisms are closely related and likely reinforce each other.

Table IA.2 studies how a borrower's reported reliance on media in the refinancing decision is associated with outcomes, using data from NSMO for refinancing borrowers in 2014–2017. The dependent variables capture the borrowers' initiation, evaluation, and completion of the refinancing loan. The main independent variable is the indicator *Media use*, equal to 1 for borrowers who report relying on information from the media in their refinancing decisions, and 0 otherwise. For each borrower, the control variables include demographics (age, gender, race, and number of applicants on the loan), measures of financial literacy and risk aversion (based on the embedded financial quiz and borrower's risk preferences,

respectively, as detailed in the legend), property and mortgage information (metropolitan vs. rural location, mortgage maturity, and interest rate spread), and measures of loan risk (loan-to-value ratio and credit score). To control for other sources of heterogeneity across borrowers and loans, all regressions include fixed effects for the borrowers' education and income bracket and for the loan's type and amount bracket. To absorb time trends and seasonality, all regressions include calendar year fixed effects and month-of-the-year fixed effects. The regressions are estimated as linear probability models.

Column 1 in Table IA.2 shows that borrowers who use information from the media are more likely to initiate contact on the refinancing application themselves rather than be solicited by the lender, broker, or a third party. This result is captured by the positive and significant coefficient on the term *Media use*.

Column 2 studies the next step in refinancing process—the evaluation of lenders before submitting an application. The dependent variable is an indicator that equals 1 if the borrower considers multiple lenders in search for the best loan terms, and 0 otherwise. This information comes from the question “How many mortgage lenders/brokers did you seriously consider before choosing where to apply?” and the follow-up question where the borrower specifies the main reason as selecting the best loan terms. The positive coefficient on *Media use* (significant at 1%) shows that borrowers who use information from the media in refinancing decisions are 14.9 percentage points more likely to evaluate loan terms at multiple lenders, consistent with better awareness of refinancing options and more comparison shopping.

Column 3 examines the application submission. The dependent variable is an indicator equal to 1 if the borrower submitted multiple refinancing applications, where the stated reason for doing so is “searching for better loan terms.” The positive and significant coefficient on *Media use* suggests that borrowers who use information from the media are 7.3 percentage points (or 37.6%) more likely to submit multiple applications in search for the best deal, consistent with overcoming inertia.

Column 4 studies the borrowers' financial awareness of the option to refinance again in the future and their comfort with the refinancing process. The dependent variable is an indicator that equals 1 if the borrower has expressed willingness to refinance the mortgage in the future, and 0 otherwise. The results show that borrowers who use information from the media are 4.2 percentage points (or 18.5%) more likely to refinance again in the future, consistent with an awareness of the option to improve the loan terms again.

In summary, households who use information from the media in refinancing decisions are more likely to personally initiate the refinancing process, evaluate multiple lenders before deciding where to apply, and submit several refinancing applications in search for the best loan terms. These results suggest that financial media could serve as an educator and an impetus in refinancing decisions.

3. Institutional Setting and Data

3.1. The Cable TV Market and Sources of Identification

Cable TV is an economically important information provider for homeowners. The number of cable TV subscribers in the U.S. increases in the 1990s, peaks at 68.5 million households in 2000, and gradually declines to 53.2 million households in 2017 (Federal Communications Commission 2017). The penetration of cable TV is higher among homeowners and older population groups (Pew Research Center 2015), consistent with survey evidence on their refinancing decisions (NSMO 2018).

We construct a panel dataset of local cable providers, their market penetration, and channel offerings in 1990–2017. We collect these data from historical TV & Cable Factbooks and programming guides, which we cross-verify and augment with Nielsen Focus, a dataset of the Nielsen Company. The Factbooks provide annual directories of the universe of the U.S. cable systems, their locations, geographic coverage, and channel offerings. Nielsen Focus, whose coverage begins in 1998, records each system’s geographic penetration (by zip code), provides its channel offerings, and lists each channel’s ordinal position in the local lineup. The Nielsen dataset also provides important details about each system’s technological infrastructure. This feature allows us to measure the local system’s capacity constraints and identify system upgrades that induce positive shocks to capacity constraints and lead to channel regroupings.

The cable industry usually operates as a local monopoly because of the high costs of laying cable. There are 9,253 local cable systems during our sample period. The median system covers four zip codes, and two thirds of zip codes have one cable provider.

The fragmented and locally monopolistic structure of the cable market creates valuable sources of identification for distinguishing the media effects from other variables. Figure IA.3 shows cross-sectional fragmentation in the cable market by showing the provider map for the state of New Jersey. The figure reveals sharp spatial discontinuities in the cable providers’ coverage across the same towns and counties. The rigidity of the cable grid, laid down in 1950–1970, introduces historical boundaries that divide modern communities and create isolated coverage pockets. For example, Figure IA.3 shows patches of coverage by Comcast and Charter Communications in Bergen County, which are encircled by Cablevision’s coverage. These patterns generate discontinuities in media exposure, while most other variables, such as household demographics, local economic activity, and credit availability evolve smoothly in their vicinity.

Another key source of identification comes from the timing of a channel’s entry into a zip code. To broadcast a TV channel in a local market, the TV network must enter into an agreement with the local cable system. An important source of variation in the timing of entry arises from capacity constraints on

the number of channels a cable system can carry. These constraints are driven by the local system architecture, the level of video compression and modulation, and the type of cable and amplifier equipment, which are largely exogenous for the TV network aiming to enter a local market.

When the local cable provider reaches capacity constraints, a new channel can be added only if an existing channel goes out or if the cable system undergoes a technological upgrade. The combination of these factors induces idiosyncratic variation in the timing of a channel's entry into a particular local market. Prior research shows that these factors generate quasi-random variation in channel availability across towns within the same county. For example, DellaVigna and Kaplan (2007) study the availability of Fox News across cable systems and conclude that "conditional on cable market size, the assignment to towns within a county or congressional district is essentially random." (p. 1205).

In summary, the cable market is geographically fragmented. In the cross-section, the historical cable grid creates discontinuities in media exposure within the same county. In the time-series, capacity constraints and the local system's architecture induce idiosyncratic variation in the timing of channel entry.

3.2. Business TV: Target Audience and Viewership Statistics

The main business TV networks include CNBC, FBN, and Bloomberg TV. Among these networks, CNBC was the first to launch in 1989. The target audience for CNBC is America's middle and upper class, as reflected in the channel's mission "to help the influential and aspirational to make astute decisions and get ahead." According to the 2010 Mendelsohn Affluent Survey, CNBC reaches 30% of people with six-figure annual incomes, more than any other business media: television, print, or online.

Bloomberg TV launched in 1994. To distinguish itself from the broad finance content of CNBC, Bloomberg TV tailored its programming to finance professionals. This niche focus somewhat constrained the network's expansion. By 2000, Bloomberg TV was available in just over 6,000 of the roughly 42,000 U.S. zip codes, mainly around the financial centers. After the turn of the millennium, Bloomberg TV gradually revised its programming towards a more general audience, but the network still commands the smallest penetration and viewership of the three business TV networks.

The final entrant into the business news market, FBN, launched in 2007. The network set the goal of making personal finance accessible to a diverse audience and positioned itself as the champion of Main Street. To execute this strategy, FBN launched a number of personal finance series, including those dedicated to personal debt management and home ownership, and recruited high-profile anchors with a broad public following, such as Maria Bartiromo (formerly with CNN and CNBC) and Jeff Flock (a 30-

year CNN veteran). FBN's emphasis on personal finance for Main Street proved effective for its growth. The network increased its reach from 30 million homes in 2008 to nearly 80 million homes in 2015.

The data reveal significant cross-sectional and time-series variation in networks' penetration into local markets. Even by the end of our sample in 2017, 32% of zip codes do not carry CNBC, 36% do not carry FBN, and 55% do not carry Bloomberg.

Figure 1 plots the viewership of business channels over time, using the data from Nielsen Local Television View (NLTV), available to us from 2005 to 2017. The viewership of business TV by the average household increases from 10 minutes per week in 2005 to 21 minutes per week in 2017. This increase comes mostly from the attraction of first-time viewers to FBN after its launch in 2007 rather than the switching of existing users from other business channels. In 2016, FBN overtakes CNBC as the most viewed business channel, a status it continues to hold at the time of writing.

In summary, despite the expansion of the Internet and social media, the viewership of business TV has increased over the past decade. CNBC, the oldest existing network, has the deepest market penetration. FBN recently overturned CNBC's leadership in viewership by attracting first-time business TV viewers. Bloomberg TV commands a narrower target audience with a primary focus on finance professionals.

3.4. Mortgage Refinancing

Our mortgage refinancing data come from the Home Mortgage Disclosure Act (HMDA) loan application registry. This application-level administrative dataset covers over 90% of the U.S. mortgage market (Dietrich et al., 2018). The dataset has three unique features useful for our identification. First, it covers both approved and denied refinancing applications, allowing us to separate the demand-side effects in borrowers' refinancing activity from the supply-side effects in banks' credit approvals. Second, the dataset provides information on the applicants' decisions on their submitted applications, such as the decision to abandon or withdraw an application and the decision to accept or reject the refinancing offer. Third, for each refinancing application, the dataset indicates the census tract of the property, allowing us to identify where the applicants live and receive their TV channels, even if they apply online or at a remote branch.

Panel B in Table 1 reports summary statistics for the refinancing data, averaged over the sample period. The average applicant earns \$83,000 per year, applies for a \$143,000 mortgage, and has a debt-to-income ratio of 1.89. In the average zip code, the annual value of submitted refinancing applications is \$93 million, of which 82% come from white applicants, 7% from Hispanics, and 5% from African Americans. About 6% of applications are left incomplete. Among the completed applications, 44% are approved.

4. Main Results

4.1. Empirical Design

Our baseline analysis studies whether exposure to business TV increases the propensity of households to refinance their mortgages in response to large declines in interest rates. While each borrower's financial circumstances are unique, Agarwal, Driscoll, and Laibson (2013) show that an interest rate drop of over 100 basis points makes refinancing financially optimal for the dominant majority of borrowers under conservative assumptions. Following this estimate, we construct an indicator *Beneficial to Refinance* to identify periods when the average interest rate on a 30-year FRM drops by over 100 bps from its peak over the trailing three years. These years include 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, and 2011.

The benefit of this approach is that it allows us to estimate the media effects for a long time series, analyze nearly the universe of refinancing applications, and derive easy-to-interpret economic estimates. The limitation is that this approach employs a uniform measure of refinancing incentives. We address this issue in Section 6.2, using a sample of borrowers with a detailed picture of personal refinancing incentives.

Our baseline tests exploit variation in exposure to business TV from the staggered introduction of FBN across zip codes, while controlling for time-persistent heterogeneity across zip codes and all dynamic variables at the county-year level (county \times year fixed effects). Our first analyses focus on the staggered entry of FBN, and our follow-up tests study the entry of CNBC and Bloomberg TV. Our decision to focus on FBN is motivated by three factors. First, FBN's target of making personal finance accessible to newbies and the general public is well suited for studying the advisory role of the media for the average household. Second, FBN has become the most watched financial channel, and much of its popular programming is dedicated to improving personal financial decisions, including special series on refinancing and home ownership. Third, FBN's staggered introduction in 2007–2015, which attracted a new audience of business TV viewers, allows us to implement additional analyses, using data available only in the latter part of our sample. Such analyses include incorporating cable systems' technical specifications into market entry decisions, studying the changes in households' online search activity, and testing the robustness of our results in a subsample of borrowers with personal data on refinancing incentives and realized savings.

4.2. The determinants of FBN entry

Table 2 studies the drivers of FBN's entry into regional markets. The dependent variable is an indicator that equals 1 in the year when FBN enters a given regional market, and 0 otherwise. The granularity of market definitions increases from the left to the right columns. Column 1 focuses on the designated market areas (DMAs), a common definition of a media market, which delineates the U.S. into 210 DMAs. Column

2 studies the entry into counties in the same DMA, while controlling for the DMA's attributes via DMA×year fixed effects. Column 3 examines the entry into zip codes within the same county, controlling for county×year fixed effects. The regressions are estimated as linear probability models.

Table 2 yields several conclusions. First, the entry of FBN is uncorrelated with prior refinancing activity, as measured by the trailing number of applications and their approval rate. This result holds for both refinancing variables and across all market definitions. We also perform a test of joint significance of the refinancing variables. The refinancing activity in the year before FBN entry cannot jointly explain the entry decision into the DMA (F -statistic=0.64, p -value=0.53), county (F -statistic=1.015, p -value=0.36), or zip code (F -statistic=1.34, p -value=0.26).

Second, local demographics explain FBN's entry into broad media markets, but are unrelated to its entry into zip codes within these markets. At the DMA level, FBN is more likely to enter a market with a greater population. The likelihood of entry is also positively associated with household income and negatively associated with debt-to-income ratios, but these relations are not statistically significant. The joint test of significance confirms the importance of local demographics for entry into DMAs (F -statistic=3.85, p -value=0.01). Column 2 shows that local demographics continue to matter for entry into counties, as indicated by the joint test of their significance (F -statistic=19.34, p -value=0.00). As expected, FBN prioritizes more populous counties. Column 3 finds that local demographics stop to matter for the network's entry into zip codes within the same county. None of the local demographics is related to FBN's entry into zip codes within the same county, whether considered individually or jointly (p -value for the joint test = 0.59). Thus, the examined demographic attributes of treated and control zip codes within a county-year are observationally equivalent. This is consistent with the evidence in DellaVigna and Kaplan (2007) that, within a given media market, the availability of Fox across towns and districts is quasi-random.

Third, FBN's market entry decisions are related to the capacity and architecture of the local cable systems, and these constraints induce useful variation in viewers' access to FBN across zip codes and cable grid boundaries. Table 2 shows that cable system characteristics, such as the technical capacity and the number of channels offered, are important determinants of FBN entry. These factors are jointly significant at 1% across all columns, and their effect increases at more granular market definitions.

In summary, FBN's entry into zip codes within a county is uncorrelated with prior refinancing activity and local demographics, consistent with the evidence of conditional random assignment in prior work. The variation in FBN exposure across zip codes within a county is related to capacity constraints of the local cable infrastructure and the historical pattern of the cable grid.

4.3. Exposure to FBN and Refinancing Activity

Table 3 studies the association between exposure to business TV and refinancing activity, using the staggered introduction of FBN across zip codes. The dependent variable is a measure of refinancing activity, defined as the natural logarithm of the dollar value of refinancing applications or their quantity. The unit of observation is a zip code-year. The model is estimated as a difference-in-differences specification with heterogeneous media effects. The binary indicator *Post FBN* is equal to 1 for all years after the FBN entry and 0 otherwise, and the binary indicator *Beneficial to Refinance* is equal to 1 during periods with favorable refinancing opportunities, as defined in Section 4.1. The main variable of interest is the interaction term *Beneficial to Refinance* \times *Post FBN*, which captures the effect of exposure to FBN on the uptake of refinancing opportunities in response to large declines in interest rates.

Our identification strategy compares changes in within-zip code refinancing propensity after the FBN entry between exposed and unexposed zip codes in the same county and year. To account for unobservable determinants of FBN entry into a county, all regressions include county \times year fixed effects, which capture all dynamic county-level variables, such as changes in economic prospects, demographic composition, and expected regulation. To absorb time-persistent heterogeneity between treated and untreated zip codes, we include zip code fixed effects. Control variables capture within-zip code changes in the composition of existing mortgage borrowers (potential refinancing pool), such as their income, debt-to-income ratio, and fraction of non-conventional loans, as well as changes in the local population, measured by the annual number of tax returns. Other controls capture the dynamic attributes of the local cable systems, such as the number of providers, infrastructure capacity, and the number of available channels. Here and henceforth, standard errors are double-clustered by zip code and year.

Table 3 shows that exposure to business TV increases local refinancing propensity in response to large declines in interest rates. Column 1 shows that a zip code's exposure to FBN is associated with a 6.3% greater increase in the refinancing volume during low interest rate periods, as compared to other zip codes in the same county with similar demographics. This effect, captured by the positive coefficient on the interaction term *Beneficial to Refinance* \times *Post FBN*, is statistically significant at 1% (t -statistic = 3.94). Relative to the average increase in the refinancing volume during beneficial-to-refinance periods (52%), this marginal effect is equivalent to adding one more refinancing application for every 8–9 applications normally submitted during low interest rate cycles. This estimate is broadly aligned with the out-of-sample survey evidence reported in Section 2, which suggests that about one in six mortgage borrowers relies on information from the media in their refinancing decision (NSMO 2018).

Column 2 shows that a zip code's exposure to FBN is associated with a 6.5% larger increase in the dollar value of refinancing applications during beneficial-to-refinance periods, as compared to unexposed zip codes in the same county, after including all controls and high-dimensional fixed effects. This result is significant at 1% with a t -statistic of 3.25. For the average zip code, this effect is equivalent to an extra \$6.7 million in refinancing applications per year and \$3 million in new refinancing loans.² The positive association between access to FBN and refinancing activity arises only during periods with favorable refinancing incentives, as shown by the insignificant coefficient on *Post FBN*. This contrast suggests that exposure to FBN induces borrowers to respond more actively to refinancing opportunities, but only when they become attractive. The temporal dichotomy in the media effect reduces the likelihood of a latent trend or an omitted variable because such an effect would need to switch off under stable or rising interest rates.

Columns 3 and 4 add additional controls for flexible pre-trends specific to each treated and untreated zip code. While the pre-treatment dynamics in refinancing activity are statistically indistinguishable between treated and untreated zip codes (Table 2), recent research (e.g., Kanh-Lang and Lang 2020) still recommends controlling for pre-trends explicitly in difference-in-differences specifications (Autor 2003 and Angrist and Pischke 2009). In columns 3 and 4, we add controls for zip code specific time trends by interacting zip code fixed effects with a linear time trend. These specifications yield similar results with comparable economic magnitudes despite a reduction in statistical power as the regression is saturated with high-dimensional fixed effects specific to each zip code.

Columns 5 and 6 restrict the comparisons between treated and control groups to neighboring zip codes whose center points are located within a 10-mile radius of each other. This criterion further refines the specification from within-county comparisons to within-district comparisons. The identification comes from the dichotomy in FBN exposure across cable grid boundaries that split districts into treated and untreated areas, while other local variables should evolve smoothly across the grid boundaries.

The most restrictive specifications that exploit only within-district comparisons with county \times year fixed effects and zip code \times time trend fixed effects yield very similar results to those in columns 3 and 4. According to column 5, a zip code's exposure to FBN is associated with a 5.1% greater increase in the refinancing volume during low interest rate periods, as compared to neighboring zip codes in the same

² The marginal increase in refinancing applications is computed based on the annual refinancing volume of \$103.7 million for the average zip code during beneficial-to-refinance years. The marginal increase in originated loans is based on the application approval rate of 45.1% during beneficial-to-refinance years.

county. This effect, significant at 1% (t -statistic = 3.40), is equivalent to adding one more refinancing application for every 10 applications normally submitted during beneficial-to-refinance periods.³

In summary, exposure to FBN increases refinancing activity in response to large declines in interest rates. This effect is robust to absorbing the determinants of FBN entry into counties, controlling for cross-zip code heterogeneity, and comparing across cable grid boundaries that split neighboring zip codes.

4.4. Robustness

This section reviews econometric caveats in staggered difference-in-differences estimators, provides robustness evidence, and offers an additional test of the parallel trends assumption.

Recent work in econometrics highlights the possibility of negative weights in difference-in-differences specifications that employ staggered treatments. This issue arises because the coefficients on the leads and lags of the treatment variable might place negative weights on the average treatment effects for certain groups and periods (Borusyak, Jaravel and Spiess 2021; Goodman-Bacon, 2021; Sun and Abraham 2021; de Chaisemartin and d'Haultfoeuille, 2020; Goldsmith-Pinkham, Hull and Kolesar 2021).

To address this issue, we follow Callaway and Sant'Anna (2020) and estimate separate event studies for each treatment cohort during the beneficial-to-refinance years. This approach ensures that there is only one treatment change, while holding the other constant, as suggested in de Chaisemartin and d'Haultfoeuille (2020). We then average the treatment effect across treatment cohorts to obtain an estimate for *Beneficial to Refinance* \times *Post FBN* that preempts the possibility of negative weights by research design.

Columns 1 and 2 in Table IA.3 show that our main results are similar in magnitude and significance when we re-estimate the effect of FBN exposure on refinancing activity after ruling out the possibility of negative weights. A zip code's exposure to FBN is associated with a 5.3% greater increase in the volume of refinancing applications (t -statistic = 4.82) and a 5.6% greater increase in their dollar value (t -statistic = 4.31) during beneficial-to-refinance periods, as compared to other zip codes in the same county and year.

Difference-in-differences estimators rely on the assumption of parallel trends between the treatment and control groups. Recent methodological work recommends an additional test of this assumption robust to heterogeneous and dynamic effects. De Chaisemartin and d'Haultfoeuille (2020) propose a placebo estimator in a stacked difference-in-differences framework that compares the outcome's evolution between treated and control groups in the periods immediately preceding the treatment.

³ This estimate is derived by comparing the 5.1% marginal increase in refinancing volume in treated zip codes to the unconditional average increase in the refinancing volume during beneficial-to-refinance periods (52%).

Columns 3 and 4 in Table IA.3 incorporate a placebo test of the parallel trends assumption into the stacked difference-in-differences framework. The results show no evidence of differential trends in refinancing activity between treated and untreated zip codes before exposure to FBN. This effect is captured by the insignificant coefficients on the placebo term *Beneficial to Refinance* \times *Post FBN*, which have near-zero point estimates (0.001–0.002) and small *t*-statistics (below 0.15). This result confirms our prior evidence that FBN entry into zip codes is uncorrelated with previous refinancing activity.

In summary, our results hold in a stacked difference-in-differences framework that eliminates the possibility of negative weights. Placebo estimators show no evidence of differential trends in refinancing activity between treated and control zip codes before their exposure to FBN.

4.5. Variation across Borrowers

This section examines the association between FBN exposure and refinancing activity across various groups of borrowers.

Columns 1 and 2 in Table 4 distinguish between regular applicants and government-protected applicants with non-conventional loans. Non-conventional loans support individuals with lower savings and tighter credit constraints with the assistance from the Federal Housing Administration, the Veterans' Administration, or the U.S. Department of Agriculture's Rural Housing Program. We find that exposure to FBN is associated with a greater increase in refinancing applications by government-assisted borrowers, and this difference is significant at 5%. The greater percentage increase in the refinancing activity by protected borrower groups is partially explained by their traditionally lower baseline refinancing propensity.

Columns 3 and 4 study how the link between exposure to financial TV and refinancing propensity varies with borrowers' credit constraints, proxied by their debt-to-income ratio at the time of application submission. The effect of FBN exposure on refinancing activity is stronger for leveraged borrowers with higher debt-to-income ratios—those for whom a reduction in monthly mortgage payments is likely to have a significant effect on disposable income.

Columns 5 and 6 show that exposure to FBN increases refinancing propensity both for white borrowers and minority borrowers, and this effect is significant at 1% for each of the racial groups. The point estimates on the term *Beneficial to Refinance* \times *Post FBN* are about 14% greater for minority borrowers, consistent with survey evidence, but this difference is not statistically significant.

Columns 7 and 8 show that exposure to FBN is associated with an increase in refinancing propensity both for high income and low income borrower groups—those in the top and bottom terciles of

annual income stated on refinancing applications, respectively. The relationship between exposure to FBN and refinancing propensity during beneficial-to-refinance periods is significant at 1% in each income group with statistically similar economic magnitudes.

In summary, exposure to FBN is associated with a broad-based increase in refinancing activity across borrowers with different incomes, credit constraints, and demographics, consistent with a wide TV audience. Our results hold for each of the examined borrower groups. The effect on refinancing is stronger for more leveraged borrowers and the traditionally more constrained government-protected groups.

4.6. Borrowers' Behaviors and Economic Mechanisms

This section presents suggestive evidence on the economic mechanisms through which media exposure could affect borrowers' refinancing behavior and search processes. We conjecture that business TV contributes to an increase in borrowers' awareness of and responsiveness to refinancing opportunities and helps households overcome inertia with salient reminders.

We first examine whether business TV serves as a complement or a substitute for other means of financial education. We focus on mortgage counseling, as it has been the primary focus of policy assistance with mortgage decisions (Agarwal et al. 2020). We obtain data on office locations of approved mortgage counsellors from the Department of Housing and Urban Development and measure ease of access to mortgage counseling by distance (in miles) from each zip code to the nearest counselling office. There is large variation in geographic access to counseling, and the interquartile range of this measure is 89 miles.

Column 1 in Table 5 shows that the association between FBN exposure and refinancing propensity is stronger for borrowers located further away from the nearest counseling office. This effect, significant at 1%, is captured by the positive coefficient on the triple interaction term *Beneficial to Refinance* \times *Post FBN* \times *Distance to Nearest Counsellor*. This result suggests that the media role as an information provider is more important when alternative sources of refinancing advice are scarce. This result is consistent with survey evidence in Section 2 that borrowers are more likely to rely on financial media in their refinancing decisions when they do not have access to mortgage counselors. In untabulated survey analyses in Section 2, we find that less experienced refinancing borrowers are more likely to rely on media when they do not have access to a mortgage counselor (17.4% report relying on media) than when they do (11.8%).

Survey evidence in Section 2 indicates that reliance on media is associated with a higher likelihood that borrowers evaluate loan terms across multiple lenders and submit multiple refinancing applications,

consistent with financial awareness and comparison shopping. We present two analyses in support of the media's contribution to mortgage shopping and tabulate the results in columns 2 and 3 of Table 5.

Column 2 shows how the link between media exposure and refinancing activity varies with the ease of lender comparisons, proxied by the density of bank branches in a zip code, using the annual panel of branch locations from the FDIC. The results show that the link between exposure to business TV and the propensity to refinance is stronger in areas with denser bank networks and easier lender benchmarking.

Column 3 provides evidence on borrower-initiated searches for refinancing opportunities, using geolocation data on the local Internet activity from Google Trends for 2004–2017. The dependent variable in this specification is the Google Search Volume Index in a given DMA (coarser geocoding in the data) for the word 'refinance' and its variations. Column 3 shows that the entry of FBN is associated with a significant increase in borrower-initiated searches for refinancing terms during low interest rate periods. This result is consistent with survey evidence in Section 2 that borrowers who rely on media in refinancing decisions are significantly more likely to self-initiate the refinancing process.

Finally, we examine borrower procrastination and inertia—the most commonly cited reasons for foregoing unambiguously profitable refinancing opportunities (Keys, Pope, and Pope 2016). To construct a measure of procrastination, we use the fraction of unfinished refinancing applications. While there are multiple reasons for leaving an application incomplete, the simplest one is leaving it to be done later and never getting back to it. Column 4 estimates our baseline specification of exposure to FBN entry, replacing the dependent variable with the share of incomplete refinancing applications. The results show that FBN entry into a zip code is associated with a 2.4 percentage point decline in the share of incomplete applications during beneficial-to-refinance periods, relative to other zip codes in the same county. This is a large decline relative to the unconditional frequency of incomplete applications (6%).

In summary, exposure to business TV is associated with a higher likelihood of borrower-initiated searches for refinancing options and a smaller fraction of unfinished applications, consistent with a greater awareness of refinancing options and less procrastination. The effects on refinancing are stronger in the absence of alternative sources of mortgage counseling, suggesting that business TV could serve as an auxiliary information mechanism for borrowers lacking other channels of financial advice.

4.7. Variation across Business Networks: CNBC and Bloomberg TV

This section studies how the link between exposure to business TV and local refinancing activity varies across business networks. We examine two other major networks—CNBC and Bloomberg.

Table 6 studies the effect of exposure to business TV on refinancing activity, using the staggered introduction of CNBC and Bloomberg into zip codes. As in our baseline specification in Section 4.3, we compare changes in zip code-specific refinancing propensity after the entry of CNBC (column 1) and Bloomberg (column 2) between exposed and unexposed zip codes in the same county and year. All regressions absorb unobservable heterogeneity between exposed and unexposed zip codes via zip code fixed effects and account for dynamic county-level drivers of entry, using county \times year fixed effects. The variable of interest is the term *Beneficial to Refinance* \times *Post Entry*, which captures the effect of exposure to a business network on the uptake of refinancing opportunities in response to large interest rate declines.

The results in column 1 show that the entry of CNBC is associated with a significant increase in refinancing activity during beneficial-to-refinance periods. The entry of CNBC is associated with a 6.5% greater increase in the refinancing volume during low interest rate periods, as compared to other zip codes in the same county and year (t -statistic = 2.71). This magnitude is comparable to the effect of FBN exposure in Section 4.3, as expected for two rival networks with the highest viewership during our sample period.

Column 2 shows that the entry of Bloomberg TV has no effect on local refinancing. The point estimate on the term *Beneficial to Refinance* \times *Post Entry* is miniscule (0.005) and indistinguishable from zero. This is consistent with the evidence that Bloomberg TV commands a small and specialized audience of financial professionals who are likely aware of refinancing options and developments in interest rates.

The sharp contrast in the association with refinancing activity between general-audience networks (FBN and CNBC) and professional financial TV (Bloomberg) suggests two conclusions. First, the media link to refinancing depends on the network's viewership breadth and target audience. Second, the sharp dichotomy between general-audience and professional audience networks reduces the likelihood of an omitted driver of network entry. While all networks face similar incentives to enter larger and wealthier markets, the increase in refinancing arises only if the media advice is likely novel to the treated population.

In summary, the association between exposure to business TV and refinancing propensity arises only for general-audience networks, but not for the professionally oriented Bloomberg TV. Thus, the media effects likely require viewership breadth and a sufficient slack in borrowers' refinancing behavior.

5. Evidence from Channel Positions and their Reshufflings

This section offers two alternative experiments to test the link between business TV and refinancing activity by exploiting variation in the channels' ordinal positions. This approach restricts the analyses to zip codes that broadcast the same business channels in the same year, thus accounting for the drivers of

networks' entry into local markets. The first experiment exploits variation in a channel's ordinal position resulting from channel allocation rules specific to local cable systems. The second experiment exploits shocks to the channels' ordinal positions resulting from channel regroupings during system upgrades.

5.1. Channels' Ordinal Positions and Viewership

The typical household in our sample receives a large number of channels. The average (median) cable system broadcasts 237 (213) channels. With so many options and a limited attention span, a viewer is more likely to watch the same channel if it appears closer to the top of the lineup (e.g., position 15 rather than 60). First, people have a positive bias favoring the top of the list, as shown across settings theoretically (Rubinstein and Salant 2006; Horan 2010) and empirically (Lohse 1997; Galesic et al. 2008; Feenberg et al. 2017). Second, the average TV viewer spends about one fifth of the viewing time on surfing channels to pick something to watch (Ericsson Consumer Lab 2016). A lower ordinal position increases a channel's likelihood of entering a viewer's opportunity set by placing it closer to the default options.

Figure 2 shows that the same business channel is more likely to be watched if it appears closer to the top of the lineup. The figure reveals a strong negative association between a business channel's ordinal position and its viewership in the local market. Table IA.4 shows that this relation is significant at 1% in a regression, whether estimated for all business channels collectively (column 1) or for each channel separately (columns 2–4). According to the point estimate in column 1, a one standard deviation decline in the minimum lineup position (44 slots) is associated with a 16.6% increase in a channel's viewership.

The variation in the channel lineup has a plausibly exogenous component driven by the channel allocation rules, which vary across providers and locations. Many cable systems add new channels sequentially to the end of the lineup in the order in which they join the system. Other systems allocate new channels to the best available slot—that is, the vacant position closest to the top of the lineup that opens up from discontinued channels. Still others pair up sister channels of the same TV network, such as Fox News and FBN, or pair up channels in the same genre, such as Fox Business, Bloomberg, and CNBC.

The allocation rules induce large and persistent variation in channels' ordinal positions across markets. For example, the interquartile range of the ordinal positions for FBN and Bloomberg is 105 and 116 slots, respectively, indicating large variation in their salience to local viewers across zip codes. The mean autocorrelation of a channel's position in a zip code is 0.96, suggesting that channels rarely change slots. Major shifts in channels' slots usually result from channel regroupings after system upgrades.

Recent work shows that the rule-based assignment of channels to ordinal slots in the cable lineup introduces some exogenous variation in channels' positions uncorrelated with the local viewers' demographics, economic attributes, and political leanings. Martin and Yurukoglu (2017) provide evidence on the relationship between the cable channels' positions in the lineup, local demographics, and viewership. First, using viewership data for 34 major cable channels, they show that the same channel receives higher viewership when it appears closer to the top of the cable lineup. Second, they find that "channel positions do not correlate with demographics that predict viewership" (p. 2565) and reject the hypothesis that a channel is placed closer to the top of the lineup in areas with higher expected demand for this channel. They conclude that cable channel positions serve as valid instruments for viewership. Using this instrument for channel viewership, they find that political slant on TV shifts voter preferences.

Table IA.5 validates the premise that the ordinal position of a business channel in the local cable lineup is uncorrelated with the predicted demand for this channel and the local residents' economic attributes. For each of the three business channels, we regress total viewership (the demand for business content) on the local residents' economic and demographic attributes in each zip code, such as their population, income per capita, wages, employment, and number of business establishments. We then take the predicted values from this model (i.e., the expected business new demand) and regress them on the minimum lineup position across the business channels (column 1). We repeat this process for each of the three business channels separately (columns 2-4). If local cable systems assign ordinal positions for business channels by catering to local demand, we should expect a strong negative correlation between the lineup positions of each of the business channel and its predicted viewership, indicating that these channels are placed closer to the top of the lineup in areas with greater expected demand.

The results in Table IA.5 show that the ordinal positions assigned to business channels in the local cable lineups are uncorrelated with their predicted viewership based on economic fundamentals. The coefficients on the lineup position are close to zero and statistically insignificant, whether estimated for all business channels jointly (column 1) or for each channel separately (column 2-4). This result is consistent with the evidence in Martin and Yurukoglu (2017) that the assignment of cable channels to vacant slots is uncorrelated with their expected local demand, but generates large variation in their future local viewership.

In summary, the same channel attracts more viewers when it appears closer to the top of the local cable lineup. A channel's ordinal position in the lineup is determined by system allocation rules, vacant channel slots, and the timing of system upgrades. These factors add an exogenous source of variation in the channel's ordinal position uncorrelated with local economic fundamentals.

5.2. Evidence from Channel Positions in the Cable Lineup

This subsection examines the association between exposure to business TV and refinancing activity by using the channels' ordinal positions in the cable lineup as a measure of their salience to the local viewers.

Table 7 studies how the link between the introduction of FBN and refinancing activity (our baseline specification) varies with the ordinal position assigned to the channel at its entry into the cable lineup. Columns 1 and 2 augment our baseline specification with the variable *Log (Lineup Entry Position)*, defined as the natural logarithm of the ordinal position assigned to FBN upon its addition to the local cable lineup. Columns 3 and 4 replace the continuous measures of FBN's ordinal position at entry with dummy variables that indicate the channel's assignment to the top or bottom half of the cable lineup. The dependent variables capture local refinancing activity in a zip code-year, measured by the number of refinancing applications (odd columns) or their dollar volume (even columns). All regressions include zip code fixed effects, county \times year fixed effects, and dynamic controls for the composition of existing mortgage borrowers (i.e., potential refinancing pool), such as their population, income, and other attributes.

Panel A in Table 7 shows that the positive link between exposure to FBN and the propensity to refinance during periods of low interest rates weakens if FBN is assigned a less salient slot in the cable lineup. In columns 1 and 2, this effect is captured by the negative and significant coefficient on the term *Beneficial to refinance \times Post FBN \times Log (Lineup Entry Position)*. Columns 3 and 4 yield a similar conclusion and show that the increase in refinancing propensity upon FBN entry is about half as large if this channel is allocated a slot in the bottom half of the channel lineup rather than the top half.⁴

Panel B restricts the sample only to zip codes selected for FBN entry. This specification effectively mutes selection effects in FBN entry by comparing only the zip codes in the same county that FBN enters in the same year. The variation in FBN exposure comes from the differences in the ordinal slots assigned to FBN by the local cable systems that serve different zip codes in the same county. The results in columns 1–2 show that across only the zip codes selected for FBN entry, the increase in refinancing propensity is weaker when FBN is assigned to a more distant (peripheral) slot in the local lineup. Columns 3–4 show that the effect of FBN is significantly stronger if this channel is allocated to the top half of the cable lineup.

Table 8 expands the analysis to all business channels. This table exploits the variation in the business channels' minimal ordinal position in the local lineup as a measure of the local viewers' exposure

⁴ For example, in column 3 of Panel A, this differential effect can be seen by comparing the coefficient on the term *Beneficial to Refinance \times Post FBN \times Low Lineup Entry Position* (coefficient = 0.087; *t*-statistic = 5.44) and that on the term *Beneficial to Refinance \times Post FBN \times High Lineup Entry Position* (coefficient = 0.042; *t*-statistic = 2.63).

to their content. The dependent variables measure local refinancing activity in a zip code-year, proxied by the volume of refinancing applications or their total dollar amount. As in the main specifications, all regressions include zip code fixed effects, county \times year fixed effects, and a system of dynamic controls for the economic and demographic attributes of the existing mortgage borrowers.

The results in Table 8 show that borrowers are more likely to refinance their mortgages in response to interest rate declines if their cable system features a business channel in a lower, more salient ordinal position. This effect is captured by the negative and significant coefficient on the interaction term *Beneficial to refinance* \times *Min log (lineup)*, where the latter variable indicates the minimal position of a business channel in the local cable lineup. According to column 1, a one-standard deviation move of a business channel (44 slots) closer to the top of cable lineup is associated with a 1.1% greater increase in the refinancing volume during beneficial-to-refinance periods, as compared to other zip codes in the same county and year that receive the same business channels but in more peripheral (higher) slots.

In summary, we confirm that exposure to business TV is associated with a greater increase in local refinancing, using an alternative measure of media exposure that exploits variation in channels' ordinal positions. By comparing zip codes in the same county that broadcast the same business channels but in different ordinal slots, this approach accounts for selection in the networks' entry into local markets.

5.3. Channel Reshufflings

This subsection exploits a discrete shock to channels' ordinal positions resulting from a staggered switch from analogue to digital TV.

The Digital Television Transition and Public Safety Act of 2005 required full-power TV stations in the U.S. to switch from analogue to digital television by June 12, 2009. This transition necessitated a technical upgrade by the local cable providers to accommodate digital broadcasting, resulting in two major effects on the local cable lineups. First, it relaxed constraints on the number of channels in the local lineups because digital channels occupy significantly less capacity than analogue ones. Second, it often triggered a one-time regrouping of the channels by genre to organize the new cable lineup.

The channel regrouping resulted from a mandated technological transition, applied to the entire lineup (mean = 237 channels), and was not driven by business channels. The regrouping of the channels produced a one-time, discontinuous shift in channels' ordinal positions and their salience to local viewers, while leaving unchanged borrowers' refinancing incentives and their demographic and financial characteristics. An example in the introduction illustrates how a one-time regrouping of channels by genre

produced a discrete upward shift in their ordinal positions in one local market, placed them in the vicinity of popular news programs, and significantly increased their viewership.

To exploit a positive shock to business TV exposure in select markets, we identify local system upgrades that satisfy three criteria. First, the lineup regrouping moves FBN or CNBC (the mainstream business channels) closer to the top of the lineup. Second, said channels are available in the local lineup for at least four years before the upgrade (to avoid contamination by channel introductions). Third, the local upgrade occurs during a year with strong refinancing incentives (beneficial-to-refinance period).

We identify 1,286 cable system upgrades across 3,661 zip codes that satisfy these criteria. These system upgrades produce the mean upward shift in a business channel's position of 30 slots closer to the top of the lineup, with a standard deviation of 49 positions. We define a control group of zip codes as those where the system upgrades did not result in channel regroupings.

Table 9 exploits a discrete upward shift in the prominence of business channels to local viewers due to channel regroupings. The dependent variable is the volume of refinancing applications in a zip code-year. The regressions are estimated in a difference-in-differences framework, where the first difference is from before to after the regrouping, and the second is between treated and control zip codes. We use entropy balancing to construct a control group of zip codes that are observationally equivalent to the treated group in the pre-treatment year on the mean values of refinancing activity, cable system attributes (minimal position of business channels, capacity, and the number of channels and cable providers), and demographics (borrower income, population, non-conventional loans, and new business starts), as shown in Table IA.6.

Column 1 shows that a one-time upward shift in the prominence of business TV to the local viewers is followed by a significant increase in their refinancing activity. This effect, captured by the positive coefficient on the term *Beneficial to Refinance* \times *Treated*, is significant at 1% (t -statistic = 2.75). The point estimate indicates that a one-time increase in the local prominence of business channels (mean shift = 30 slots) is followed by a 3.3% greater increase in refinancing activity in treated zip codes than in a control group of observationally indistinguishable zip codes. Relative to the average increase in the refinancing volume during beneficial-to-refinance years (52%), this effect is equivalent to adding an extra application for every 16 applications normally submitted.

Column 2 compares the effect of regroupings that lift a business channel into one of the top 30 slots in the cable lineup (marked by the indicator *Top 30*) with the effect of other regroupings that produce upward moves of similar magnitude elsewhere in the lineup. We find that the increase in refinancing is associated with the regroupings that move a business channel into the most salient top 30 slots. This effect

is shown by the positive coefficient (significant at 1%) on the term *Beneficial to Refinance* \times *Treated* \times *Top 30*. In contrast, other upward moves in business channels' positions that do not place them into the top 30 slots are associated with positive but statistically insignificant changes in refinancing.

Column 3 replaces the discrete indicator *Treated* with a continuous measure of a channel's move in the lineup. The variable *Change in Channel Position* captures the difference in a business channel's ordinal position from before to after the reshuffling. This specification shows a similar pattern. A reduction in a business channel's ordinal position (an upward move) is associated with an increase in refinancing activity, as shown by the negative coefficient on *Beneficial to Refinance* \times *Change in Channel Position*.

In summary, the federally-mandated upgrade from analogue to digital TV induced a regrouping of channels across cable systems, producing a persistent shift in the channels' salience to the local viewers without changing their refinancing incentives. A discrete increase in the prominence of business channels to local viewers is followed by an increase in their take-up of refinancing opportunities.

6. Refinancing Outcomes

This section examines the refinancing incentives of individual borrowers and studies how their refinancing propensity and speed vary with exposure to business TV. We also provide evidence on the borrowers' savings from refinancing and changes in their mortgage interest rates. Given the complexity of the refinancing decision and the possibility of unobservable factors, we view this evidence as suggestive.

6.1. Savings from Refinancing

To construct loan-specific measures of refinancing incentives and outcomes, we collect details on a borrower's outstanding mortgage (e.g., origination date, interest rates, type, remaining balance, etc.) and personal financials (e.g., credit score, income, and leverage) from the Fannie Mae Single Family Loan Performance files, which include two datasets. The primary file contains fixed rate mortgages originated after January 1, 1999 and acquired by Fannie Mae between January 1, 2000 and March 31, 2016. The secondary dataset contains over one million mortgage loans included in the primary file and subsequently refinanced through the Home Affordable Refinance Program (HARP) program between April 1, 2009 and September 30, 2016. The data include over 100 characteristics of the mortgage, its borrower, and the underlying property. The loans in the datasets are linked with a mapping identifier, allowing us to study which mortgages are refinanced and how their financial terms change after refinancing.

Figure 3 plots the distribution of changes in the loan interest rate and monthly payment after refinancing. The top pane, which depicts interest rate reductions, shows a sharp spike in the distribution

mass at 100 bps. This pattern confirms the conclusions in Agarwal, Driscoll, and Laibson (2013) that a reduction in the mortgage interest rate of at least 100 bps makes refinancing optimal for the overwhelming majority of borrowers. This pattern is also consistent with our definition of beneficial-to-refinance periods.

The data confirm that mortgage refinancing generates significant savings. For the average borrower, mortgage refinancing reduces the interest rate by 197 bps and the monthly loan payment by \$218. Given the mean remaining loan maturity of 290 months, this effect generates nominal savings of \$63,220 over the remaining mortgage life or \$37,104 in present value terms (if discounted at 5%).

Table 10 studies the association between access to FBN in a zip code at the time of refinancing (an indicator) and borrowers' savings from the refinancing decision.⁵ It provides evidence on the intensive margin by focusing only on successfully refinanced mortgages. The dependent variable is a reduction in the loan interest rate (column 1) and monthly payment (column 2). Control variables include the determinants of mortgage interest rates, such as the borrower's credit score, loan amount, and maturity. All specifications also control for the local and temporal determinants of interest rates by using state \times month fixed effects and absorb time-persistent heterogeneity across zip codes by including zip code fixed effects.

Table 10 shows that local access to FBN at the time of the refinancing decision is associated with greater monetary savings. Borrowers residing in zip codes with access to FBN obtain 13 bps lower interest rates (column 1) and pay \$11 less per monthly loan payment (column 2) than other borrowers with similar credit scores and loan attributes who reside in the same state and apply in the same month, but do not have access to FBN. For the average borrower, these differentials aggregate to an extra \$3,190 in nominal savings over the remaining loan life or \$1,853 in present value terms (under a 5% discount rate).

The additional reduction in mortgage interest rates is consistent with the survey evidence in Section 2.4 and Table IA.2 that borrowers using refinancing advice from the media are more likely to evaluate multiple lenders before submitting an application and more likely to submit multiple applications with the stated goal of "searching for better loan terms."

In summary, refinancing borrowers realize large monetary savings. Borrowers with access to FBN obtain lower interest rates than their unexposed peers who have similar credit scores and apply for similar loans at the same time. This effect is consistent with borrowers' survey responses that financial advice from the media encourages comparison shopping across lenders in pursuit of better refinancing offers.

⁵ The Fannie Mae Loan Performance dataset defines zip codes by their first three digits, and we follow this definition throughout the analyses in Section 6 as the most granular unit of geospatial variation available in these data.

6.2. Loan-Level Incentives and the Propensity and Speed of Refinancing

Our main analyses use a time-series measure of refinancing incentives based on the changes in the market interest rates for residential mortgages. While this measure accommodates long-run analyses for a large fraction of the mortgage market, it masks important cross-sectional variation in the refinancing incentives across borrowers. This subsection examines the refinancing incentives of individual borrowers.

As a proxy for loan-specific refinancing incentives, we calculate the difference between a loan's interest rate and the market interest rate for the respective loan type observed in a given month. Greater values of this measure imply stronger refinancing incentives.

Panel A in Figure 4 plots the distribution of loan-level refinancing incentives (vertical bars), and the observed probability of refinancing (solid line), measured as the ratio of refinanced loans to the total number of eligible-to-refinance loans at various incentive bins, as in Andersen et al. (2020). The distribution of financial incentives to refinance is symmetric and centered slightly above zero, indicating slightly positive refinancing incentives during the sample. The probability of refinancing (solid line) rises steeply when mortgage interest rates drop by at least 100 bps relative to the original interest rate embedded in the mortgage, consistent with the threshold we use for defining beneficial-to-refinance periods.

Panel B in Figure 4 compares the propensity to refinance in response to interest rate incentives between zip codes that have access to FBN at the time of the observation and other zip codes in the same state and month that do not have FBN access. The figure plots estimates from a regression where the dependent variable is the observed probability of refinancing in a zip code-month. The estimates control for zip code fixed effects and state \times month fixed effects.

Panel B yields two conclusions. First, borrowers with access to FBN (dotted line) are more likely to respond to refinancing incentives than their peers in the same state whose cable providers do not carry FBN (solid line). Second, the gap in the refinancing propensity between these groups arises only in the presence of strong refinancing incentives (100+ bps) and generally expands with the strength of these incentives (up to 300 bps). In contrast, the refinancing behavior in zip codes with and without FBN is nearly indistinguishable under weak refinancing incentives (0–75 bps). These conclusions refine our main results with a more precise, mortgage-specific measure of refinancing incentives.

Panel C examines how the speed of refinancing varies with local borrowers' access to FBN. Using a Cox proportional hazard model and loan-level data at monthly frequency, we estimate the likelihood of refinancing at different time intervals in the presence of strong incentives (i.e., the average mortgage rate is 100+ bps below the loan's interest rate). The solid line plots the time-to-refinance survival function for

borrowers located in zip codes with access to FBN before refinancing, and the dashed line plots the corresponding function for zip codes without FBN access.

Panel C reveals four patterns. First, borrowers are slow to respond to refinancing incentives, consistent with inattention (Agarwal, Rosen, Yao 2016; Andersen et al., 2020). Second, many borrowers fail to refinance, no matter how long they face strong incentives, consistent with inertia (Keys, Pope, and Pope, 2016). Third, borrowers with access to FBN are quicker to refinance when faced with similar loan-level incentives. Finally, at any interval before the limiting time horizon, access to FBN is associated with a higher refinancing propensity in response to similar loan-level incentives.

Next, in addition to similar interest rate incentives, we refine our comparisons to borrowers who also have similar credit scores, live in the same state, and hold similar-size loans with the same vintage and maturity. We construct a sample of borrowers matched on the following characteristics: (1) credit score, (2) state of residence, (3) loan amount, (4) loan interest rate, (5) loan origination month, and (6) loan maturity. After imposing these criteria on a pool of loans issued before 2007 (the year of FBN launch), we arrive at a sample of 538,279 matched loan pairs, as detailed in the footnote.⁶ Table IA.7 shows that the treatment and control groups are statistically indistinguishable across all matching attributes.

Panel A of Table 11 studies how access to FBN is associated with the likelihood of refinancing in a sample of mortgages matched on said loan-level and borrower-level characteristics. Each observation is a mortgage (along with its borrower's attributes), and the dependent variable is an indicator that equals 1 if a mortgage is refinanced, and 0 otherwise. All regressions include matched pair fixed effects. This specification compares the loans within each matched pair that have nearly the same borrower and loan attributes but receive exposure to FBN at a different time. Coefficient estimates are multiplied by 100.

Column 1 in Panel A shows that a borrower with FBN access is 1.53 percentage points (or about 5.6%) more likely to successfully refinance their loan than their peer with the same credit score who lives in the same state, owes a similar mortgage amount, and pays a similar interest rate. In column 2, we define an indicator that equals 1 if a loan is refinanced during the temporal gap (*Gap*) between the entry of FBN into the treated zip code and the control zip code in the same state. The results in column 2 show that the differential propensity to refinance increases after the entry of FBN into the treated zip code but before its entry into the control zip code—that is, during the period of their differential access to FBN. Columns 3–

⁶ Consider original mortgages A and B that are outstanding in 2007 and have the same matching attributes (e.g., interest rate, vintage, maturity, amount to the nearest \$5,000, etc.) but belong to borrowers in different zip codes in the same state. Suppose, FBN enters the zip code of loan A in 2007 and the zip code of loan B in 2009. In our comparisons between loans A and B, we consider loan A as the treated loan for the two-year gap between 2007 and 2009 when the residents of loan A's zip code have access to FBN, but the residents of loan B's zip code do not. This matching process yields 538,279 matched loan pairs: 538,279 early adopters of FBN (the treated group) and 538,279 late adopters (the control group), with each pair having a unique time gap between FBN's entry into the treated and control zip codes.

6 introduce interaction effects with the measures of refinancing incentives, defined as the difference between the original interest rate on the loans in the matched pair and the average mortgage rate available in a given month. The results suggest that the positive association between access to FBN and the likelihood of refinancing within a matched loan pair increases in the presence of stronger refinancing incentives.

Panel B in Table 11 performs a similar loan-level analysis in a sample matched on mortgage and borrower characteristics, but focuses on the speed of refinancing. The dependent variable is the time to refinancing, measured in months. Since incentives to refinance are on average positive during the sample period, Column 1 shows that borrowers with access to FBN are quicker to refinance their mortgages than their peers who live in the same state, hold mortgages with similar balances, and pay similar interest rates, but whose cable providers do not broadcast FBN at the time of refinancing. According to column 2, exposure to FBN is associated with a four-month shorter response time to refinancing when the prevailing mortgage rates are more than 100 bps lower than the mortgage's original interest rate. Other columns show that the difference in refinancing speed is more pronounced in the presence of stronger incentives.

In summary, the association between exposure to business TV and refinancing propensity persists when we match borrowers on observable characteristics and consider only successfully refinanced loans rather than loan applications. A borrower with access to FBN is more likely to refinance their loan than a peer with the same credit score who lives in the same state, owes a similar mortgage amount, and pays a similar interest rate. Exposure to FBN is also associated with a higher speed of refinancing.

7. Conclusion

We have studied how business TV affects a household's management of its main financial liability, using three sources of variation: (1) network's entry into a zip code; (2) channel's ordinal position assigned by the cable system, and (3) channel reshufflings after system upgrades. Borrowers exposed to business TV exhibit savvier refinancing behaviors, such as a higher refinancing propensity, faster response, and fewer incomplete applications. These behaviors generate large economic savings. The effects are driven by general-audience networks (FBN and CNBC) and do not arise for the professionally oriented Bloomberg TV.

Our results suggest that financial media could play a role in increasing financial awareness and helping households overcome inertia. A better understanding of this role is important, given the societal interest in increasing financial literacy and the unique position of business TV as a privately funded source with vast content production capabilities and a wide reach into people's homes. Our paper makes a step towards compiling systematic evidence on the viewership patterns of business TV, its content, and role in financial decisions. Given the importance of TV for the average household and the policy interest in financial education, the intersection of these topics presents promising opportunities for future research.

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Figure 1
Business channel viewership

This figure plots business channel viewership overtime for the three major business channels as well as in total. This graph illustrates the average viewership per week (in minutes) for the three cable business channels: CNBC, Fox Business Network, and Bloomberg TV, as well as their combined total, in the United States from 2005 to 2017. Note that Fox Business makes its debut in 2007.

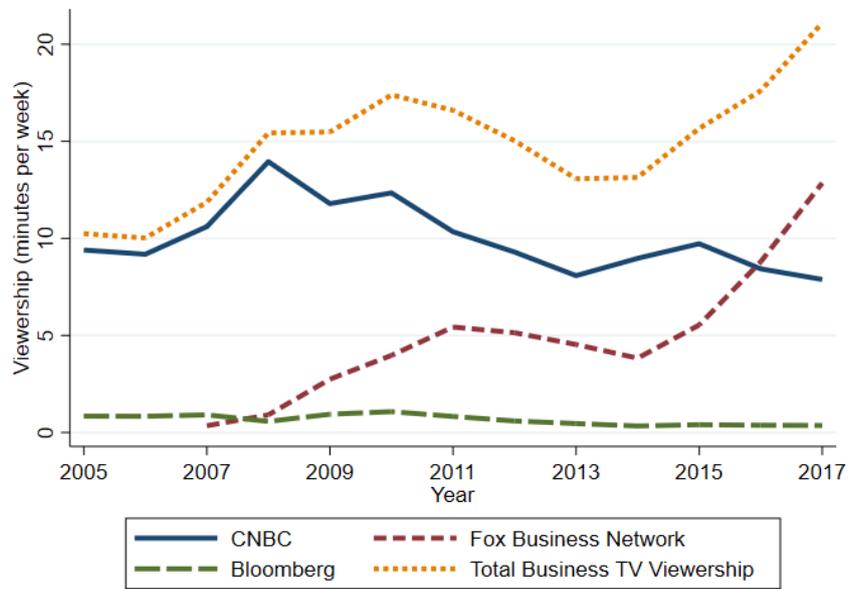


Figure 2
Scatter plot of business TV viewership against business channel lineup position

This figure illustrates the correlation between the total business TV viewership (minutes per week) across the three business channels (CNBC, Bloomberg and FBN) and the natural logarithm of minimum business channel lineup position across the three business channels (CNBC, Bloomberg and FBN). Our analysis organizes observations at the zip-code-year level into 40 groups, determined by lineup positions. We calculate the average rating points for each group. The size of each circle on the graph corresponds to the number of observations within that particular bin. The line on the graph represents the linear regression fit between the average viewership and lineup positions. The coefficient for this relation is -0.36, which is statistically significant at the 1% level.

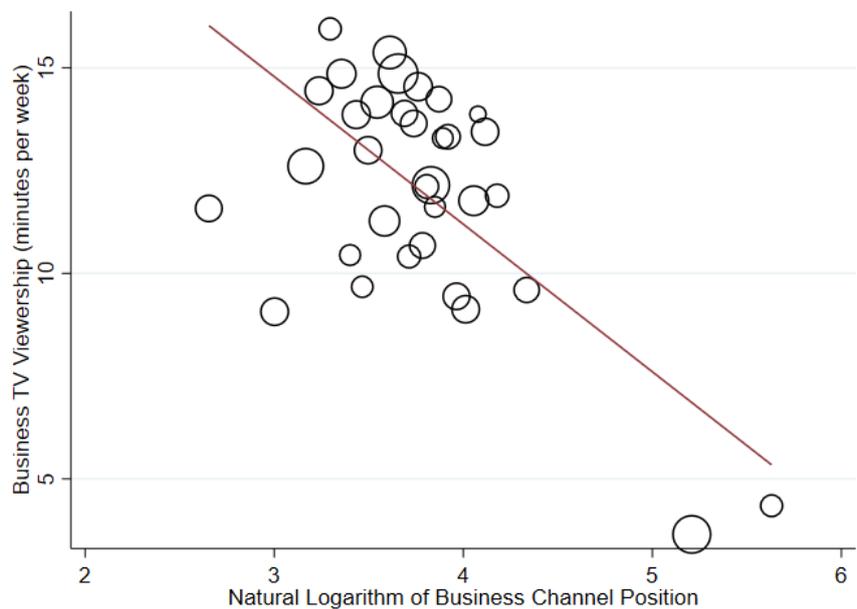
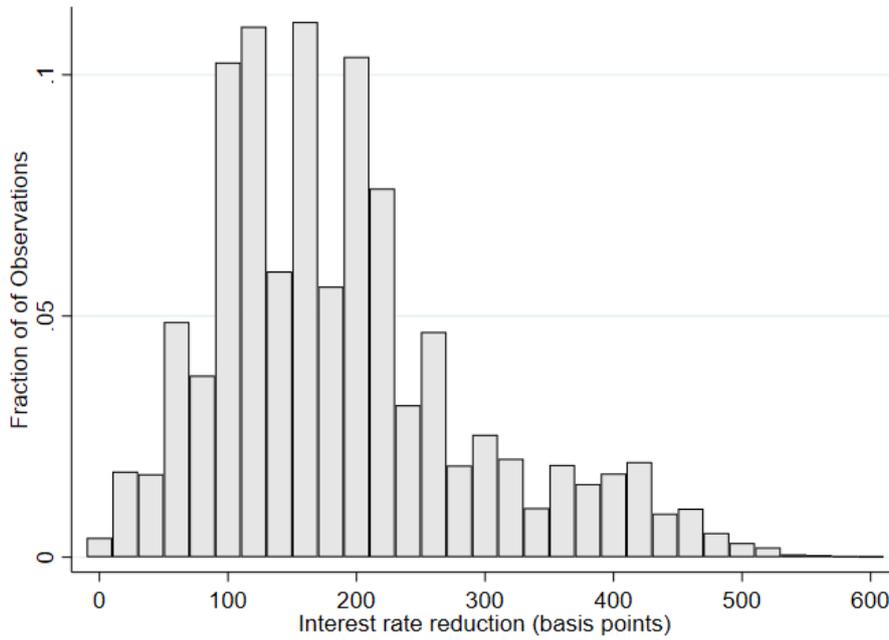


Figure 3
The benefits of refinancing

This figure plots the distribution of the interest rate reduction (panel (a)) and monthly repayment reduction (panel (b)) after refinancing. To identify refinance events, we utilize data from the Fannie Mae Single Family Loan Performance file. We calculate the differences in interest rates and monthly repayments (before minus after) surrounding these refinance events.

Panel (a) Distribution of the reduction in mortgage rate after refinancing



Panel (b) Distribution of the reduction in monthly mortgage repayments after refinancing

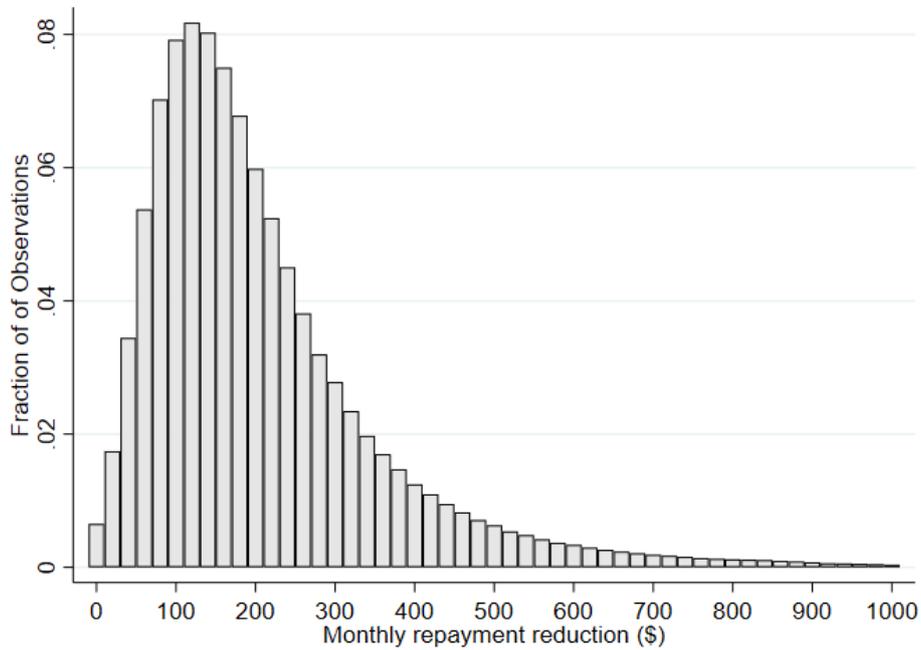
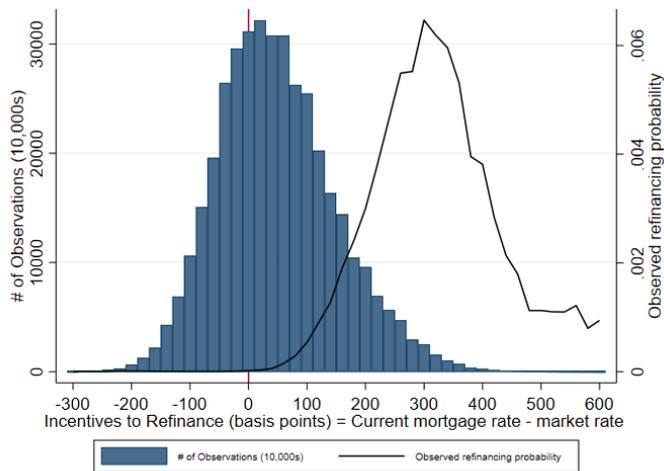


Figure 4

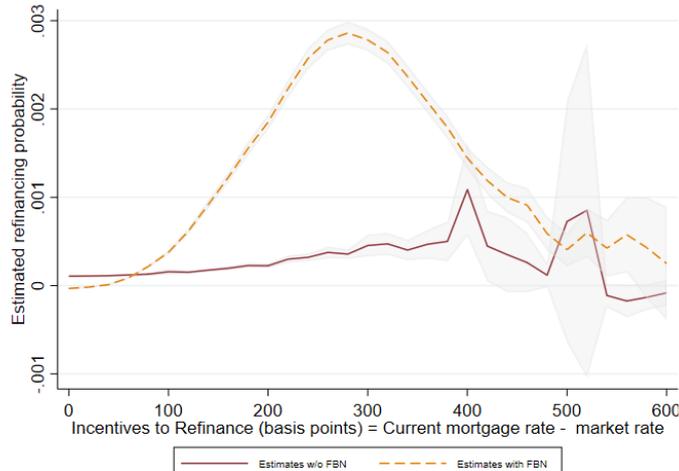
Incentives and the probability of refinancing

This figure presents three plots related to incentives to refinance (i.e., current mortgage rate minus market rate) and the probability of doing so. Data come from the Fannie Mae Single Family Loan Performance file. Panel (a) plots the number of loan-month observations across incentive bins (positive incentives imply the market rate is below a loan's current rate) in blue bars. Overlaid is the observed probability of refinancing (i.e., the ratio of refinancing to the total number of observations) at various incentive bins. Panel (b) provides estimates of the probability of refinancing at the three-digit zip-code-month level for areas with and without Fox Business Network at the time of refinancing. The estimates control for three-digit zip-code fixed effects and state-by-year-month fixed effects. The shaded area around the point estimates represents 95% confidence intervals. Panel (c) plots the survival curves (Cox proportional hazard model) for loans with and without Fox Business Network and whose current mortgage rate is at least 100 basis points higher than the current mortgage rate.

Panel (a) Distribution of incentives to refinance



Panel (b) Estimated probability of refinancing



Panel (c) Survival curves for loans with and without FBN

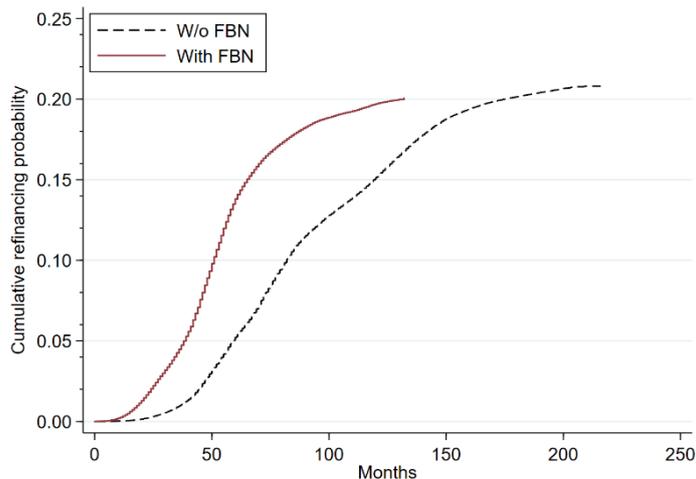


Table 1**Summary statistics**

This table reports summary statistics. The reported values are time-series averages over the sample period: January 1990 to December 2017. Panel A describes local cable television systems and their viewership, using two administrative datasets from the Nielsen Company: Nielsen Local Television View and Nielsen FOCUS. Panel B describes refinancing loans and their borrowers, using data from the Home Mortgage Disclosure Act (HMDA) loan application registry. Panel C describes zip-code level controls. The number of observations is 351,239 and corresponds to the number of zip-code years.

	mean	std	p25	p50	p75
Panel A: Media					
Fox lineup position	157.21	81.53	106.00	129.00	211.00
CNBC lineup position	45.48	32.84	32.00	40.00	48.00
Bloomberg lineup position	172.11	89.81	106.00	130.00	222.00
Min lineup position	49.47	43.78	32.00	40.00	49.00
Number of Cable Systems per zip code	1.74	1.02	1.00	1.00	2.00
Number of Channels in Cable System Lineup	236.65	106.29	158.00	213.00	340.00
Panel B: Borrower and loan characteristics					
Annual number of applications per zip code	465.77	749.16	38.09	168.24	576.58
Application approval rate	0.44	0.11	0.37	0.44	0.51
Annual value of applications (\$'000) per zip code	92623.84	187715.83	4410.81	22705.23	96640.31
Value Weighted application approval rate	0.44	0.12	0.36	0.44	0.51
Borrower income (\$'000 per year)	82.73	58.92	55.77	70.01	94.19
Loan amount (\$'000)	143.58	164.68	75.34	111.15	170.84
Debt-to-Income ratio	1.89	0.83	1.52	1.88	2.28
Fraction of non-white applications	0.18	0.09	0.13	0.18	0.23
Fraction of non-conventional applications	0.23	0.18	0.07	0.19	0.36
Fraction of male applicants	0.57	0.15	0.54	0.60	0.65
Fraction of Hispanic applicants	0.07	0.13	0.01	0.02	0.06
Fraction of African American applicants	0.05	0.11	0.00	0.01	0.04
Fraction of Asian applicants	0.02	0.06	0.00	0.00	0.02
Application incompleteness rate	0.06	0.03	0.04	0.05	0.07
Panel C: Zip-code controls					
Borrower income (\$'000 per year)	83.73	58.92	56.77	71.01	95.19
Loan amount (\$'000)	144.58	164.68	76.34	112.15	171.84
Debt-to-Income ratio	1.89	0.83	1.52	1.88	2.28
Fraction of non-conventional applications	0.23	0.18	0.07	0.19	0.36
Number of income tax filings (000)	7.84	1.47	6.75	7.94	9.11
Distance to nearest mortgage counsellor, miles	20.21	23.45	5.00	13.20	26.60
Number of bank branches per zip code	1.36	0.76	1.00	1.00	2.00

Table 2**Determinants of Fox Business Network entry in media markets, counties and zip-codes**

This table presents analysis of the zip-code level determinants of Fox Business Network entry using OLS. The dependent variable, *FBN Entry*, is an indicator equal to 1 if Fox Business Network is available in zip-code z at time t and 0 otherwise. The independent variables are categorized into three groups: refinancing activity at $t-1$, cable system characteristics at t and demographic variables at t . Past refinancing activity is captured by the following variables: (i) *Log(Lagged Number of applications)*, the natural logarithm of the number of refinancing applications; and (ii) *Lagged Approval Rate*, the ratio of approved applications to total applications in a given zip-code. Cable system characteristics include (i) *Number of Cable Systems* is the number of unique cable providers in zip-code z at time t ; (ii) *Total Channel Capacity* is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (iii) *Number of Channels Currently Offered* is the number of channels currently offered by any cable provider in zip-code z at time t . Demographic variables include: (i) *Log(Number of Tax Returns Filed)* which is the number of income tax returns filed in zip-code z and time t (to proxy for local population); (ii) *Borrower Income* which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; and (iv) *Fraction non-conventional applications* which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t . The bottom of the table presents F -statistics and p -values for the tests of joint significance for each category of independent variables (i.e., refinancing activity at $t-1$, cable system characteristics at t and demographic variables at t). Standard errors in column (1), standard errors clustered by DMA and year in column (2) and clustered by county and year in column (3) are reported in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)	(3)
	DMA Level	County Level	Zip-code Level
Log(Lagged Number of applications)	-0.053 (0.053)	-0.013 (0.009)	-0.003 (0.003)
Lagged Approval rate	0.275 (0.485)	-0.071 (0.066)	0.033 (0.026)
Number of Cable Systems	0.188* (0.112)	0.078*** (0.016)	0.059*** (0.004)
Total Channel Capacity	0.756*** (0.228)	0.528*** (0.037)	0.640*** (0.019)
Number of Channels Currently Offered	-0.439** (0.175)	-0.111*** (0.016)	-0.130*** (0.008)
Log(Number of Tax Returns Filed)	0.097*** (0.027)	0.059*** (0.007)	0.005 (0.003)
Fraction non-conventional applications	0.033 (0.338)	0.064 (0.063)	0.017 (0.021)
Debt-to-Income ratio	-0.048 (0.130)	0.023 (0.020)	0.006 (0.006)
Borrower income (\$'000 per year)	0.061 (0.101)	-0.009 (0.018)	0.001 (0.008)
Observations	284	8,061	57,022
R-squared	0.193	0.531	0.789
DMA \times Year FE	No	Yes	No
County \times Year FE	No	No	Yes
Joint F test (Refinancing variables)	0.643	1.015	1.337
p-value	0.526	0.363	0.263
Joint F test (Cable system attributes)	5.114	116.09	822.9
p-value	0.002	0.000	0.000
Joint F test (Demographics)	3.847	19.34	0.700
p-value	0.005	0.000	0.592

Table 3
Media exposure and refinancing activity: Evidence from Fox Business Network entry

This table presents OLS regression results of refinancing activity on exposure to business TV, using the staggered introduction of FBN across zip-codes as the source of variation in media exposure. The dependent variables measuring refinancing activity are: (i) $\text{Log}(\text{Number of applications})$, the natural logarithm of the number of refinancing applications in zip-code z at time t ; and (ii) $\text{Log}(\text{Value of applications})$, the natural logarithm of the value of refinancing applications in zip-code z at time t . The independent variable of interest is $\text{Beneficial to Refinance} \times \text{Post FBN}$ where Post FBN is an indicator equal 1 for all years t after Fox Business Network enters zip-code z and 0 otherwise; and $\text{Beneficial to Refinance}$ is an indicator equal to 1 if the Freddie Mac 30-year fixed mortgage rate in year t is at least 100bps lower than the maximum interest rate in the prior 3 years and 0 otherwise, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Columns 1 and 2 represent our benchmark regressions. Columns 3 and 4 replace zip-code fixed effects with zip-code specific linear time trends. Columns 5 and 6 are the results from a geographic matched sample where only treatment and control firms within 10 miles of each other remain in the sample. Control variables include local cable system and demographic characteristics. Cable system characteristics include (i) $\text{Number of Cable Systems}$ which is the number of unique cable providers in zip-code z at time t ; (ii) $\text{Total Channel Capacity}$ is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (iii) $\text{Number of Channels Currently Offered}$ is the number of channels currently offered by any cable provider in zip-code z at time t . Demographic variables include: (i) $\text{Log}(\text{Number of Tax Returns Filed})$ which is the number of income tax returns filed in in zip-code z and time t (to proxy for local population); (ii) Borrower Income which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (iii) $\text{Debt-to-Income Ratio}$ which is debt-to-income ratio of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; and (iv) $\text{Fraction non-conventional}$ which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t . Robust standard errors clustered by zip-code and by year are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline		Accounting for zip-code specific time trends		Control zip-codes within 10 miles	
	Log(Number of applications)	Log(Value of applications)	Log(Number of applications)	Log(Value of applications)	Log(Number of applications)	Log(Value of applications)
Post FBN	-0.027*	-0.027	-0.014	-0.019	-0.025	-0.023
	(0.013)	(0.017)	(0.011)	(0.013)	(0.012)	(0.015)
Beneficial to Refinance \times Post FBN	0.063***	0.065***	0.059***	0.056**	0.051***	0.052**
	(0.016)	(0.020)	(0.016)	(0.019)	(0.015)	(0.018)
Observations	351,239	351,239	351,239	351,239	324,121	324,121
R-squared	0.948	0.964	0.975	0.982	0.947	0.964
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	No	No	No	No
Zip FE \times Time trend	No	No	Yes	Yes	Yes	Yes
County \times Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4
FBN exposure and refinancing activity across various applicant characteristics

This table presents OLS regression results of refinancing activity on exposure to business TV, using the staggered introduction of FBN across zip-codes as the source of variation in media exposure, for subsamples based on differing borrower characteristics. The dependent is $\text{Log}(\text{Number of applications})$, the natural logarithm of the number of refinancing applications in zip-code z at time t , for a particular applicant characteristic. Conventional/Non-conventional considers conventional vs. non-conventional (i.e. government supported) loans; Low/High debt-to-income considers low (below median) vs. high (above median) debt to income ratio loans; White/Non-white considers applications from the white and non-white populations; and Low income/High income considers applications from low (bottom tercile) income vs. high (top tercile) income applicants. The independent variable of interest is $\text{Beneficial to Refinance} \times \text{Post FBN}$ where Post FBN is an indicator equal 1 for all years t after Fox Business Network enters zip-code z and 0 otherwise; and $\text{Beneficial to Refinance}$ is an indicator equal to 1 if the Freddie Mac 30-year fixed mortgage rate in year t is at least 100bps lower than the maximum interest rate in the prior 3 years and 0 otherwise, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Control variables include local cable system and demographic characteristics. Cable system characteristics include (i) $\text{Number of Cable Systems}$ which is the number of unique cable providers in zip-code z at time t ; (ii) $\text{Total Channel Capacity}$ is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (iii) $\text{Number of Channels Currently Offered}$ is the number of channels currently offered by any cable provider in zip-code z at time t . Demographic variables include: (i) $\text{Log}(\text{Number of Tax Returns Filed})$ which is the number of income tax returns filed in in zip-code z and time t (to proxy for local population); (ii) Borrower Income which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (iii) $\text{Debt-to-Income Ratio}$ which is debt-to-income ratio of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; and (iv) $\text{Fraction non-conventional}$ which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t . Robust standard errors clustered by zip-code and by year are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Conventional loans	Non-conventional loans	Low (< median) debt-to-income	High (> median) debt-to-income	White borrowers	Non-white borrowers	Low (1 st tercile) income	High (3 rd tercile) income
Beneficial to Refinance \times Post FBN	0.062*** (0.016)	0.098*** (0.033)	0.033* (0.019)	0.057*** (0.019)	0.065*** (0.017)	0.074*** (0.015)	0.054*** (0.014)	0.066*** (0.019)
Diff (B - A)	-0.036		-0.024		-0.009		-0.017	
Z statistic (H0: A = B)	-1.963**		-1.787*		-0.794		-1.441	
Observations	351,239	351,239	351,239	351,239	351,239	351,239	351,239	351,239
R-squared	0.948	0.927	0.937	0.950	0.945	0.947	0.937	0.950
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County \times Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5
Mechanisms: Access to mortgage counselling, mortgage shopping and incomplete applications

This table provides evidence on the possible mechanisms behind the media-refinancing relation. The dependent variables are (i) $\text{Log}(\text{Number of applications})$, the natural logarithm of the number of refinancing applications (Columns 1 and 2); (ii) Google Search Volume Index (SVI) for the term "refinance" and its variants (Column 3); and (iii) and $\text{Share of Incomplete Applications}$, the number of incomplete refinancing applications (i.e., those that are initiated but never finalized) relative to total applications in zip-code z and time t (Column 4). The independent variable of interest is $\text{Beneficial to Refinance} \times \text{Post FBN}$ where Post FBN is an indicator equal 1 for all years t after Fox Business Network enters zip-code z and 0 otherwise; and $\text{Beneficial to Refinance}$ is an indicator equal to 1 if the Freddie Mac 30-year fixed mortgage rate in year t is at least 100bps lower than the maximum interest rate in the prior 3 years and 0 otherwise, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. $\text{Distance to the Nearest Mortgage Counsellor}$ is the distance (in miles) from zip-code z to the nearest mortgage counsellor in year t . $\text{Bank Branch Density}$ is the number of branches in zip-code z in year t . Control variables include local cable system and demographic characteristics. Cable system characteristics include (i) $\text{Number of Cable Systems}$ which is the number of unique cable providers in zip-code z at time t ; (ii) $\text{Total Channel Capacity}$ is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (iii) $\text{Number of Channels Currently Offered}$ is the number of channels currently offered by any cable provider in zip-code z at time t . Demographic variables include: (i) $\text{Log}(\text{Number of Tax Returns Filed})$ which is the number of income tax returns filed in in zip-code z and time t (to proxy for local population); (ii) Borrower Income which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (iii) $\text{Debt-to-Income Ratio}$ which is debt-to-income ratio of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; and (iv) $\text{Fraction non-conventional}$ which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t . Robust standard errors clustered by zip-code and by year are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)	(3)	(4)
	Log(Number of applications)		Google SVI for "refinance"	Share of Incomplete Applications
	Factor = Distance to Nearest Mortgage Counsellor	Factor = Bank Branch Density		
Beneficial to Refinance \times Post FBN	-0.214*** (0.042)	0.055*** (0.016)	4.285* (2.278)	-0.024** (0.009)
Beneficial to Refinance \times Post FBN \times Factor	0.095*** (0.012)	0.020** (0.009)		
Observations	349,832	351,239	2,912	351,239
R-squared	0.949	0.948	0.738	0.885
Control	Yes	Yes	No	Yes
Zip FE	Yes	Yes	No	Yes
County \times Year FE	Yes	Yes	No	Yes
Year FE	No	No	Yes	No
DMA FE	No	No	Yes	No

Table 6**CNBC and Bloomberg entry and local refinancing activity**

This table presents OLS regression results of refinancing activity on exposure to business TV, using the staggered introduction of CNBC (Column 1) and Bloomberg (Column 2) entry across zip-codes as the source of variation in media exposure in zip-code z and time t . The dependent variables measuring refinancing is $\text{Log}(\text{Number of applications})$, the natural logarithm of the number of refinancing applications. The independent variable of interest is *Beneficial to Refinance* \times *Post Entry* where *Post Entry* is an indicator equal 1 for all years t after CNBC/Bloomberg enters zip-code z ; and *Beneficial to Refinance* is an indicator equal to 1 if the Freddie Mac 30-year fixed mortgage rate in year t is at least 100bps lower than the maximum interest rate in the prior 3 years and 0 otherwise, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Control variables include local cable system and demographic characteristics. Cable system characteristics include (i) *Number of Cable Systems* which is the number of unique cable providers in zip-code z at time t ; (ii) *Total Channel Capacity* is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (iii) *Number of Channels Currently Offered* is the number of channels currently offered by any cable provider in zip-code z at time t . Demographic variables include: (i) *Log(Number of Tax Returns Filed)* which is the number of income tax returns filed in in zip-code z and time t (to proxy for local population); (ii) *Borrower Income* which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; and (iv) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t . Robust standard errors clustered by zip-code and by year are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1) CNBC entry	(2) Bloomberg entry
Post Entry	0.020 (0.020)	-0.009 (0.014)
Beneficial to Refinance \times Post Entry	0.065*** (0.024)	0.005 (0.012)
Observations	457,799	343,951
R-squared	0.959	0.949
Control	Yes	Yes
Year FE	No	No
Zip FE	Yes	Yes
County \times Year FE	Yes	Yes

Table 7**The amplifying effects of a salient channel position at entry on local refinancing activity**

This table examines the influence of the channel position assigned to FBN by local cable providers on the FBN entry-refinancing relation. Panel A presents the results for the full sample and Panel B presents the results for the selected sample of zip-codes that have access to FBN (i.e., $Post\ FBN = 1$). The dependent variables measuring refinancing activity are: (i) $\text{Log}(\text{Number of applications})$, the natural logarithm of the number of refinancing applications in zip-code z and time t ; and (ii) $\text{Log}(\text{Value of applications})$, the natural logarithm of the value of refinancing applications in zip-code z and time t . In Columns 1 and 2 the independent variables of interest are: (i) $\text{Beneficial to Refinance} \times \text{Post FBN}$; and (ii) $\text{Beneficial to Refinance} \times \text{Post FBN} \times \text{Log}(\text{Lineup Entry Position})$. Post FBN is an indicator equal 1 for all years t after Fox Business Network enters zip-code z ; $\text{Log}(\text{Lineup Entry Position})$ is the natural logarithm of the channel number FBN is assigned upon entry; and $\text{Beneficial to Refinance}$ is an indicator equal to 1 if the Freddie Mac 30-year fixed mortgage rate in year t is at least 100bps lower than the maximum interest rate in the prior 3 years and 0 otherwise, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. In Columns 3 and 4 the independent variables of interest are $\text{Beneficial to Refinance} \times \text{Post FBN} \times \text{Low Lineup Entry Position}$ and $\text{Beneficial to Refinance} \times \text{Post FBN} \times \text{High Lineup Entry Position}$ where $\text{Low Lineup Entry Position}$ ($\text{High Lineup Entry Position}$) is equal 1 if FBN enters zip-code z with a channel number lower (higher) than the sample median entry position. Control variables include local cable system and demographic characteristics. Cable system characteristics include (i) $\text{Number of Cable Systems}$ which is the number of unique cable providers in zip-code z at time t ; (ii) $\text{Total Channel Capacity}$ is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (iii) $\text{Number of Channels Currently Offered}$ is the number of channels currently offered by any cable provider in zip-code z at time t . Demographic variables include: (i) $\text{Log}(\text{Number of Tax Returns Filed})$ which is the number of income tax returns filed in zip-code z and time t (to proxy for local population); (ii) Borrower Income which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (iii) $\text{Debt-to-Income Ratio}$ which is debt-to-income ratio of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; and (iv) $\text{Fraction non-conventional}$ which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t . Robust standard errors clustered by zip-code and by year are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1) Log(Number of applications)	(2) Log(Value of applications)	(3) Log(Number of applications)	(4) Log(Value of applications)
Panel A: Full Sample				
Post FBN	-0.011 (0.102)	-0.031 (0.129)	-0.028* (0.015)	-0.030 (0.020)
Beneficial to Refinance \times Post FBN	0.315*** (0.100)	0.357** (0.127)		
Beneficial to Refinance \times Post FBN \times Log(Lineup Entry Position)	-0.052** (0.019)	-0.060** (0.024)		
Post FBN \times Log(Lineup Entry Position)	-0.002 (0.020)	0.002 (0.025)		
Beneficial to Refinance \times Log(Lineup Entry Position)	0.011*** (0.002)	0.013*** (0.004)		
Beneficial to Refinance \times Post FBN \times Low Lineup Entry Position			0.087*** (0.016)	0.091*** (0.022)
Beneficial to Refinance \times Post FBN \times High Lineup Entry Position			0.042*** (0.016)	0.045** (0.020)
Observations	351,239	351,239	323,149	323,149
R-squared	0.948	0.964	0.951	0.965
Control	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes
County \times Year FE	Yes	Yes	Yes	Yes
	(1) Log(Number of applications)	(2) Log(Value of applications)	(3) Log(Number of applications)	(4) Log(Value of applications)
Panel B: Conditional on FBN Entry (Selected Sample)				
Beneficial to Refinance \times Post FBN \times Log(Lineup Entry Position)	-0.048* (0.025)	-0.056* (0.030)		
Beneficial to Refinance \times Post FBN \times Low Lineup Entry Position			0.049** (0.022)	0.057* (0.027)
Observations	175,514	175,514	175,514	175,514
R-squared	0.951	0.951	0.951	0.951
Zip FE	Yes	Yes	Yes	Yes
County \times Year FE	Yes	Yes	Yes	Yes

Table 8**Business channel lineup position and local refinancing activity**

This table examines the link between local business channel position in the lineup and local refinancing activity. The dependent variables measuring refinancing activity are: (i) $\text{Log}(\text{Number of applications})$, the natural logarithm of the number of refinancing applications in zip-code z and time t ; and (ii) $\text{Log}(\text{Value of applications})$, the natural logarithm of the value of refinancing applications in zip-code z and time t . The independent variable of interest is $\text{Beneficial to Refinance} \times \text{Log}(\text{Lineup position})$ where $\text{Log}(\text{Lineup position})$ is the natural logarithm of the minimum lineup position of the three business channels in zip-code z and time t ; and $\text{Beneficial to Refinance}$ is an indicator equal to 1 if the Freddie Mac 30-year fixed mortgage rate in year t is at least 100bps lower than the maximum interest rate in the prior 3 years and 0 otherwise, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Control variables include local cable system and demographic characteristics. Cable system characteristics include (i) $\text{Number of Cable Systems}$ which is the number of unique cable providers in zip-code z at time t ; (ii) $\text{Total Channel Capacity}$ is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (iii) $\text{Number of Channels Currently Offered}$ is the number of channels currently offered by any cable provider in zip-code z at time t . Demographic variables include: (i) $\text{Log}(\text{Number of Tax Returns Filed})$ which is the number of income tax returns filed in in zip-code z and time t (to proxy for local population); (ii) Borrower Income which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (iii) $\text{Debt-to-Income Ratio}$ which is debt-to-income ratio of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; and (iv) $\text{Fraction non-conventional}$ which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t . Robust standard errors clustered by zip-code and by year are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)
	Log(Number of applications)	Log(Value of applications)
Beneficial to Refinance \times Log(Lineup position)	-0.021** (0.007)	-0.019** (0.008)
Observations	351,239	351,239
R-squared	0.948	0.964
Control	Yes	Yes
Zip FE	Yes	Yes
County \times Year FE	Yes	Yes

Table 9**Channel regroupings, business channel salience and local refinancing activity**

This table presents results from analysis of channel lineup reshufflings that lead to a discrete upward shift in the prominence of business channels to local viewers, and their association with local refinancing activity. The sample includes 1,286 lineup reshufflings across 3,661 zip codes. The regressions are estimated in a difference-in-differences framework on a restricted time period, where the first difference is from before to after the regrouping, and the second is between treated and control zip codes. The dependent variables measuring refinancing activity are: (i) $\text{Log}(\text{Number of applications})$, the natural logarithm of the number of refinancing applications in zip-code z and time t . The independent variable of interest in Column 1 is $\text{Beneficial to Refinance} \times \text{Treated}$ where Treated is an indicator equal 1 for zip-code z if z experiences a channel reshuffling and zero otherwise; and $\text{Beneficial to Refinance}$ is an indicator equal to 1 in the post-reshuffling period & if the Freddie Mac 30-year fixed mortgage rate in year t is at least 100bps lower than the maximum interest rate in the prior 3 years and 0 otherwise. In Column 2, the variable Top 30 is an indicator equal 1 if the channel reshuffling leads to a business channel moving into a top 30 position in the lineup. In Column 3, the variable $\text{Change in Channel Position}$ is the inverse hyperbolic sine transformed numerical change in business channel position after reshuffling. Control variables include local cable system and demographic characteristics. Cable system characteristics include (i) $\text{Number of Cable Systems}$ which is the number of unique cable providers in zip-code z at time t ; (ii) $\text{Total Channel Capacity}$ is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (iii) $\text{Number of Channels Currently Offered}$ is the number of channels currently offered by any cable provider in zip-code z at time t . Demographic variables include: (i) $\text{Log}(\text{Number of Tax Returns Filed})$ which is the number of income tax returns filed in zip-code z and time t (to proxy for local population); (ii) Borrower Income which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (iii) $\text{Debt-to-Income Ratio}$ which is debt-to-income ratio of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; and (iv) $\text{Fraction non-conventional}$ which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t . Robust standard errors clustered by zip-code are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)	(3)
Beneficial to Refinance \times Treated	0.033*** (0.012)	0.014 (0.014)	
Beneficial to Refinance \times Treated \times Top 30		0.057*** (0.022)	
Beneficial to Refinance \times Change in Channel Position			-0.006* (0.003)
Observations	135,702	135,702	135,702
R-squared	0.986	0.986	0.986
Controls	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Table 10**Media exposure and the monetary savings from refinancing**

This table presents the results from estimating the association between the availability of FBN at the time of refinancing and on the monetary savings from refinancing. The dependent variables are (i) the reduction in mortgage rate upon refinancing measured in basis points (Column 1); and (ii) the reduction in monthly repayment upon refinancing measured in dollars (Column 2). The independent variable of interest is Access to FBN which is an indicator equal 1 if Fox Business Network is available to the borrower at the time of refinancing and 0 otherwise. Control variables are (i) Loan Amount which is the natural logarithm of the loan amount outstanding, (ii) $\text{Remaining Maturity}$ which is the natural logarithm of the number of monthly payments remaining on the loan; and (iii) Credit Score which is the borrower's credit score. Robust standard errors clustered by three digit zip-code are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1) Reduction in Mortgage Rate	(2) Reduction in Monthly Repayment
Access to FBN	12.931** (5.243)	10.820** (5.462)
Observations	1,416,452	1,416,437
R-squared	0.192	0.395
ZIP3 FE	Yes	Yes
State \times Year \times Month FE	Yes	Yes

Table 11**Media exposure, incentives to refinance and the propensity and speed of refinancing**

This table presents matched loan analysis of the impact of FBN entry on refinancing probabilities (Panel A) and refinancing speed (Panel B) using OLS. We match loans by state, date of origination, credit score, loan amount, loan maturity and interest rate. In total, this matching process yields 538,279 matched-pairs of loans: 538,279 early adopters of FBN (i.e., the *Treated* group) and 538,279 late adopters (i.e., the control group), with each pair having a unique time gap (*Gap*) between when FBN enters the treated zip-code and when it enters the control zip-code. In Panel A, the dependent variable in Column 1 is an indicator equal 1 if a loan is refinanced before the end of the sample in 2017. The dependent variable in Columns 2-6 is an indicator equal 1 if a loan is refinanced within the time gap (i.e., *Gap*) between when FBN enters the treated zip-code and before it enters the matched control zip-code. We define a series of indicators *Incentive* ($\geq X bp$) for $X=100, 75, 50$ and 25 . These indicators are equal 1 for each month in *Gap* where the market mortgage rate is at least X basis points below the current rate each of the loans in a matched-pair are paying. Note that the coefficients have been multiplied by 100 to improve readability of the table. In Panel B, the dependent variable is number of months it takes a borrower to refinance their loan. In Column 1 we estimate the unconditional difference in time to refinance over our entire sample period. In Columns 2-5 we estimate the difference in time to refinance conditional on positive incentives to refinance. The indicators *Incentive* ($\geq X bp$) for $X=100, 75, 50$ and 25 equal 1 for each month where the market mortgage rate is at least X basis points below the current rate each of the loans in a pair are paying. Robust standard errors clustered by three digit zip-code pair are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Propensity to Refinance	Refinance by 2017			Refinance within <i>Gap</i>		
Treated	1.530*** (0.327)	0.072*** (0.016)	0.015*** (0.004)	0.008** (0.004)	0.009** (0.004)	0.006 (0.003)
Treated \times Incentive ($\geq 100bp$)			0.556*** (0.119)			
Treated \times Incentive ($\geq 75bp$)				0.431*** (0.094)		
Treated \times Incentive ($\geq 50bp$)					0.287*** (0.067)	
Treated \times Incentive ($\geq 25bp$)						0.218*** (0.049)
Observations	1,076,558	1,076,558	1,076,558	1,076,558	1,076,558	1,076,558
R-squared	0.570	0.532	0.533	0.533	0.533	0.533
Match-pair FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 11 cont.

	(1)	(2)	(3)	(4)	(5)
Panel B: Speed of Refinancing	Time to Refinance (in months)				
Treated	-1.389*** (0.291)	-1.068*** (0.317)	-0.994*** (0.324)	-0.927** (0.342)	-0.814** (0.345)
Treated × Incentive (>100bp)		-3.097*** (0.627)			
Treated × Incentive (>75bp)			-2.653*** (0.499)		
Treated × Incentive (>50bp)				-2.074*** (0.409)	
Treated × Incentive (>25bp)					-1.873*** (0.322)
Observations	1,076,558	1,076,558	1,076,558	1,076,558	1,076,558
R-squared	0.758	0.759	0.759	0.759	0.759
Match-pair FE	Yes	Yes	Yes	Yes	Yes

Internet Appendix A: Survey Evidence, Robustness and Auxiliary Tests

Table IA.1

Sources of information in mortgage refinancing

This table presents the results from the National Survey of Mortgage Originations (NSMO) from 2014 to 2017. The NSMO is a voluntary survey of a nationally representative sample of newly originated closed-end first-lien residential mortgages in the United States asking respondents to share their experiences getting a mortgage, their perceptions of the mortgage market, and their future expectations. The NSMO is jointly sponsored by the Federal Housing Finance Agency (FHFA) and the Consumer Financial Protection Bureau (CFPB) and has been conducted quarterly since the first quarter of 2014. We focus on the responses to Question 8 from the survey: “How much did you use each of the following sources to get information about mortgages or mortgage lenders?” The survey question asked respondents to tick one of the following options: (1) “a lot”; (2) “a little”; or (3) “not at all” for each of the alternative information sources below. This table presents the percentage of respondents who answered either “a lot” or “a little” to using each of the alternative information sources listed in the survey.

How much did you use each of the following sources to get information about mortgages or mortgage lenders?	(1) % answering "a lot" or "a little" all mortgages (17,446 responses)	(2) % answering "a lot" or "a little" refinancing only (8,315 responses)
Other lenders or brokers	40.9%	40.3%
Real estate agents or builders	41.2%	14.8%
Material in the mail	16.2%	21.9%
Websites that provide information about getting a mortgage	49.6%	49.5%
Media	12.5%	15.6%
Friends, relatives, co-workers	41.4%	32.9%
Bankers or financial planners	34.1%	30.4%
Housing counsellors	5.1%	3.5%

Table IA.2

Borrowers' reliance on media and their approach to refinancing

This table presents OLS regression results for four dependent variables (capturing the different stages of the refinancing process) constructed using the National Survey of Mortgage Originations (NSMO): (1) *Self-Initiated* is an indicator equal 1 if the respondent initiated the refinancing process him- or herself and 0 otherwise; (2) *Evaluate Interest Rates Across Multiple Lenders* is an indicator equal 1 if the respondent considered more than one lender when searching for better loan terms and 0 otherwise; (3) *Applied to Multiple Lenders* is an indicator equal 1 if the respondent applied to more than one lender when searching for better loan terms and 0 otherwise; and (4) *Future Refinance* which is an indicator equal 1 if the respondent answered either "very" or "somewhat" to the question "How likely is it that in the next couple of years you will refinance the mortgage on this property?" and 0 otherwise. The independent variable of interest is *Media Use* which is an indicator equal 1 if respondents answered either "a lot" or "a little" to using the media as an information source about mortgages in Q8 and 0 otherwise. The controls are defined as follows: *Age* is the age of the respondent. *Female* is an indicator equal 1 if the respondent is female and 0 otherwise. *White* is an indicator equal 1 if the respondent is white and 0 otherwise. *Number of Borrowers* is the number of applicants on the loan. *Financial Literacy Index* is a financial literacy index created using the answers to Q5 from the survey. Respondents were asked how familiar they were with various financial concepts and asked to tick one to the following options "very", "somewhat" or "not at all" for each concept. We assign the values 2, 1, 0 to the answers "very", "somewhat" or "not at all", respectively and sum up the values across all the concepts asked in the survey to construct the index. *Risk Aversion* is a measure of self-reported risk appetite based on Q87. *Metro* is an indicator equal 1 if the respondent resides in a metropolitan area and 0 otherwise. *Term* is the maturity of the mortgage. *Rate Spread* is the mortgage interest rate at origination minus primary mortgage market rate. *Combined LTV* is the combine loan-to-value ratio. *Credit Score* is the respondents' Vantage Score 3.0 at origination. We include income category, education level, loan type (i.e. conventional vs. non-conventional), loan amount category, origination year and origination month fixed effects in all regressions. Robust standard errors are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)	(3)	(4)
	Self-Initiated Application (Y=1 if yes)	Evaluated Interest Rates Across Multiple Lenders (Y=1 if yes)	Applied to Multiple Lenders (Y=1 if yes)	Likely to Refinance in the Future (Y=1 if yes)
Media Use	0.031** (0.01)	0.149*** (0.01)	0.073*** (0.01)	0.042*** (0.01)
Age	-0.001* (0.00)	0.000 (0.00)	0.000 (0.00)	-0.002*** (0.00)
Female	-0.009 (0.01)	-0.060*** (0.01)	-0.029*** (0.01)	-0.017* (0.01)
White	0.074*** (0.01)	-0.064*** (0.02)	-0.039*** (0.01)	-0.082*** (0.01)
Number of Borrowers	0.017* (0.01)	-0.021* (0.01)	-0.018** (0.01)	-0.015 (0.01)
Financial Literacy Index	0.012*** (0.00)	-0.004 (0.00)	-0.006*** (0.00)	-0.012*** (0.00)
Risk Aversion	-0.012* (0.01)	-0.026*** (0.01)	-0.010* (0.01)	-0.006 (0.01)
Metro	-0.043*** (0.02)	0.015 (0.02)	-0.002 (0.01)	0.000 (0.02)
Rate Spread	-0.042*** (0.01)	-0.063*** (0.01)	-0.023*** (0.01)	0.018** (0.01)
Term	0.000 (0.00)	0.001 (0.00)	0.000 (0.00)	0.005*** (0.00)
Combined LTV	-0.001*** (0.00)	-0.000 (0.00)	0.001** (0.00)	-0.001** (0.00)
Credit Score	0.000* (0.00)	0.000 (0.00)	-0.000** (0.00)	-0.000*** (0.00)
Income Category FE	Yes	Yes	Yes	Yes
Educational Attainment Level FE	Yes	Yes	Yes	Yes
Loan Type FE	Yes	Yes	Yes	Yes
Loan Amount Category FE	Yes	Yes	Yes	Yes
Origination Year FE	Yes	Yes	Yes	Yes
Origination Month FE	Yes	Yes	Yes	Yes
Observations	8,315	8,315	8,315	8,315
R-squared	0.0626	0.0428	0.0289	0.0719

Table IA.3**Robust Difference-in-Difference Estimation**

This table presents robustness tests for our main identification strategy using staggered FBN entry. The dependent variables measuring refinancing activity are: (i) $\text{Log}(\text{Number of applications})$, the natural logarithm of the number of refinancing applications in zip-code z at time t ; and (ii) $\text{Log}(\text{Value of applications})$, the natural logarithm of the value of refinancing applications in zip-code z at time t . In Columns 1 and 2 we estimate separate event studies for each treatment cohort during our *Beneficial to Refinance* years (i.e., 2008-2009, 2009-2010, 2010-2011, 2011-2012). We then average the treatment effect across treatment cohorts to obtain an estimate for *Beneficial to Refinance* \times *Post FBN* that is free from negative weights (de Chaisemartin and d'Haultfoeuille, 2020; Callaway and Sant'Anna, 2020). In Columns 3 and 4 we present the long-difference placebo estimators of the common trends assumption (de Chaisemartin and d'Haultfoeuille, 2020). Robust standard errors clustered by zip-code and by year are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	Stacked Sample		Stacked Placebo Sample	
	(1) Log(Number of applications)	(2) Log(Value of applications)	(3) Log(Number of applications)	(4) Log(Value of applications)
Beneficial to Refinance \times Post FBN	0.053*** (0.011)	0.056*** (0.013)	0.002 (0.014)	0.000 (0.017)
Observations	90,162	90,162	45,081	45,081
R-squared	0.971	0.971	0.865	0.871
Control	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes
County \times Year FE	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes

Table IA.4**Lineup position and viewership**

This table presents the results of regressing business news viewership on local business channel lineup position. Column 1 regresses total viewership across all three channels on our main independent variable $\text{Log}(\text{Lineup position})$ which is the natural logarithm of the minimum lineup position of the three business channels in zip-code z and time t . Column 2 regresses Bloomberg viewership on $\text{Log}(\text{Lineup position})$ (*Bloomberg*) which is the natural logarithm of the lineup position for Bloomberg in zip-code z and time t . Column 3 regresses CNBC viewership on $\text{Log}(\text{Lineup position})$ (*CNBC*) which is the natural logarithm of the lineup position for CNBC in zip-code z and time t . Column 4 regresses Fox Business viewership on $\text{Log}(\text{Lineup position})$ (*FNB*) which is the natural logarithm of the lineup position for Fox Business in zip-code z and time t . Standard errors clustered by zip-code and by year are given in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1) Total Viewership	(2) Bloomberg Viewership	(3) CNBC Viewership	(4) Fox Business Viewership
Log(Lineup position)	-0.032*** (0.005)			
Log(Lineup position) (Bloomberg)		-0.003*** (0.001)		
Log(Lineup position) (CNBC)			-0.028*** (0.004)	
Log(Lineup position) (FNB)				-0.009** (0.003)
Observations	148,423	135,362	146,691	110,091
R-squared	0.001	0.000	0.001	0.000

Table IA.5**Validation of channel lineup position**

This table presents the results of regressing *predicted* business news viewership on local business channel lineup position for the period 2005-2017. Predicted viewership is constructed from a regression of actual viewership on Census zip-code economic and demographic factors (i) *Population* which is the natural logarithm of the population count in zip-code z and time t ; (ii) *Income per capita* which is income per head of population in zip-code z and time t ; (iii) *Employment* which is the natural logarithm of the total number of people employed in zip-code z and time t ; (iv) *Wages* which is the natural logarithm of the total wage bill in zip-code z and time t ; and (v) *Establishments* which is the natural logarithm of the number of business establishments in zip-code z and time t . We include zip-code and year fixed-effects. Column 1 regresses predicted total viewership across all three channels on our main independent variable *Log(Lineup position)* which is the natural logarithm of the lowest lineup position of the three business channels in zip-code z and time t . Column 2 regresses predicted Bloomberg viewership on *Log(Lineup position) (Bloomberg)* which is the natural logarithm of the lineup position for Bloomberg in zip-code z and time t . Column 3 regresses predicted CNBC viewership on *Log(Lineup position) (CNBC)* which is the natural logarithm of the lineup position for CNBC in zip-code z and time t . Column 4 regresses predicted FBN viewership on *Log(Lineup position) (FNB)* which is the natural logarithm of the lineup position for FBN in zip-code z and time t . Robust standard errors clustered by zip-code and by year are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)	(3)	(4)
	Predicted Total Viewership	Predicted Bloomberg Viewership	Predicted CNBC Viewership	Predicted FBN Viewership
Log(Lineup position)	-0.005 (0.004)			
Log(Lineup position) (Bloomberg)		0.001 (0.001)		
Log(Lineup position) (CNBC)			-0.004 (0.005)	
Log(Lineup position) (FNB)				0.009 (0.010)
Observations	199,275	175,541	194,536	136,769
R-squared	0.998	0.988	0.997	0.977
Year FE	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes

Table IA.6**Comparing characteristics for treatment and control groups used in Table 9**

This table compares the zip-code characteristics for treatment and control groups used the tests linking business channel reshuffling and refinancing activity in Table 9. We compare the mean of the zip-code characteristics between treatment and control groups before and after entropy balancing. After balancing, the zip-code characteristics between treatment and control groups are virtually identical and statistically indistinguishable from one another. The characteristics we compare include: (i) *Log(Number of applications)*, the natural logarithm of the number of refinancing applications; (ii) *Log(Value of applications)*, the natural logarithm of the value of refinancing applications in zip-code z and time t ; (iii) *Log(Number of Tax Returns Filed)* which is the number of income tax returns filed in in zip-code z and time t (to proxy for local population); (iv) *Borrower Income* which is average income of mortgage applicants (excluding refinancing applications) in zip-code z and time t ; (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing applications) in zip-code z and time t ; (vi) *Number of Cable Systems* which is the number of unique cable providers in zip-code z at time t ; (vii) *Number of Channels Currently Offered* is the number of channels currently offered by any cable provider in zip-code z at time t ; (viii) *Total Channel Capacity* is the total cable channel capacity (i.e., number of possible channels) in zip-code z at time t ; and (ix) *Lineup position* which is the the minimum lineup position of the three business channels in zip-code z and time t . Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1) treatment sample mean	(2) unweighted control sample mean	(3) weighted control sample mean	(4) difference (treatment-unweighted control)	(5) difference (treatment-weighted control)
Log(Number of applications)	4.953	5.198	4.953	-0.245***	0.000
Log(Value of applications)	9.186	9.496	9.186	-0.310***	0.000
Log(Number of Tax Returns Filed)	7.458	7.681	7.458	-0.223***	0.000
Borrower income	3.811	3.866	3.811	-0.055	0.000
Fraction non-conventional applications	0.821	0.825	0.821	-0.004	0.000
Number of Cable Systems	1.441	1.448	1.441	-0.007	0.000
Number of Channels Currently Offered	4.905	5.035	4.905	-0.130***	0.000
Total Channel Capacity	6.606	6.678	6.606	-0.072***	0.000
Lineup position	68.6	41.16	68.6	27.433***	0.000

Table IA.7**Comparing characteristics for treatment and control groups used in Table 11**

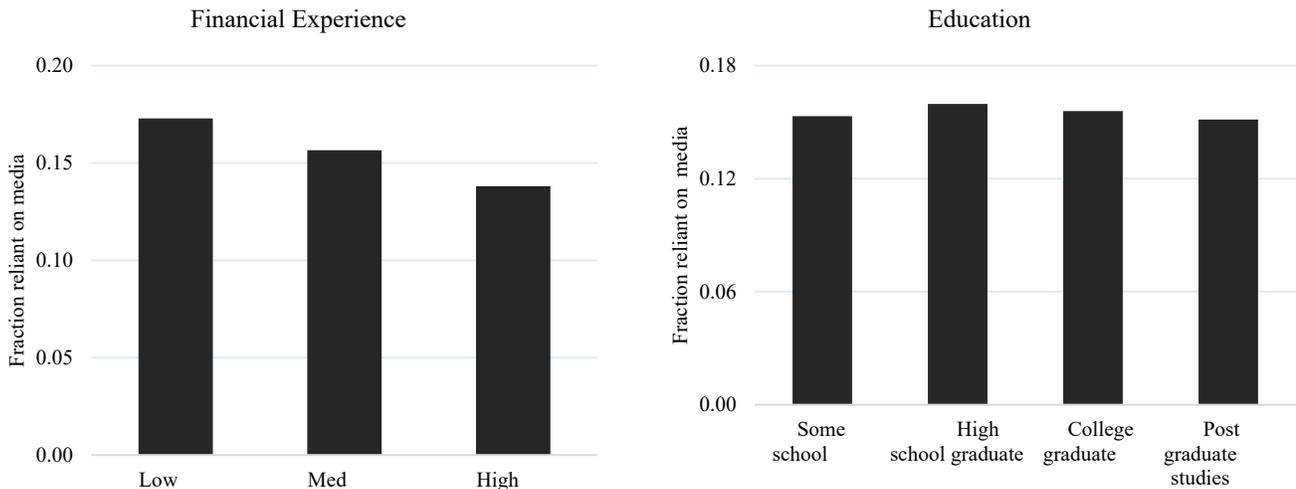
This table compares loan characteristics between treatment and control groups used in our matched loan analysis examining the impact of FBN entry on refinancing probabilities and refinancing speed in Table 11. We match loans by state, date of origination, credit score, loan amount, loan maturity and interest rate. After matching the loan characteristics between treatment and control groups are virtually identical and statistically indistinguishable from one another. The state and date of origination are matched exactly, we compare the means of the remaining continuous loan characteristics: credit score, loan amount, loan maturity and interest rate. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1) treatment sample mean	(2) control sample mean	(3) difference (treatment-control)
Credit Score	738.8	738.7	0.122
Loan Amount (\$)	140678	140678	0.000
Interest Rate (%)	5.763	5.763	0.000
Loan Maturity (months)	302.6	302.6	0.000

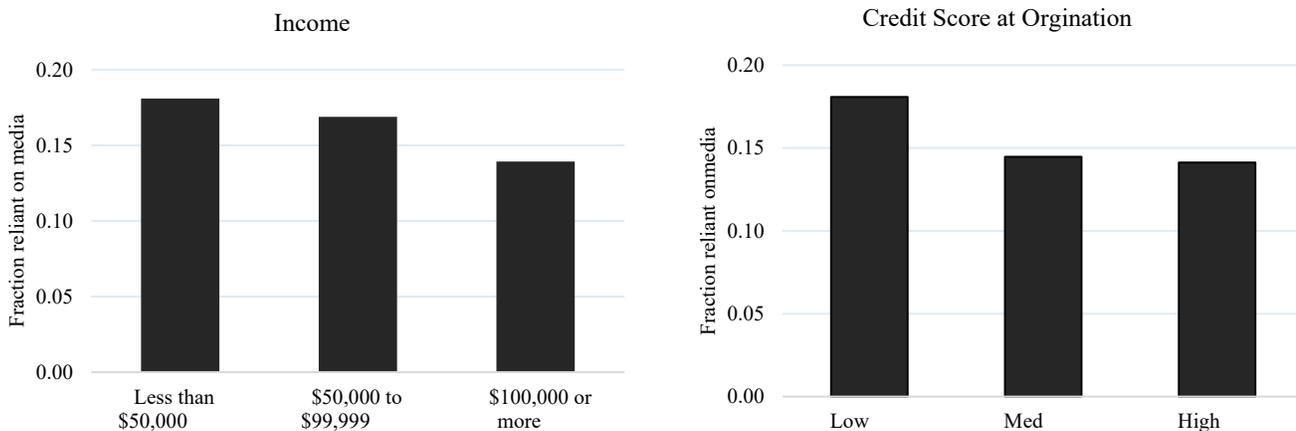
Figure IA.1. Reliance on media in refinancing decisions across borrower groups

This figure presents the results from the National Survey of Mortgage Originations (NSMO). The survey data are from 2014 to 2017. This figure plots the responses to the question: “How much did you use each of the following sources to get information about mortgages or mortgage lenders?” The charts show the fraction of respondents who answered “a lot” or “a little” to using media as an information source, across borrower characteristics. Panel A focuses on financial experience and general education. Panel B examines borrower income groups and credit score terciles (Vantage Score 3.0) at origination. Panel C plots media use by race and age.

Panel A: Mortgage experience and educational attainment



Panel B: Borrower financials



Panel C: Borrower demographics

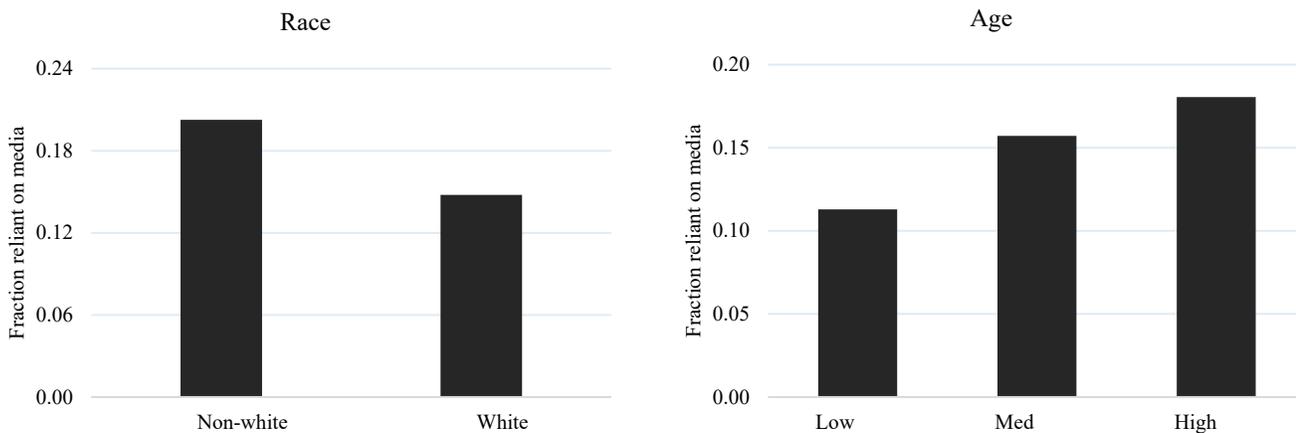


Figure IA.2.

The frequency of refinancing coverage on primetime business TV in 2000–2017

This figure shows the frequency of refinancing coverage on primetime business TV in 2000–2017. The dotted line (which corresponds to the left scale) plots the average fraction of primetime TV episodes aired on CNBC from 5 to 10 pm that mention the word ‘refinancing’ and its variations. The data on TV transcripts and their airing times come from The Internet Archive (<https://archive.org/details/tv>) a digital repository of media content, and Factiva. The solid line in the figure plots the average interest rate on a 30-year fixed rate mortgage (FRM), shown on the right scale. The shaded regions identify periods when the average interest rate on a 30-year FRM drops by least 100 bps from its peak over the trailing three years (i.e., *Beneficial to Refinance* periods).

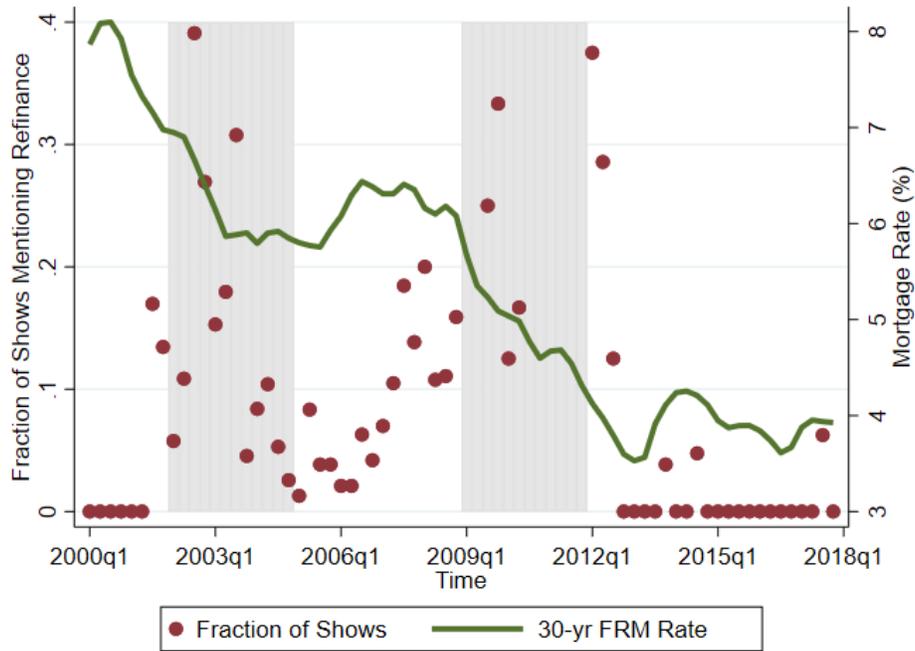
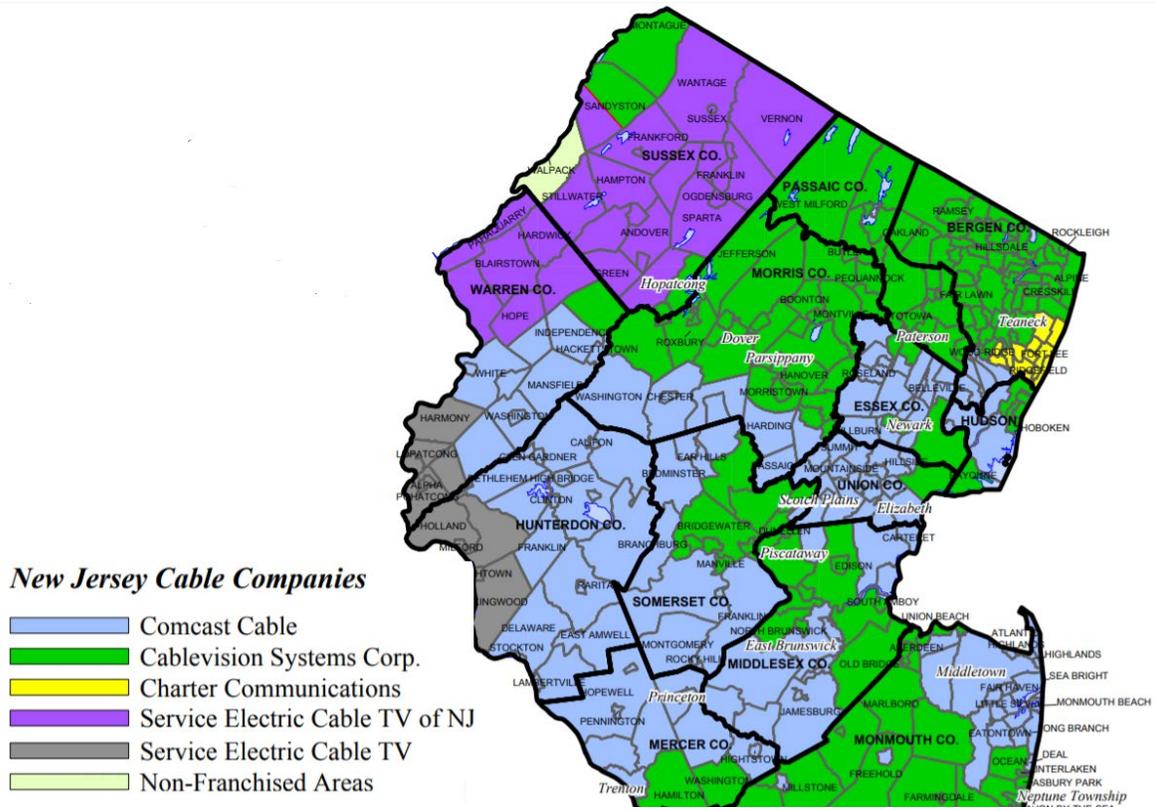


Figure IA.3

Cross-sectional fragmentation in the cable market

This figure shows cross-sectional fragmentation in the cable market for the state of New Jersey. The figure reveals sharp spatial discontinuities in the cable providers' coverage across the same towns and counties. For example, we can see patches of coverage by Comcast and Charter Communications in Bergen County, which are encircled by Cablevision's coverage.



Internet Appendix B: Coverage of refinancing on business TV

B.1. Transcripts of Segments Dedicated to Refinancing

Example 1

Title: Helping you save money on your mortgage

Program: Refi-Nation by Dagen McDowell

Network: Fox Business Network, May 4, 2011

Run time: 3.20 minutes

Link: <https://video.foxbusiness.com/v/3883414/#sp=show-clips>

David: We are taking a week long look at refinancing homes in America. Can you get a lower mortgage? Our Dagen MacDowell joins us now with her first instalment of her series Refi-Nation. Everybody wants to with rates this low, the question is: can you?

Dagen: For some yes, we're look at—all week—the who can refinance? The what? The when? The where? The why? And the how? Today it's the what? What is refinancing?

Let's just spell it out for people. It means getting a new mortgage on your home with hopefully a lower interest rate, a lower payment but also if you have a good deal of equity maybe cashing out a little bit, also lowering the term of your mortgage—those are two critical things. You can save tens of thousands of dollars on your mortgage by doing that.

There has been clearly a rush to refinance because we've had multi decade lows on 30 year fixed rate mortgages, below 5 percent last month and even though they ticked up a little bit still very attractive.

Now the refinancing applications, David you saw a big spike, and a big come down. One of the reasons people attribute to that is maybe they are waiting around because they think mortgage rates are going even lower but then it is also who is really qualifying for these refinancings because many people have told me that it may be 50 percent of people who are actually qualifying to refinance.

David: Do you have any numbers on how good your credit rating has to be in order to refinance?

Dagen: On that note, well one: you have to have equity, you have to have some equity. 5 percent well actually 3 percent—you can get a federal housing administration mortgage with just 3 percent down, but again if you really want the best mortgages with no mortgage insurance on it you need to have 15 percent—more than 15 equity. In terms of credit score, we talked to Dale Vermillion and we've got a cite from Dale who wrote navigating the mortgage maze, let's listen to them

Dale: Well the best rates are 720 FICO scores and above um if you're above 620 you're going to qualify. FHA programs today are very aggressive and they go 620 and above and in some cases even 580 to 620. The key is be prepared. When you go into a mortgage refinance, know your credit report, know your FICO score, know your debt, have your income prepared, know what you want to pay off and you'll really help your lender to get you a better rate when you do that.

Dagen: And we talked about equity David, there are some estimates that more than 70 percent of mortgages are under water these days so there are only about a third of people out there with mortgages that qualify for refinancing but it's worth a look and that's what we're talking about all week.

Example 2

Title: When to refinance your home: What factors to take into account when considering refinancing

Program: The Dave Ramsey Show

Network: Fox Business Network, May 07, 2011

Run time: 2.11 minutes

Link: <https://video.foxbusiness.com/v/4213612/#sp=show-clips>

Dave: We have Lori from Dallas Texas to start us off tonight, hi Lori how are you tonight?

Lori: I'm fine thank you Dave

Dave: Good, what's up?

Lori: I am a surrogate mother and I will be delivering soon and I will have about 18 thousand dollars and I am trying to decide if I should refinance my home and put this money down as a close to 20% down—I'll have to add a little bit more to it which I could do—or should I pay off my last debt off of my car which is 8 thousand dollars or should it all go into like a mutual fund?

Dave: So by putting the money on your home you would be getting it below the 80% loan to value with a little bit of help so you wouldn't have any more PMI?

Lori: Correct

Dave: Wow, what's your household income?

Lori: Um, it's about 80 thousand

Dave: Ok, and what's your interest rate on the mortgage?

Lori: It would be at 4.25 percent

Dave: What is it now?

Lori: Right now it's 6.3

Dave: Ok, alright

Lori: I'm also changing from a 30 to a 15 year by doing this

Dave: Hmmmm, well it kinda jumps around the baby steps a little but I like it. I like getting rid of a 6 percent mortgage, locking in a 4.25, locking in a 15 year, getting rid of PMI...boy that just sets you up on a solid situation on your home then you guys just have to roll up your sleeves and attack this last car debt and get rid of it though. I mean you've got to commit to yourself to knock that thing out very very soon if you go this mortgage refi route. These rates are down, it's a good time to do that, there are just so many reasons for this. In my mind it makes sense that I would do it.

Lori: Excellent, that's exactly what I'm after

Dave: So the surrogate mom fee is 18 grand?

Lori: There a little bit more but I've actually paid off about \$35265.53 in 2 and a half years

Dave: Wow, well good for you.

B.2. Additional Examples of Business TV Segments on Refinancing

Example 1

As mortgage rates fall to a 3-year low, is now the time to refinance?

Fox Business Network, February 28, 2020.

<https://video.foxbusiness.com/v/6137155862001/#sp=show-clips>

Example 2

Why now is the best time to refinance

Fox Business Network, May 4, 2011.

<https://video.foxbusiness.com/v/3883409/#sp=show-clips>

Example 3

How to know when to refinance

Fox Business Network, May 4, 2011.

<https://video.foxbusiness.com/v/3883414/#sp=show-clips> (accessed May 22, 2020);

Example 4

Record number of homeowners can refinance—Here's how much you could save.

CNBC, March 6, 2020.

<https://www.cnbc.com/video/2020/03/06/record-number-of-homeowners-can-refinanceheres-how-much-you-could-save.html>

Example 5

What to know before you refinance

CNBC, February 5, 2009.

<https://www.cnbc.com/2009/02/05/what-to-know-before-you-refinance.html>

Example 6

Refinance, please

CNBC, March 16, 2012

<https://www.cnbc.com/2012/03/16/refinance-please.html>

Example 7

How low interest rates are impacting the home mortgage market

Bloomberg TV, September 27, 2019

<https://www.bnnbloomberg.ca/investing/video/how-low-interest-rates-are-impacting-the-home-mortgage-market~1790978>

Example 8

Tempted by low mortgage rates? Consider fees, penalties for refinancing first

BNN Bloomberg May 21, 2020

<https://www.bnnbloomberg.ca/tempted-by-low-mortgage-rates-consider-fees-penalties-for-refinancing-first-1.1439414>