Financial Media as a Money Doctor:
Evidence from Refinancing Decisions[*]

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Abstract

We find that the viewership of business television raises the propensity of households to refinance their homes when doing so is financially advantageous. To estimate the effect of business TV, we exploit the staggered entry of Fox Business Network (FBN) into zip codes across the U.S. Exposure to FBN is associated with a 14% increase in local refinancing volume in response to a 100 bps drop in mortgage interest rates. We confirm the media effect on refinancing by using an instrument for TV viewership, which exploits exogenous variation in the channels' ordinal positions. The media influence is stronger for minority and lower-income applicants. Overall, business TV likely raises financial awareness and serves as a nudge against inertia.

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There is extensive evidence that households make costly financial mistakes. Given the large personal losses from these mistakes, there has been concerted effort to improve households' financial decisions, ranging from education programs and mandatory counselling to increased disclosure and even robo-advice. 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).

This paper is among the first to provide evidence that financial media—namely, business TV—can help households avoid some of the costliest financial mistakes related to mortgage refinancing. We focus on business TV because it remains the primary source of news for the median U.S. household, with over 57% of U.S. adults obtaining their news from TV, almost three times as many as from print media (20%). Further, financial media play an important role in mortgage refinancing decisions. According to the 2018 National Survey of Mortgage Originations (NSMO), 15.6% of all refinancing applicants and 20.3% of non-white applicants rely on information from financial media, an information source more important than real estate agents (14.8%) or housing counsellors (3.5%).

To identify the effect of financial media on refinancing decisions, we use two identification strategies. First, we focus on the staggered entry of Fox Business Network (FBN) across the U.S. zip codes. The highly decentralized structure of the local cable systems generates an idiosyncratic component in the timing of FBN's entry into zip codes within each county. This approach allows us to exploit within-county variation between economically similar regions, which are exposed to FBN at different points in time due to the sharp boundaries in the coverage of local cable TV systems.

As a second approach, we focus on the numerical ordering of business channels in the local cable TV line-up. Using viewership data by zip code, we show that households are more likely to watch a channel with a lower ordinal position in their original cable line-up. All else equal, the same TV channel reaches 15% more households in a zip code if it appears as, say, channel 15 instead of channel 50 in the original cable line-up (a one standard deviation move of 35 channel positions). One mechanism is that a lower ordinal position of a channel makes it more likely to enter a household's opportunity set via channel surfing, which accounts for about 20% of total viewership time (Ericsson Consumer Lab).

In support of using a channel's ordinal position in the local cable line-up as an instrument for viewership, we show that this position is determined by the institutional rules of the local cable provider

and various local shocks to channel positions. Consider three sample rules for channel ordering by different local cable providers. Cable Provider A assigns channel numbers based on how recently a channel was added to its line-up. Cable Provider B groups channels by content, such that all news channels are assigned adjacent ordinal positions. Cable Provider C assigns channel numbers in an alphabetical order, according to their name. In this example, as FBN is gradually introduced in 2007-2017, it will appear at the end of the line-up for Cable Provider A (the most recent is last), closer to the front of the line-up for Provider B (grouped with other news), and somewhere in the top quintile of the line-up for Provider C (alphabetical order). These institutional factors produce large, persistent differences in the positioning of a given channel across zip codes, while containing a component uncorrelated with economic and demographic community characteristics.

In the analysis of outcomes, we focus on households' home refinancing decisions because of their large economic impact on the majority of consumers. In 2018, U.S. household mortgage debt accounted for 71% of all household liabilities and exceeded $9 trillion nationwide, a figure equivalent to 45% of the GDP (Federal Reserve Bank of New York). A large literature, reviewed in Campbell (2006), shows that a failure to refinance mortgages when interest rates decline is one of the costliest household mistakes. Keys, Pope, and Pope (2016) find that 20% of U.S. households for whom refinancing appears to be financially optimal fail to refinance, losing an average of $130,000 in savings over the loan's life as of 2012. The failure to refinance is usually explained by inattention, inertia, and lower financial literacy (e.g., Campbell 2006; Andersen, Campbell, Nielsen, and Ramadorai 2020).

We argue that financial media improves households' refinancing behavior by drawing their attention to refinancing opportunities and informing less sophisticated consumers. To estimate these effects, we use micro data on the universe of refinancing applications in the U.S. in 1990-2017, which includes applicants' demographic characteristics (e.g., income, location, gender, race, etc.). A unique feature of the data is the ability to observe both approved and denied applications, banks' decisions on each application, and applicants' decisions on each approved refinancing application.

Our main result is that an increase in the viewership of business TV in a zip code has a large positive impact on the local households' refinancing activity when interest rates decline. For example, the entry of FBN is associated with a 14% increase in the refinancing activity in response to a 100 bps

decline in mortgage interest rates. For the average county, this effect corresponds to an extra $98 million in refinancing applications per year. We observe the strongest increase in refinancing over the first three years after the channel's introduction into a zip code and estimate the average household saves over $63,000 in nominal terms over the remaining life of the loan.

We find a directionally similar, but economically smaller increase in refinancing activity in response to exposure to business television when we exploit the variation in the ordinal position of the business channels in the local cable lineup as an instrument for viewership. In the cross-section of media outlets, we find a robust positive effect on refinancing activity from all three main business channels—CNBC, Bloomberg News, and Fox Business News—but find that CNBC and FBN have the strongest marginal effect, consistent with their broader audiences.

We uncover two contributing economic channels that drive the increase in refinancing activity: (i) an increase in the fraction of households submitting refinancing applications (extensive margin) and (ii) an increase in the number of refinancing applications submitted by observationally the same applicants (intensive margin). We find that the extensive margin accounts for the overwhelming majority of the increase in the refinancing activity.

In the time-series, an increase in refinancing activity from exposure to business television arises only after large interest rate drops. Using a closed-form solution to the optimal refinancing rule, prior work shows that an interest rate drop of over 100 basis points makes refinancing financially optimal under conservative assumptions (Agarwal, Driscoll, and Laibson 2013). This evidence suggests that the media-induced increase in refinancing is value-enhancing for the participating households.

In the cross-section of households, the effect of exposure to business TV on refinancing activity is higher for applicants with a minority status and weaker credit. For example, the effect of exposure to business TV on refinancing activity is about 9% stronger for minority applicants than for their white counterparts with similar characteristics. Consistent with our findings, prior evidence shows that the failure to optimally refinance is most prevalent for households from said demographic groups (Campbell 2006). Also consistent with our findings, survey evidence shows that the financial media is more likely to drive the refinancing decisions of minority applicants, applicants with lower incomes, and with lower credit scores (NSMO 2018).

In an effort to understand how business television affects households' approach to refinancing, we provide suggestive evidence 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, the entry of FBN into a zip code increases the propensity of households to follow through on their refinancing applications, as measured by a decline in abandoned and incomplete applications. Consistent with a contribution of media to a more informed refinancing process, the entry of FBN is followed by an increase in comparison shopping across mortgage lenders, as measured by local Google searches for refinancing terms. In support of the comparison shopping interpretation (motivated by an out-of-sample survey), we show that households in zip codes with access to FBN obtain refinancing interest rates that are 13 bps lower than their observationally similar refinancing peers unexposed to FBN, realizing an additional $3,190 in nominal savings over the remaining life of the loan.

Overall, our evidence suggests that exposure to business news encourages borrowers to refinance their homes when doing so is financially advantageous. The net effect is a significant increase in originated loans and an expansion of refinancing activity among the less privileged households—those for whom a reduction in interest payments from refinancing is likely to matter the most for solvency and disposable income.

The central contribution of this article is to establish the first link between exposure to business news and refinancing decisions. Viewed broadly, our evidence suggests that business media can serve as a channel of financial education and an effective way to help overcome households' financial mistakes. Our findings contribute to research on (i) the effect of financial media on households' behavior and (ii) the drivers of refinancing decisions.

We contribute to the literature studying the effect of media on peoples' financial behaviors. This literature has focused primarily on print media and investors' trading behavior. For example, Tetlock (2007) shows that the tone of newspapers' market coverage predicts next-day stock returns, and Dougal et al. (2012) find that this effect is causal. Engelberg and Parsons (2011) and Peress (2014) show that newspapers causally affect investors' trading behavior. Most of this prior work paints a negative picture of the media's consequences on peoples' financial behaviors, leading investors to trade excessively (Barber and Odean 2008), trade on stale news (Huberman and Regev 2001; Tetlock 2011), drive up short-term mispricing (Engelberg, Sasseville, and Williams 2012), chase stocks with high past

returns (Solomon, Soltes, and Sosyura 2014), and react to biases in media coverage (Gurun and Butler 2012; Ahern and Sosyura 2015).

Our paper departs from most of the prior media literature in finance in three ways. First, we provide the first evidence on the role of media in refinancing decisions, focusing on an asset class which makes up over a half of the median household's wealth (Iacoviello 2011). Second, we explore a relatively understudied news medium with broad coverage—business television. Third, in contrast to the predominantly negative consequences of print media on households' financial behavior in prior work, we uncover significant positive effects, thus contributing to a more balanced perspective on the benefits and pitfalls of financial media in household finance.

We also contribute to the literature on the drivers of refinancing decisions. Although this literature labels the refinancing decision as "one of the biggest financial decisions a household makes" (Campbell 2006), prior work finds a surprisingly large fraction of households who fail to refinance despite the large financial incentives (Green and LaCour-Little 1999; Schwartz 2006; Deng and Quigley 2012). After accounting for rational explanations for the failure to refinance, such as financial constraints, negative home equity, and declines in creditworthiness, the literature estimates that 20-30% of U.S. households make a financial mistake by not refinancing their mortgage (Campbell 2006).

The failure to refinance is more prevalent among minority households with lower financial literacy, less education, and less experience (Agarwal, Rosen, and Yao 2016). Given the persistence of these characteristics, many policy interventions aimed at encouraging refinancing have had little effect. For example, Keys, Pope, and Pope (2016) find that 87% of borrowers fail to respond to a direct mailing campaign by a lender, which offers to refinance their mortgages with zero out-of-pocket costs, guaranteed pre-approval, and large financial savings. The authors find that the failure to refinance is explained by inattention (failure to read the offer), procrastination (decision to delay), inertia, and low financial education. The challenges in overcoming these physiological barriers have led some researchers to suggest automatically refinancing mortgages as a policy response (Campbell 2013).

Our paper offers novel evidence on the role of financial media as an education tool and a possible nudge against inertia in refinancing decisions. The findings in our paper suggest that financial television could serve as a high-penetration mechanism capable of inducing the refinancing behavior even for the households traditionally left out from the refinancing process.

1. Motivation: The Role of Media in Refinancing Decisions

1.1. Survey evidence

To assess the role of financial media in refinancing decisions, we use data from the National Survey of Mortgage Originators (NSMO). Conducted quarterly by the Consumer Financial Protection Bureau since 2014, the NMSO covers a nationally representative sample of first-lien residential mortgages originated in the prior quarter. For each borrower, the survey provides about 100 data points, combining detailed demographic and financial information with questions about the borrower's decisions, information sources, and financial behaviors. We focus on the respondents who originated or refinanced a home mortgage in 2014–2017 (the earliest available data), a sample of 8,315 borrowers.

Table A1 in 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 the borrowers rely on information from the media in their refinancing decisions. 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 media is 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 and Education 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 as likely to obtain information from the media as from a housing counselor—a free, government-backed, and, at times, mandated source. This comparison underscores an interest in studying the role of financial media as a high-penetration, privately-funded source of information.

1.2. Cross-sectional evidence

Figure A1 in Appendix A shows how the reliance on media as an information source in refinancing decisions varies across borrower characteristics. The data come from the NSMO and focus on borrowers who refinanced their mortgages in 2014–2017.

Panel A in Figure A1 shows the plots by financial experience and general education. The left pane shows that the media plays a more important role for borrowers who are less experienced 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 the reliance on media is unrelated to the borrower's educational attainment.

Panel B examines borrowers' financials. It shows that the media plays a more important role for financially constrained borrowers with lower incomes and lower credit scores. This would be expected if such borrowers are less likely to afford alternative sources of financial advice, such as the services of financial planners and professional advisers, a pattern we confirm in untabulated tests.

Panel C focuses on demographic characteristics. The media has a stronger effect on the refinancing decisions of minorities and senior citizens. 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, a difference significant at 1%. 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 even greater over a longer historical horizon. For example, the latest NSMO data suggest that nearly half of the borrowers supplement their decisions with online research. Since the Internet emerged as a relatively recent alternative to business television, the current survey estimates likely provide a lower bound of the media effect on refinancing decisions over a longer period, such as our sample of 1990–2017.

In summary, a significant fraction of borrowers rely on information from the media in their mortgage decisions, especially for mortgage refinancing. The media plays a more important role for borrowers who have less experience with financial products and for traditionally underbanked borrowers, such as minorities, seniors, and lower-income groups.

2. Media Content and Possible Mechanisms

This section reviews non-mutually exclusive economic mechanisms through which financial media could affect refinancing decisions. Sections 2.1 discusses the contribution of media to financial education. Section 2.2 focuses on the role of media as a nudge against inertia. Section 2.3 offers micro-level evidence on borrowers' decision making that motivates our subsequent analyses.

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 television networks include a variety of programs aimed at financial education in general and mortgage refinancing in particular. This subsection reviews a few examples of such programs across all business television networks, and Appendix B offers additional details and program transcripts.

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 ran for three years on Fox Business Network in 2011–2013. The Refi-Nation segments reviewed a variety of refinancing topics such as "How to refinance your home" and "When should I refinance my home?" Such segments aimed to inform viewers on the basics of refinancing, included interviews with mortgage experts, and offered financial advice. To make such programs accessible to finance newbies and hold their interest, Fox Business made an explicit emphasis on avoiding jargon and featuring popular hosts. Appendix B includes references to video segments from Refi-Nation and shows a transcript of a sample program.

Other business channels offer similar programming. For example, during the same period as Refi-Nation, CNBC ran a series of informational programs covering most aspects of refinancing, including government assistance for mortgage modifications. The breadth of program content is illustrated by such segment headlines (referenced in Appendix B) as "Refinance, please", "How to Refinance your Home," and "What to Know before You Refinance." Similarly, Bloomberg TV has traditionally offered a variety of informational programs targeted at the more sophisticated viewers, emphasizing the nuances and pitfalls of the refinancing process. This emphasis on the details can be gleaned from such segment headlines (referenced in Appendix B) as "Tempted by Low Mortgage

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Rates? Consider Fees, Penalties for Refinancing First" or "How Low Interest Rates Are Impacting tape Home Mortgage Market."

In addition to the dedicated programming tailored to mortgage refinancing, business TV networks offer a variety of personal finance shows which inform the viewer on various aspects of household finance, including refinancing decisions. A salient example is The Suze Orman Show, which ran in prime time on CNBC in 2002–2015. Hosted by Suze Orman, a financial advisor and the author of several books on personal finance, the show dedicated the bulk of its time to answering viewers' personal questions, including those on home refinancing. Another example of a similarly-structured educational program on a different network is The Dave Ramsey Show, which aired every weeknight in prime time on Fox Business Network and had a particular focus on managing household debt. Appendix B illustrates the broad variety of the viewers' refinancing questions that were addressed on the aforementioned shows. Other examples of ongoing shows include CNBC's The Deed: Chicago (dedicated to helping struggling real estate owners), Bloomberg's Real Yield (focused on the analysis of interest rates), and Fox's Mornings with Maria, which covers a variety of personal finance topics and financial news.

In summary, business television offers a broad 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 help increase the viewers' awareness of mortgage refinancing opportunities when they become financially 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. For example, Keys, Pope, and Pope (2016) find that the majority of households who fail to respond to a pre-approved, zero-cost refinancing offer cite inattention (25%) or procrastination (33%) as the main reasons for their failure to refinance.

Business television increases the salience of refinancing opportunities in several ways. First, the average 30-year mortgage interest rate (or other indicators of interest rates) is often included with key market indicators displayed prominently throughout most programming as a running ticker tape

(see Appendix B for an example). In this case, regardless of the program watched, the viewer is reminded of the current interest rates on mortgages 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 television covers significant developments in refinancing activity as part of the general market news. For example, the rise in refinancing activity after a drop in interest rates tends to get prominent coverage by all business networks, with salient headlines such as "Mortgage Refinance Applications Spike 79% as Homeowners Rush to Take Advantage of Lower Rates" (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.

Third, business television attracts substantial advertising volume from financial institutions. During periods of low interest rates, banks actively advertise their refinancing offers on business TV. Thus, the viewer is frequently reminded of refinancing options through advertising, receiving a nudge to consider refinancing and an easy way to follow up on the advertised offer. Further, the viewer is exposed to multiple refinancing advertisements, which can induce borrowers to do more comparison shopping in their refinancing decisions.

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

2.3. Micro Evidence from Borrowers' Refinancing Decisions

In this section, we offer preliminary evidence on how borrowers' reliance on media is correlated with their approach to refinancing. To motivate further analysis, we focus on the aspects of refinancing that correspond 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 and

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[1] CNBC: https://www.cnbc.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

the number of submitted applications). We alert the reader that these mechanisms are closely related and likely reinforce each other. For example, financial education could help overcome inertia in important financial decisions. Our goal is to offer motivating evidence on these mechanisms rather than cleanly separate their effects. We rely on the data from NSMO (the sample of refinancing borrowers in 2014–2017 introduced in Section 1.1), which provide a unique level of granularity and detail on borrowers' approach to refinancing.

Appendix Table A2 studies how a borrower's self-reported reliance on media in the refinancing decision is associated with decision outcomes. The dependent variables correspond to the borrowers' decisions in initiating, evaluating, and completing the refinancing loan. The main independent variable is the indicator *Media use*, which is 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), information about the property and mortgage (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 in refinancing activity, all regressions include calendar year fixed effects and month-of-the year fixed effects. The regressions are estimated as linear probability models.

Column 1 shows that borrowers who use information from the media are more likely to initiate the first contact on the refinancing application rather than have the first contact initiated by the lender/broker or a third party. This result is statistically significant at 5% (*t*-statistic = 2.32) and economically important. The coefficient estimate on the variable *Media use* suggests that borrowers who use information from the media are 3 percentage points more likely to personally initiate the refinancing process. This marginal effect represents a 4.1% increase relative to the unconditional frequency of borrower-initiated refinancing applications (74%), consistent with the nudge channel.

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Column 2 focuses on the next step in the refinancing process—the borrower's evaluation of lenders before submitting an application. The dependent variable is an indicator that equals 1 if the borrower considered more than one lender to obtain better loan terms, and zero otherwise. This information is obtained from the question "How many different mortgage lenders/brokers did you seriously consider before choosing where to apply for this mortgage?" and the follow-up question about the main reason for doing so. The positive coefficient on the term *Media use* (significant at 1%) indicates that borrowers who use information from the media in their refinancing decisions are 14.6 percentage points more likely to evaluate multiple lenders before choosing where to apply. This effect represents a 30% increase over the unconditional probability of considering multiple lenders (48.8%), consistent with better awareness of the refinancing options and more extensive comparison shopping.

Column 3 focuses on the next step—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 the term *Media use* (coefficient = 0.073; t-statistic = 6.58) 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 paying greater attention to the loan terms and overcoming inertia.

Column 4 evaluates 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 ("likely" or "very likely" to refinance again), and 0 otherwise. The results show that borrowers who use information from media in their refinancing decisions 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. Such borrowers are also more willing to refinance their mortgage in the future. These results suggest that financial media could serve as an educator and a nudge in refinancing decisions. In the next sections, we isolate exogenous variation in media exposure to provide sharper inferences on its role in refinancing decisions.

3. Institutional Setting and Data

3.1. The Cable TV Market

The cable industry typically operates as a local monopoly because of the high fixed costs of laying cable. Over 60% of zip codes have only one cable provider, which determines the portfolio of channels offered in a given market and their ordinal positions in the channel lineup. To broadcast a TV channel in a given local market, the TV network (which produces the channel's content) must enter into an agreement with the local cable TV system. Since there are thousands of local cable TV providers, the negotiations between the TV network and each local cable company induce variation in the timing of channels' entry into a particular zip code.

An important source of variation in the negotiations between the TV network and the local cable provider arises from capacity constraints of the cable provider on the number of channels the 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 given local market.

When the local cable provider reaches capacity constraints, a new channel can be added if an existing channel goes out of business, if the cable provider decides to drop an existing channel, or if the cable provider undergoes a technological upgrade to relax capacity constraints. The combination of these factors induces idiosyncratic variation in the timing of a channel's entry into a particular local market, as shown in DellaVigna and Kaplan (2007). For example, the penetration of CNBC into local markets extends from 1991 to 2002 across markets, and the penetration of Fox Business News extends from 2007 to 2015, resulting in significant cross-sectional and time-series variation in channel offerings. Even by 2017 (the end of our sample period), 32% of zip codes do not carry CNBC, 36% do not carry Fox Business Network, and 55% do not carry Bloomberg.

In summary, the cable market is geographically fragmented and usually controlled by a local monopolist. The capacity constraints of the local cable provider, combined with the heterogeneity of negotiations with the TV network, introduce idiosyncratic variation in business channels' availability across zip codes and their ordinal positions in the local channel lineup. We exploit these factors as a source of variation in the local viewership of business television.

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3.2. Business Television Networks: Background and Differentiation

The business TV market includes three main networks: CNBC, Bloomberg, and Fox Business Network. This section discusses the evolution of this market and the target audience of each network.

Among the big three networks, Consumer News and Business Channel (CNBC) was the first to launch in April 1989. Until 1991, CNBC competed with the Financial News Network (FNN), an offshoot of Los Angeles station KWHY, which pioneered business television. However, after a series of accounting scandals, FNN filed for bankruptcy and was acquired by CNBC in May 1991.

The acquisition of FNN turned CNBC into a temporary monopolist in business television and immediately expanded its reach from 17 to 40 million homes. The CNBC's expansion accelerated when Roger Ailes became its President in 1993. During his three-year tenure, CNBC tripled its revenues and expanded its reach to 55 million homes. In the late 1990s, CNBC's ratings often exceeded those of CNN during business hours. CNBC's daytime viewership peaked in 2000 and then spiked again during the mortgage default crisis in late 2008. After the turn of the millennium, CNBC continued to slowly expand its distribution, reaching 93 million households by 2015 (or 80% of the 116 million homes with a TV).

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, which covers households with an annual income over $100,000, CNBC reaches 13.1 million people in this well-to-do category (or 30% of this segment), more than any other any other business media: television, print, or online.

In January 1994, CNBC gained a competitor in the business news genre with the launch of Bloomberg TV. To distinguish itself from the general finance content of CNBC, Bloomberg TV originally tailored its programming to finance professionals. However, this niche focus constrained the network's expansion during its first decade on-air. For example, in 2000, six years after its launch, Bloomberg TV was available in only 6,262 of the roughly 42,000 U.S. zip codes, being heavily concentrated around the main financial centers and the Northeastern corridor.

After the turn of the millennium, Bloomberg TV gradually revised its programming towards a more general audience by hiring content managers from other news networks and expanding its coverage of personal finance, energy, and government policy. As a vivid example of the concerted shift

in its content, in September 2011, Bloomberg entered into a strategic partnership with Gas Station TV to become the sole provider of personal finance news to viewers at gas stations. The addition of the more general finance content facilitated Bloomberg's expansion beyond the financial centers. By 2017, Bloomberg extended its reach to over 28,000 zip codes.

The final entrant into the business news market, Fox Business Network (FBN), was launched in October 2007. Right from the start, FBN set the goal of making personal finance accessible to a diverse audience and positioned itself as the champion of Main Street. To bring personal finance to the general viewer, FBN made an emphasis on avoiding financial jargon and covering key issues in household finance, such as retirement planning, managing credit, and budgeting for a mortgage. To execute this strategy, FBN hired popular personal finance experts, such as Dagen McDowell and Dave Ramsey, and added high-profile anchors with a broad following in the general population, such as Jeff Flock (a 30-year CNN veteran) and, subsequently, Maria Bartiromo (formerly with CNN and CNBC).

Fox's emphasis on personal finance for Main Street proved highly effective. The network gradually negotiated its expansions into the local cable systems and increased its reach from 30 million homes in 2008 to nearly 80 million homes in 2015 (or about 69% of the market). In 2016, FBN overtook CNBC as the most viewed business channel and continues to hold this status today.

In summary, the business television market is controlled by three main networks. CNBC, the oldest existing financial network, has the deepest market penetration. More recently, CNBC's leadership in viewership was overturned by Fox Business News, which gained popularity by making personal finance accessible to a general audience. Bloomberg TV, initially launched as a network for finance professionals, has expanded its programming for the general viewer but still commands a narrower target audience than its chief competitors.

3.3. Media Data and Summary Statistics

Our TV data come from The Nielsen Company, the largest provider of media data and analytics. We obtain two proprietary datasets: (1) Nielsen Focus and (2) Nielsen Local Television View (NLTV).

The Nielsen Focus dataset provides detailed information about the local cable TV systems in 1998–2017. For each cable system, the data include its geographic coverage at the zip code level, the system's owner, technological infrastructure (which we use to identify system upgrades), and the

detailed listing of all available channels and their ordinal positions in the local channel line-up. The availability of channels and their ordinal positions vary both across providers (e.g., Century Link vs. Cox) and within the same provider across its geographic locations (e.g., Cox Scottsdale vs. Cox Sedona). The average annual number of local cable systems is 9,253, and the median system covers four zip codes. This level of granularity provides rich variation in channel offerings and ordinal positions even within the same county.

The number of cable TV subscribers in the U.S. increases steadily in the 1990s, peaks at 68.5 million in 2000, and gradually declines to 53.2 million in 2017. These statistics demonstrate that cable TV affects a large population of Americans and serves as an economically important information intermediary. Further, the penetration of cable TV is likely even higher among home owners—the focus of our research—because of their higher income and lower likelihood of moving relative to renters.

The NLTV dataset measures TV viewership from a rotating panel of households. Viewership is measured in rating points, which indicate the fraction of households tuned into each channel at a given period in time. We acquire viewership ratings for each business channel (CNBC, FBN, and Bloomberg) from 2005 to 2017. The ratings are measured as the average daily (24-hour) household viewership over a year. Since these ratings average out the fraction of households over a 24-hour block (including nighttime), they represent conservative estimates and are lower than the traditionally reported ratings for daytime viewing or primetime viewing.

The top pane in Table 1 describes the media data, and Figure 2 plots viewership patterns over time. Several patterns emerge from the data. First, 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 seems to come mostly from the attraction of first-time viewers to FBN after its launch in 2007 than the switching of existing users from other business channels. Second, CNBC and FBN command significantly higher viewership than Bloomberg, and by the end of the sample period, FBN overtakes CNBC as the most watched business channel. Third, there is large variation in the viewership of business channels across zip codes, with standard deviations of viewership times several times greater than their mean values: 27.3 minutes for CNBC, 21.4 for FBN, and 6.6 for Bloomberg. Part of this variation is driven by the channel's ordinal position in the lineup, as we discuss next.

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3.4. Channel's Ordinal Position as a Driver of Viewership

An important driver of a channel's viewership is its ordinal position in the cable lineup, which varies at the level of the local cable system. Table 1 shows that the average (median) channel lineup of a cable system in our sample includes 202 (186) channels. Yet, from this variety, the average household regularly watches only 17 cable channels (Nielsen 2014). Given so many options and a fairly narrow attention span, a household is significantly more likely to view a channel if it appears closer to the top of the lineup (i.e., in the ordinal position number 15 rather than 60).

Several mechanisms contribute to this pattern. First, individuals have a positive bias toward the top of the list, as shown across a variety of settings theoretically (Rubinstein and Salant 2006; Horan 2010) and empirically (Lohse 1997; Galesic et al. 2008; Feenberg et al. 2017). Second, the average American TV viewer spends about one fifth of the total viewing time on switching across channels in an effort to pick something to watch (Ericsson Consumer Lab 2016). Thus, a lower ordinal position of a given channel will make it more likely to enter a household's opportunity set via channel surfing because the channel will appear closer to the default options.

Focusing on the three business networks, Figure 2 plots the relation between a business channel's ordinal position and its viewership in the local market. The data reveal a strong negative pattern: a business channel is significantly more likely to be watched if it appears earlier in the lineup (i.e., has a lower ordinal position). Table 2 confirms this pattern in a multivariate regression and shows that it is statistically significant at 1% for all business channels (column 1) and for each channel separately (columns 2-4). The economic impact is sizeable: a one standard deviation fall in the minimum lineup position is associated with a 15% increase in the business channel's viewership.

The variation in the channel lineup has a plausibly exogenous component driven by the providers' channel allocation rules and technological shocks, such as system upgrades, that lead to channel regroupings. The following examples of channel allocation rules, which vary across providers and locations, illustrate this source of variation.

First, many cable systems seek to limit changes in channels' ordinal positions to maintain consistency for the viewer. The cable systems that follow this channel allocation rule add new channels sequentially to the end of the lineup in the order in which they joined the system. Second, some systems

allocate new channels to the best available slot—the vacant positon closest to the top of the lineup. In this case, the new channel's position is determined by the ordinal position of the discontinued channel (which went off air, merged with another channel, or was dropped by the provider). The third type of allocation rules seeks to pair up sister channels of the same television network, such as Fox News and Fox Business Network. The fourth common allocation rule is to pair up channels in the same genre (e.g., Fox Business, Bloomberg, and CNBC). Finally, some cable systems use even more intricate rule variations. Examples of such less common channel allocation protocols include the allocation of channels in alphabetical order by their name (akin to directory listings in Yellow Pages) and channel groupings by their geographic origin (e.g., local, regional, national, and international).

The channel allocation rules produce large variation in their positions across local markets. Panel A in Table 1 illustrates the magnitude of this variation for each business channel. For example, the standard deviation of the channel's position in the local cable lineup across the three business networks ranges from 45 to 90 position slots. As another example, the interquartile ranges of the ordinal positions for FNB (Bloomberg) is 105 (113) slots, indicating stark differences across local markets.

The channel allocation rules are persistent. The mean autocorrelation of a channel's position in a given zip code is 0.96, suggesting that channel positions change rarely. The infrequent changes in channels' ordinal positions often result from sporadic technological shocks, which relax capacity constraints and lead to channel regrouping.

In summary, the drivers of a business channel's position in a local market include the system's channel allocation rules, the vacant slots available in a given local market, and the timing of local system upgrades that lead to regroupings. Since these factors affect all channels in a cable system, they contain a source of variation orthogonal to the area's economic fundamentals, as we show formally in the empirical section.

3.5. Mortgage Refinancing

Our mortgage refinancing data come from the Home Mortgage Disclosure Act (HMDA) loan application registry. This application-level administrative data set, based on mandatory reporting to financial regulators, covers over 90% of the U.S. mortgage market (Dietrich et al., 2018). Excluded from the data are loan applications processed by the smallest banks below the minimum size threshold.

In 2004, the median sample year, this reporting threshold was $33 million in book assets, equal to the 14th size percentile of FDIC-insured depository institutions.

A unique property of the dataset is its coverage of both approved and denied refinancing applications, thus permitting the separation of demand-side effects in borrowers' refinancing activity from the supply-side effects in banks' credit approvals. Another useful feature of the data is the coverage of the applicants' active decisions on their submitted applications, such as the decision to leave the application incomplete or withdraw it, and the decision to accept or reject the bank's refinancing offer. Since the application level data in HMDA start in 1990, our sample period is from 1990 to 2017.

For each application, HMDA reports borrower characteristics (e.g., income, sex, and race), requested loan attributes (e.g., amount, type, and purpose), property characteristics (e.g., type, lien, and occupancy), the identity of the financial institution processing the application, and the application outcome (e.g., approved, denied, or closed). The data also indicate the precise location of the refinancing property at the level of a U.S. census tract. This allows us to identify where the applicants live (and receive their TV channels), even if they apply for refinancing online or at a remote bank branch.

The U.S. mortgage market is comprised mostly of 30-year fixed-rate mortgages (FRMs), which account for over 90% of the outstanding loans, with the remainder split between shorter-term fixed rate mortgages and adjustable rate mortgages (Campbell 2013). Given the market dominance of the 30-year FRMs, it is generally optimal to refinance outstanding mortgages in response to a significant decline in interest rates. As a proxy for the available interest rates, we use the average interest rate for 30-year FRMs from Freddie Mac's monthly Primary Mortgage Market Survey. Yet, we alert the reader that besides the interest rate, the refinancing decision depends on multiple household-specific factors, such the up-front costs of refinancing, the probability of moving in the immediate future, the remaining mortgage balance, the discount factor on future savings, and expectations about future interest rates.

We supplement the data on mortgages and refinancing rates with information on bank branches. We construct a panel dataset of bank branches from the summary of deposits data compiled by the Federal Deposit Insurance Corporation (FDIC). These data contain detailed historical information on all domestic branches, both existing and defunct, of all FDIC-insured financial institutions. For each

branch, we obtain its physical address and opening date (and closing date, if any). Using this approach, we construct a full history of bank penetration in each geographic market.

Panel B in Table 1 reports summary statistics for the refinancing data, averaged over the sample period. The average applicant earns $62,000 per year, applies for a $96,000 mortgage, and has a debt-to-income ratio (a measure of loan risk) of 1.5. In the average zip code, the annual value of submitted refinancing applications is just over $50 million, with the overwhelming majority (84%) coming from white applicants. The most common minority groups are Hispanic and Black applicants, who account for 6% and 4%, respectively, of submitted applications. Among the completed applications, 47% are approved. Among the approved applications, 94.1% result in the refinancing of the loan, while 5.9% are rejected by the borrower, usually because the borrower has accepted another offer.

4. Empirical Analysis

We are interested in the marginal effect of media exposure on refinancing activity conditional on it being a good time to refinance, that is, if interest rates fall below one's current mortgage rate. Because we do not know the interest rate at which individuals take out their original mortgage, we take an indirect approach to identify periods that are beneficial to refinance (i.e., financial incentives to refinancing).

Prior work shows that an interest rate drop of over 100 basis points makes refinancing financially optimal under conservative assumptions (Agarwal, Driscoll, and Laibson 2013). Accordingly, we construct an indicator variable *Beneficial to Refinance* equal one if the Freddie Mac 30-year fixed mortgage rate in year *t* is at least 100 basis points lower than the maximum mortgage rate in the prior three years. This definition yields the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, and 2011. The choice of the prior three-year reference period is of course subjective; however, we feel it strikes the correct balance. Shorter periods likely underestimate incentives to refinance, for example, interest rates did not change much between 2010 and 2011 but this was certainly a good time to refinance for anyone who took out a mortgage between 2006-08. On the other hand, longer periods likely overestimate the incentives to refinance because longer reference periods allow for the possibility that we include years where rates are rising after a recent drop. For example, using

a 10-year reference period would result in classifying 2006 as a good year to refinance as the average interest rate in 2006 was 6.4% compared to 7.8% a decade earlier, however 2006 was when interest rates were at their recent peak after a protracted period of low interest rates following the 2001 September 11 attacks.

Using this definition, our primary test employs the staggered entry of Fox Business Network into different zip codes across the US to capture variation in exposure to business news. In additional tests discussed later, we also use the staggered entry of Bloomberg and CNBC as an alternative source of variation in media exposure.[2]

We estimate the heterogeneous effects—i.e. during periods when it is beneficial to refinance vs. other periods—of media exposure on refinancing outcomes in the following difference-in-difference specification:

$$Refinance_{z,t} = \gamma_1 Beneficial\ to\ Refinance_t \times Post_t \times Treated_z$$

$$\gamma_2 Post_t \times Treated_z + \boldsymbol{\beta}' \boldsymbol{X_{z,t}} + \alpha_z + \alpha_{c,t} + \varepsilon_{z,t} \tag{1}$$

where $Refinance_{z,t}$ is one of the following zip-year refinancing variables (i) the natural logarithm of the number of refinancing applications; and (ii) the natural logarithm of the value of refinancing applications. In later analysis, we also examine the supply side by looking at approval rates. Here, the dependent variables are defined as (i) the approval rate (i.e. the ratio of approved applications to total applications in a given zip code); and (ii) the value weighted approval rate (i.e. the ratio of the value of approved applications to total value of applications in a given zip code).

The variable of interest is $Beneficial\ to\ Refinance_t \times Post_t \times Treated_z$ where the term $Post_t \times Treated_z$ is equal one for all periods after the entry of Fox Business into zip code z in year t. We hypothesize that a greater exposure to business television increases refinancing activity when it is

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[2] We focus on Fox Business entry for two reasons. First, we do not have the complete history of Bloomberg and CNBC entry. Second, data limitations mean that we can only investigate our proposed mechanisms during the period Fox Business entered the market.

economically beneficial to do so, implying that $\gamma_1 > 0$. In contrast, media exposure during periods when it is not beneficial to refinance should not have an impact on refinancing activity implying $\gamma_2 \approx 0$.

We include a vector of zip code demographic control variables, $X_{z,t}$ constructed using *non-refinancing* mortgage applications from HMDA, these include: (i) *Borrower Income* which is the average income of mortgage applicants in zip code z and time t; (ii) *Loan Amount* which is the average loan amount of mortgage applicants in zip code z and time t; (iii) *Debt-to-Income Ratio* which is the debt-to-income ratio of mortgage applicants in zip code z and time t; (iv) *Fraction non-white applications* which is the fraction of applicants who are non-white in zip code z and time t; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications in zip code z and time t. We include zip code fixed-effects, α_z, to control for time-invariant zip code characteristics. Finally, $\alpha_{c,t}$ is a vector of county-by-year fixed effects that control for all county level heterogeneity. Our identification thus comes from comparing the impact of Fox Business entry on the within zip code refinancing activity of zip code z in year t to that of neighboring zip codes in the same county without Fox in the same year t. We double cluster standard errors at the zip code and year level.

Our secondary approach to isolate variation in media exposure is to use the local cable channel lineup as our instrument for media exposure. As discussed in Section 3, the lineup position of a channel is correlated with viewership—channels higher in the lineup (i.e. lower ordinal channel number) have higher viewership. Thus, zip codes where a business channel features higher in the lineup are more likely exposed to the media. We estimate the following model:

$$Refinance_{z,t} = \theta Beneficial\ to\ Refinance_t \times Lineup\ Position_{z,t}$$

$$+ \ \boldsymbol{\beta'X_{z,t}} + \alpha_z + \alpha_{c,t} + \varepsilon_{z,t} \qquad (2)$$

where $Lineup\ Position_{z,t}$ is the natural logarithm of the lowest lineup position of the three business channels in zip code z and time t, i.e. $p_{z,t} = \ln\ [\min\ (p_{z,t}^c)]$ where $c=1,2,3$ and $p_{z,t}^c$ is the line up position of channel c. Since greater exposure to business television (i.e. lower $Lineup\ Position_{c,z,t}$) increases refinancing activity when it is economically beneficial to do so we expect $\theta < 0$. All other variables are the same as above.

4.1. Selection

As mentioned earlier, capacity constraints induce idiosyncratic diffusion of Fox Business across time and space. We can see this in Figure 3, which plots the geographic entry pattern of Fox Business overtime by Designated Market Area (DMA).[3] Notwithstanding, entry is unlikely to be random. In particular, a problem arises if refinancing activity is rising in zip code z in the years prior to Fox Business entry in year $t,$ relative to other zip codes. In this case, our estimated effect could simply be picking up time trends. This concern is ameliorated because our hypothesized effect only operates when entry coincides with a sufficient fall in aggregate interest rates to make refinancing beneficial—an event that is out of the control of the TV networks and cable companies.

In Figure 4, we plot the evolution of our two main dependent variables for treated and control groups in the 10-years before Fox Business entry.[4] What we can see is that, the pre-entry trend for treated and control groups looks very similar, especially in the 3-years prior to entry. If anything, the trend for our treated group is slightly negative relative to the control group, which biases against our hypothesized effect.

We explore the nature of selection in timing and location of Fox entry in tests similar to DellaVigna and Kaplan (2007). Using a linear probability model, we regress an indicator equal one for all zip-years Fox Business is available on our key refinancing variables along with zip code characteristics (average borrower income, borrower debt-to-income ratio, the fraction of non-white borrowers, the fraction of male borrowers and the fraction non-conventional loan applications), zip-code fixed-effects and county-by-year fixed effects.

The results are presented in Table 3 in five columns. Each column includes a different refinancing variable and the last column combines all four refinancing (demand side and supply side) variables into the regression. There is some evidence that Fox Business is more likely to enter zip codes with larger loans and higher income, and less likely to enter zip codes with higher debt-to-income ratios and a higher fraction of males. However, these correlations are not robust across specifications.

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[3] A DMA, also referred to as a media market, is a region used to define television and radio markets. There are 210 DMAs in the US.

[4] Consistent with our regressions, the zip code-year observations are demeaned by subtracting the county-year average.

Importantly, none of our refinancing variables of interest are significant suggesting that Fox Business entry is independent of local refinancing activity. Moreover, in Column 5 where we include all refinancing variables, we see that none of the demographic variables are insignificant.

Since these regressions include county-by-year fixed effects we control for all county level factors that may determine entry. To unpack the fixed-effects, we also investigate how a host of county level factors determines Fox Business entry (at the county level) in Table IA1 of the internet appendix.[5] Three factors stand out to robustly determine the entry of Fox Business into a given county: the availability of Bloomberg, the county population and the number of vacant channel positions in the cable lineup. That is, Fox Business is more likely to enter counties with a larger population, where there is a competitor business channel and when capacity constraints are not binding.

Taken together, the results here show that within county and year, zip codes where Fox Business entered are no different in refinancing behavior, demographics, nor prior refinancing trends to zip codes where Fox Business does not enter. We exploit this conditional random assignment to study the impact of Fox Business entry on refinancing activity.

5. Results

In this section, we present our results. We begin with our main findings, followed by an examination of the heterogeneous effects across applicant characteristics and tests in support of our proposed economic mechanisms. We then round out the paper with additional analysis, robustness tests and an estimate of the economic impact of media on refinancing decisions.

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[5] The variables include: *Availability of CNBC* which is an indicator equal one CNBC is available in the county; *Availability of Bloomberg* which is an indicator equal one if Bloomberg is available in the county; *FBN available in adjacent county* is an indicator equal one if the adjacent county has Fox Business Network; *Availability of Fox News* is an indicator equal one if Fox News is available in the county; *Number of vacant channel positions in lineup* is a measure of capacity constraints which is equal to the natural logarithm of the number of vacant channel positions int eh cable lineup. *Real Estate Price* which is the All-Transactions house price index (FRED); *Poverty* which is percent of people of all ages in poverty (Census); *Number of Establishments* which is the number of businesses in the county (Census); *Per Capita Income* is the county income per capita (FRED); *Median Income* which is the median county income (FRED); *Population* which is the natural logarithm of county population (Census); *Unemployment* which is the county unemployment rate (FRED); *Urban* which is an indicator equal 1 if the county is in a urban area (Census); *Democratic Vote Share* which is the fraction of voters who voted for the democratic party in the most recent Federal election; *GDP* which is county gross domestic product; *Crime* which is the combined violent and property crime incidents known to law enforcement; and *Subprime* which is the county level Equifax subprime credit population.

5.1 Main results

Our main results are presented in Table 4. The dependent variable in Column 1 is the natural logarithm of the number of refinancing applications and in Column 2 is the natural logarithm of the value of refinancing applications.

We can see that the entry for Fox Business has a positive and significant effect on the number of refinancing applications as well as the value of applications, when refinancing is beneficial. In contrast, entry during other periods has no significant impact on the number or value of refinancing applications. Because the dependent variables are in logs, the coefficient estimates on our variable of interest approximate percentage changes; thus, economically we see that that entry of Fox Business results in about a 22% increase in the number and value of applications when it is beneficial to refinance. To put this number in context, the average increase in number (value) of refinancing applications during *Beneficial to Refinance* years is 52% (60%).[6] Thus, Fox Business entry drives an additional 22% increase in refinancing activity during *Beneficial to Refinance* years. We note that for the years we define as *Beneficial to Refinance*, the average interest rate drop from the prior three-year max is 153 basis points. Thus, an alternative interpretation of the economic magnitude is that Fox Business entry increases refinancing activity by an additional 14% for a 100 basis point drop in interest rates.

Although we showed earlier that the pre-trends in refinancing activity for treated and control groups were very similar prior to Fox Business entry, recent work (e.g. Kanh-Lang and Lang, 2020) argues that regardless of this, researchers should still control for differences in pre-trends explicitly. We therefore follow prior research (e.g. Autor, 2003; Angrist and Pischek; 2009) to control for differences in time trends across treated and control groups. To do this we introduce zip-code specific time trends into equation (1) by interacting zip code fixed effects with a linear time trend. The results presented in Columns 3 and 4 of Table 4 show that our results are not only robust to this specification but also slightly increases the economic magnitude of our main effect, which is consistent with our earlier observation that the minor difference in pre-trends between our treated and control groups biases our estimated effect downward.

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[6] Since we include county-by-year fixed-effects in our regressions, the level effect of *Beneficial to Refinance* subsumed. To obtain the average sensitivity of refinancing activity to *Beneficial to Refinance* for our whole sample, we drop the county-by-year fixed effects and reestimate the model.

5.2 Cross-sectional evidence and economic mechanisms

Motivated by the survey evidence suggesting that media reliance in refinancing decisions is greater for males, the non-white population, low-income groups, borrowers with weaker credit scores at origination, we perform a series of cross-sectional tests by running subsample tests along these demographic characteristics. For each characteristic, we replace the dependent variable with the number (or value) of applications from only that particular demographic group. For example, when considering the white population, we use the natural logarithm of the number of applications from only white applicants. To minimize the amount of information tabulated in this section, we report only the coefficient of interest for the number of applications; however, the results using value of applications are similar.

First, we examine differences between conventional versus non-conventional loans. Since HMDA does not provide borrower credit scores, we use conventional versus non-conventional loans to proxy for high and low creditworthiness, respectively. A conventional loan is any type of mortgage that is *not* secured by a government-sponsored entity (GSE), such as the Federal Housing Administration (FHA) or the U.S. Department of Veterans Affairs (VA). On the other hand, non-conventional loans are backed by the government, offer different and sometimes more flexible products for certain buyers who do not meet conventional guidelines (e.g. borrowers who do not have sufficient savings for a down payment). Columns 1A and 1B of Table 5 show that media exposure has a stronger impact on non-conventional mortgages. In Columns 2A and 2B we examine differences between white and non-white applicants. We can see that the impact of media exposure on refinancing decisions is more pronounced for the non-white population. Next, in Columns 3A and 3B we find that media exposure influences male applicants significantly more than female applicants. Finally, we examine differences according to borrower income. To do this, we split the sample into income terciles and examine the influence of Fox Business entry on each sample separately. The results for the bottom and top income terciles (i.e. low and high income) reported in Columns 4A and 4B respectively show no significant difference between these two groups. In summary, consistent with the survey evidence, we find that the media-refinancing relation is significantly stronger for the non-white population, males, and the borrowers of lower credit quality.

We next present evidence in favor of our proposed mechanisms, namely, media serves as a nudge against inertia and media educates. The survey evidence showed that reliance on the media as a source of information in the refinancing process is correlated with lower financial literacy. We interpret this as evidence of the education role of the media. To provide more direct evidence we supplement our data with data from the National Financial Capability Study (NFCS). This study is commissioned by the Financial Industry Regulatory Authority (FINRA) and is a nationwide online survey of over 25,000 Americans, asking them questions relating to how they manage their resources and how they make financial decisions (e.g. relating to their mortgage). The survey began in 2009 and has been conducted every three years since. State level data are currently available for 2009, 2012, 2015 and 2018. The survey also asks a series of basic financial questions allowing us to calculate respondent financial literacy scores.[7] Using these data, we calculate state level financial literacy scores and introduce them into our estimation as an additional interaction term with our main variable of interest, $Beneficial\ to\ Refinance_t \times Post_t \times Treated_z$.[8] The result in Table 6 Column 1 shows the effect of media on refinancing decisions is weaker for the more financially literate, which is consistent with our survey evidence.

Our survey evidence also shows that reliance on media is correlated with both a higher likelihood that borrowers evaluate loan terms across multiple lenders when searching for a mortgage and a higher likelihood that borrowers apply to more than one lender. This evidence is consistent with both mechanisms. That through education, media improves borrower savviness and/or because media provides a nudge to financially literate individuals who know to shop around for the best deal.

We present two pieces of evidence in support of media increasing mortgage shopping. First, we examine how our main effect varies with the density of bank branches in the zip code. The idea here is if media encourages shopping, we will see a complimentary effect between the media and density of local branches (i.e., shopping is easier if you have more branches nearby).[9] We collect bank branch

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[7] Financial literacy is calculated based on the answers to five basic financial questions in the survey (questions M6-M10). The results reported are for a financial literacy index constructed as a simple count of the correct answers but we find similar results if we use the first principal component of correct answers as our financial literacy index.

[8] We use an indicator for above median literacy in the regression.

[9] We use an indicator for above median branch density in the regression. Our results are similar if we use the density of unique banks, instead of branches.

location data from the Federal Deposit Insurance Corporation (FDIC) Summary of Deposits (SOD) database (available from 1994) to perform this analysis. We similarly interact this variable with our main variable of interest and add it to our estimation. The result in Column 2 of Table 6 shows that the coefficient is positive and significant as expected. Second, using Google Trends data we investigate how the intensity of Google searches for the term "refinance" varies around the introduction of Fox Business. We use a similar model to equation (1) save the dependent variable is the Search Volume Intensity Index available from Google Trends. These data are only available from 2004 and at much coarser geographic unit so we perform the analysis at the DMA level. The result in Column 3 shows that the entry of Fox Business during periods when it is beneficial to refinance leads to a significant increase in the search intensity of the term "refinance".

Our survey evidence shows that reliance on media as an information source increases the likelihood borrowers initiate the refinancing process which we interpret as evidence of the nudge mechanism. To provide similar evidence here we investigate how the share of incomplete applications varies with Fox Business entry. The HMDA data include all applications that are started, regardless of whether they are eventually submitted or not. While there are a number of factors that determine why a potential borrower may start but never complete an application, we argue that an important factor is simply procrastination—leaving it to be done later and never getting back to it. Thus, if media acts as a nudge against this type of inertia we expect that Fox Business entry will reduce the share of incomplete applications relative to other locations without Fox Business. We estimate Equation 1 replacing the dependent variable with the fraction of incomplete refinancing applications in zip code z and time t. The result in Column 4 shows that we do indeed see a decline in the fraction of incomplete applications after Fox Business entry, during periods it is beneficial to refinance.

Finally, we investigate how the impact of Fox Business entry varies over event-time. We augment our main variable of interest $Beneficial\ to\ Refinance_t \times Post_t \times Treated_z$ by splitting the *Post* indicator into *T-yr Post* for $T = [1, 5]$ where *T-yr Post* is an indicator equal one in the *T* years after the entry of Fox Business. Our argument is that the nudge mechanism implies an immediate but short-lived effect whereas the education mechanism is more likely to take time to become effective. We present the results from this analysis in Table 7. What we find is that the impact of Fox Business

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entry is immediate, increases in magnitude for the first three years, and then appears to level off. Consistent with our findings, these results show that both mechanisms are likely at work.

5.3 Robustness and additional tests

Up to this point, we have examined the impact of media exposure on the demand for refinancing (i.e., the number and value of applications). We now examine the supply side by looking at approval rates. We repeat the analysis in Table 4 replacing the dependent variables with the following: (i) the approval rate (i.e. the ratio of approved applications to total applications in a given zip code); and (ii) the value weighted approval rate (i.e. the ratio of the value of approved applications to total value of applications in a given zip code). In contrast, to what we reported in Table 4, the results in Table 8 show Fox Entry has no statistically significant effect on approval rates, though the coefficient of interest is negative.[10]

Since the media exposure effect on refinancing activity is conditional on interest rates being low enough to make refinancing economically sensible. An alternative approach to estimating heterogenous treatment effects in Equation 1 is to estimate a standard difference-in-difference model just for periods when it is beneficial to refinance. In the case of Fox Business entry, beneficial to refinance years are 2009-2011 (inclusive). Using this subsample we estimate three alternative models. First, we use the fixed-effect (FE) model we have used thus far. Second, we estimate the a between-effects (BE) which relies on pure cross-sectional variation—we are comparing zip codes with and without Fox Business during this period. Third, we estimate a random-effects (RE) model. The random effects model produces a coefficient estimate that is the weighted average of the FE and BE models. Because we cannot include county-by-year fixed effects, we demean the data by subtracting the county-year mean from each observation before estimation. We report the results in Table 9. Though the magnitudes differ across the models, we see that in all cases, Fox Business entry has a positive and significant effect on refinancing activity.

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[10] The approval rate can be decomposed into (i) the natural logarithm of the number of approved applications and (ii) the natural logarithm of the number of rejected applications. Robustness tests in the Internet Appendix (Table IA2) shows that both the number of accepted applications and the number of rejected applications increase, with rejected applications increasing by slightly less, consistent with the approval rate results. Likewise, the value weighted approval rate can be decomposed into (i) the natural logarithm of the value of approved applications and (ii) the natural logarithm of the value of rejected applications.

For our last two robustness tests, we use alternative identification strategies. The first is to use the entry pattern for Bloomberg TV and CNBC. We estimate models similar to Equation 1 replacing Fox Business entry with that of Bloomberg or CNBC. From Table 10 we can see similar effects occur after the entry of Bloomberg TV and CNBC. There are positive and significant effects on refinancing activity post-entry when it is beneficial to refinance.

Next, we use local cable TV lineups to identify media exposure. We discussed the intuition for using channel lineup in Section 3. Still, a concern is that lineup maybe correlated with local economic conditions. That is, cable operators might place business channels at the front of the lineup (i.e. lower channel number) in areas with greater expected demand for business news. Although our discussion above implies that this should not be the case, we investigate this concern through the following empirical test.

We regress total viewership across the three business channels (i.e. business news demand) on a wide range of zip code economic and demographic factors. We then take the predicted values from this model (i.e. expected business news demand) and regress it on the minimum lineup position across the business news channels. We then repeat this process for the individual channels. If cable operators are catering to local demand for business news, then we expect the lineup positions of each of the business news channels to be negatively related to predicted viewership. However, Table 11 shows that this is clearly not the case. Predicted total viewership is positively correlated with minimum lineup position. Likewise, predicted Bloomberg viewership is positively correlated with Bloomberg's lineup position. Finally, predicted viewership of CNBC and Fox Business is not significantly correlated with their respective lineup positions.

Using local TV lineups as our instrument, we estimate Equation 2 and present the results in Table 12. We find very similar results: a drop in minimum lineup position leads to a significant increase in refinancing activity when it is beneficial to do so. Economically, we find that a standard variation fall in the local lineup leads to about a 3.5 percent increase in refinancing activity, when it is economically beneficial to do so. The economic magnitude is much smaller compared to Fox Business entry, but this is expected, as the impact of channel position on business news exposure is second order to the availability of a new business channel.

6. The Economic Impact on Refinancing Activity

So far, we have shown that media exposure robustly increases households' propensity to refinance. One drawback of our approach is that we do not observe individual households' incentive to refinance. That is, we do not observe the interest rate on households' mortgages prior to refinancing. This shortcoming means that were unable to put a figure on the lifetime savings from refinancing for the average household nor ask whether media exposure also leads to even greater savings from refinancing. It also lead us to take an indirect approach to determine periods when households are likely to have positive incentives to refinance.

In this section, we use data from the Fannie Mae Single Family Loan Performance files to address these issues. The Fannie Mae data contain monthly performance statistics split into two files: the primary dataset and the Home Affordable Refinance Program (HARP) dataset. The primary dataset contains over 35 million fixed rate mortgage loans originated after January 1, 1999 and acquired by Fannie Mae between January 1, 2000 and March 31, 2016. The HARP dataset contains about one million mortgage loans included in the primary dataset and subsequently refinanced through the HARP program between April 1, 2009 and September 30, 2016. The same loans in two datasets are reliably identified via a mapping key, allowing us to determine pre- and post-refinancing loan terms.

Figure 5 plots the distribution of interest rate and monthly loan payment reductions following the refinancing of a mortgage in our sample. The left panel plots interest rate reductions, and the right panel plots monthly repayment reductions. The data reveal a spike in the distribution at a 100 bps reduction in the interest rates, consistent with prior literature showing that refinancing becomes optimal with a 100 basis point reduction in the mortgage rate (Agarwal, Driscoll, and Laibson 2013), as well as our own threshold for defining beneficial-to-refinance periods. We find that the mean (standard deviation) of interest rate reductions is 197 (104) basis points, and the mean (standard deviation) of monthly payment reductions is \$218 (\$155). Since the average remaining maturity on loans in our sample is about 290 months, the monthly payment reduction translates to a total saving of \$63,220 over the remaining life of the loan or \$37,104 in present value terms (when discounted at 5%).

Table 13 estimates the marginal impact of Fox Business availability *at the time of refinancing* on interest rate and monthly repayment reductions. We regress our two variables of interest on an

indicator equal one if Fox Business is available in three-digit zip code z at the time of refinancing, as well as controls for loan amount, remaining maturity and credit score. We also include zip code and state-by-year-month fixed effects. The estimates show that the availability of Fox reduces interest rates by an additional 13 basis points when a loan is refinanced—consistent with more shopping. This translates to a further $11 reduction in monthly repayments which equates to $3,190 in savings over the remaining life of the loan or approximately $1,853 in present value terms.

Finally, we test the robustness of our results to alternative measures of incentives to refinance. We calculate refinancing incentives by taking the difference between a loan's interest rate and market mortgage rate, such that positive values imply positive economic incentives to refinance. Following the approach in Andersen et al. (2020), we first plot the distribution of financial incentives along with the observed and estimated probability of refinancing in Figure 6. The top panel plots the number of loan-month observations across incentive bins in blue bars. Overlaid is the observed probability of refinancing (i.e., the ratio of refinanced loans to the total number of observations) at various incentive bins. The distribution of financial incentives to refinance looks symmetric and is centered slightly above zero, meaning that during our sample period, households, on average, had positive incentives to refinance. Consistent with Figure 5, the observed probability to refinance increases steeply when market mortgage rates are at least 100 basis points lower than the loan's interest rate.

The middle panel provides estimates of the probability of refinancing at the three-digit zip code-year-month level for areas with and without Fox Business Network *at the time* of refinancing. The dependent variable is the ratio of refinanced loans to the total number of observations (i.e., the observed probability of refinancing at the three-digit-year-month level). The estimates control for three-digit zip code fixed effects and state-by-year-month fixed effects. The dashed and solid lines are the estimates from zip codes with and without FBN, respectively. The shaded area around the point estimates represents 95% confidence intervals. Consistent with our prior results, we find a large and significant difference in the refinancing probabilities for areas with and without Fox Business. This significant difference exists for incentives bins up to 380 basis points where the two lines converge. The figure indicates that media exposure seems to not only increase the propensity to refinance but also shorten the lag time to the refinancing decision.

To examine this directly, we use loan level data to estimate the likelihood of refinancing at different time intervals, conditional on households facing a positive incentive to refinance of at least a 100 basis points (i.e., market rates are at least 100 basis points below the loan's interest rate). We use a Cox proportional hazard model and plot a simple survival function of time to refinance. The result is presented in the bottom panel of Figure 6 which plots two curves: (1) households in three-digit zip codes with FBN in the month of refinancing (i.e., the solid line) and (2) households in three digit zip codes without Fox Business in the month of refinancing their loan (i.e., the dashed line). The shape of the refinancing curves is similar to that in Andersen et al (2020). As households face positive incentives to refinance, they are slow to respond to these incentives, consistent with inattention. A substantial fraction of households fail to refinance, no matter how long they face positive incentives to do so, consistent with inertia. The difference between the two curves is striking: Households in areas with FBN tend to refinance more quickly when faced with the same incentives. This is evident from the significant steepening of the slope of the curve for households with FBN at the time of refinancing, consistent with the effect of the media on attention to refinancing opportunities.

In our next analysis, we augment the cross-sectional comparisons in Figure 6 with a dynamic approach that exploits time-series variation. We first limit our analysis to loans originated before 2007, the year when FBN launched. We then match loans by state, date of origination, credit score, loan amount, loan maturity and interest rate. This ensures that households within this group have similar refinancing incentives when market interest rates drop.

To illustrate the matching, consider that the algorithm yields a pair of loans, A and B that belong to different three-digit zip-codes. Since FBN was almost universally available by the end of our sample (at the three-digit zip-code level), we track the availability of Fox Business in the three-digit zip-codes associated with loans A and B. Suppose Fox Business enters loan A's zip code in 2007 and loan B's zip code in 2009. Since loan A's zip code receives Fox Business earlier, we consider loan A as the treated loan for the two-year gap between 2007 and 2009. In total, this matching process yields 538,279 matched-pairs of loans: 538,279 early adopters of Fox Business (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 Fox Business enters the treated zip code and when it enters the control zip code.

With this matched sample, we ask the following questions. First, since the loans in our sample, on average, have positive incentives to refinance, does an earlier exposure to FBN increase the likelihood of refinancing by the end of our sample (i.e., 2017)? Second, does an earlier exposure to FBN increase the likelihood of refinancing within the gap period before FBN enters the control zip code? Finally, conditional on a pair of loans having the same positive incentives to refinance, does an earlier exposure to FBN increase the likelihood of refinancing within the gap period before Fox Business enters the control zip code?

To answer the first question, we define an indicator equal one if a loan is refinanced before the end of the sample and regress this indicator (using a linear probability model) on our *Treated* variable along with match-pair fixed effects. The result is presented in column 1 of Table 14. An early entry of FBN increases the likelihood that a loan is refinanced before 2017.

To address the second question, we define an indicator equal one if a loan is refinanced during the time gap (i.e., *Gap*) between when FBN enters the treated zip code and before it enters the control zip code. We regress this indicator on our *Treated* indicator and matched-pair fixed effects. Column 2 in Table 14 shows that FBN entry significantly increases the probability of refinancing within the time gap. Columns 3–6 estimate the same regression, but condition on various levels of incentives to refinance. We define a series of indicators *Incentive (≥ X bp)* for *X*=100, 75, 50 and 25. These indicators are equal one for each month in *Gap* where the market mortgage rate is at least *X* bps below the interest rate on each of the loans in a matched pair. The coefficient of interest is the interaction term between *Treated* and *Incentive (≥ X bp)*. We find that each of the interaction terms is positive and significant. Moreover, the point estimate is decreasing from column 3 to 6, as the incentive to refinance falls. For example, in column 3, when we use the 100 basis point threshold, the likelihood of refinancing within *Gap* is 21.5% higher for treated loans relative to the mean refinancing rate within *Gap*. In contrast, in column 6 (which corresponds to a 25 bps threshold), the likelihood of refinancing is only 2.8% higher for *Treated* loans relative to the mean refinancing rate within *Gap*.

7. Conclusion

We study how business media affects households' refinancing decisions. We find that an increase in the viewership of business television in a zip code raises the propensity of local households to refinance their homes when doing so is financially advantageous. Using two experimental settings that exploit an idiosyncratic component in exposure to business news, we argue that the effect of media is causal.

Our results suggest that financial media could serve as a money doctor for the less sophisticated households by helping increase their financial awareness and overcome inertia. From a policy perspective, a wider access to business content in an engaging TV format could serve as a means of financial education for the less sophisticated consumers, given the wide reach of television into their homes.

Our paper makes one of the first steps in financial economics in compiling systematic evidence on the overall viewership patterns of business TV among the American public. Given the significance of television as an information source for the average household, we hope that future research will yield further insights into its effect on households' financial decisions.

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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 810,639 and corresponds to the number of zip code years. Sample selection criteria appear in Appendix C.

	mean	std	p25	p50	p75
Panel A: Media					
Length of lineup	202.52	103.42	123.00	186.00	279.00
Min lineup position	45.81	34.97	31.00	39.00	48.00
CNBC lineup position	49.74	44.90	31.00	39.00	49.00
Bloomberg lineup position	173.10	89.53	109.00	131.00	222.00
Fox lineup position	159.37	81.94	106.00	130.00	211.00
Total business viewership, mins per week per household	14.82	38.35	0.00	10.08	20.16
CNBC viewership, mins per week per household	10.00	27.34	0.00	0.00	10.08
Bloomberg viewership, mins per week per household	0.66	6.59	0.00	0.00	0.00
Fox viewership, mins per week per household	4.16	21.37	0.00	0.00	0.00
Panel B: Borrower and loan characteristics					
Number of applications	289.72	651.69	3.2	44.78	265.81
Number of accepted apps	134.08	311.36	1.37	19.99	120.34
Number of rejected apps	155.64	356.55	1.53	22.89	138.29
Approval rate	0.47	0.16	0.37	0.46	0.55
Value of applications ($'000)	50,568.13	146,688.95	242.98	4,310.99	31,877.71
Value of accepted applications ($'000)	23,525.82	71,449.92	103.57	1,905.48	14,173.71
Value of rejected applications ($'000)	27,042.31	78,072.42	110.55	2,219.52	16,779.73
Value Weighted Approval rate	0.47	0.16	0.37	0.46	0.55
Borrower income ($'000 per year)	61.22	54.44	38.54	55.51	76.36
Loan amount ($'000)	96.39	154.95	39.98	73.98	122.58
Debt-to-Income ratio	1.5	13.51	1.1	1.54	1.98
Fraction non-white applications	0.16	0.12	0.08	0.16	0.23
Fraction non-conventional applications	0.17	0.17	0.02	0.11	0.27
Fraction male applicants	0.53	0.25	0.5	0.6	0.68
Fraction Hispanic applicants	0.06	0.14	0	0.02	0.05
Fraction African American applicants	0.04	0.1	0	0	0.03
Fraction Asian applicants	0.01	0.05	0	0	0.01
Application incompletion rate	0.047	0.041	0.023	0.044	0.065
Loan acceptance rejection by borrower	0.059	0.054	0.031	0.054	0.078
Panel C: Zip code controls					
Borrower income ($'000 per year)	62.22	54.44	39.54	56.51	77.36
Loan Amount ($'000)	97.39	154.95	40.98	74.98	123.58
Debt-to-Income ratio	1.5	13.51	1.1	1.54	1.98
Fraction non-white applicants	0.16	0.12	0.08	0.16	0.23
Fraction non-conventional applications	0.17	0.17	0.02	0.11	0.27
Distance to nearest mortgage counsellor, miles	25	34.18	6	16	32.2
Number of Branches in zip	1.36	0.78	1	1	2

Table 2
Lineup position and viewership
This table presents the results of regressing business news viewership on local lineup position. Column 1 regresses total viewership across all three channels on our main independent variable *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 Bloomberg viewership on *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 *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 *Lineup position (Fox Business)* which is the natural logarithm of the lineup position for Fox Business 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)
Panel A	Total Viewership	Bloomberg Viewership	CNBC Viewership	Fox Business Viewership
Lineup position	-0.0323***			
	(0.00428)			
Lineup position (Bloomberg)		-0.00334***		
		(0.00102)		
Lineup position (CNBC)			-0.0291***	
			(0.00341)	
Lineup position (Fox Business)				-0.00921***
				(0.00269)
Constant	0.247***	0.0240***	0.206***	0.0797***
	(0.0168)	(0.00509)	(0.0137)	(0.0133)
Observations	143,743	50,231	143,586	83,016
R-squared	0.001	0.001	0.001	0.000
Year FE	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes

Table 3
Determinants of Fox Business Network entry

This table presents analysis the zip code level determinants of Fox Business Network entry using a linear probability model. The dependent variable is an indicator equal one if Fox Business Network is available in zip code z at time t and zero otherwise. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code z and time t; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code z and time t; (iii) Debt-to-Income Ratio which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code z and time t; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code z and time t; (v) *Fraction male applicants* which is the fraction of applicants who are male in zip code z and time t; and (vi) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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)
Log(Number of applications)	0.00136				-0.0199
	(0.00193)				(0.0119)
Log(Value of applications)		0.000956			0.00317
		(0.00117)			(0.00235)
Approval rate			-0.00377		-0.00330
			(0.00433)		(0.00586)
Value weighted approval rate				-0.000853	-5.38e-05
				(0.00248)	(0.00557)
Loan Amount ($'000)	0.00828**	0.00814**	-0.00603	-0.00603	-0.00530
	(0.00378)	(0.00375)	(0.00374)	(0.00374)	(0.00332)
Borrower income ($'000 per year)	0.00697*	0.00683*	-0.00197*	-0.00203*	-0.000864
	(0.00372)	(0.00363)	(0.00102)	(0.00105)	(0.000613)
Debt-to-Income ratio	-4.01e-06*	-3.75e-06*	0.000151	0.000152	0.000143
	(2.06e-06)	(1.97e-06)	(0.000113)	(0.000114)	(9.81e-05)
Fraction non-white applicants	0.0125	0.0123	-0.00348	-0.00376	-0.00231
	(0.00796)	(0.00797)	(0.00527)	(0.00534)	(0.00497)
Fraction male applicants	-0.0434*	-0.0435*	-0.0122	-0.0123	-0.0120
	(0.0224)	(0.0225)	(0.00737)	(0.00742)	(0.00725)
Fraction non-conventional applications	0.0252	0.0255	0.0219	0.0218	0.0221
	(0.0262)	(0.0265)	(0.0152)	(0.0151)	(0.0149)
Constant	-0.00397	-0.00495	0.0874***	0.0865***	0.0935***
	(0.0364)	(0.0371)	(0.0145)	(0.0140)	(0.0164)
Observations	426,291	426,291	371,200	371,199	371,199
R-squared	0.804	0.804	0.820	0.820	0.820
Control	Yes	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes	Yes
County-Year FE	Yes	Yes	Yes	Yes	Yes

Table 4

Media exposure and refinancing activity: Baseline results using Fox Business Network entry

This table presents the results from estimating equation (1). The dependent variables measuring refinancing activity are: (i) the natural logarithm of the number of refinancing applications; and (ii) the natural logarithm of the value of refinancing applications. The independent variable of interest is *Beneficial to Refinance × Treated × Post* where *Treated × Post* is an indicator equal 1 for all years *t* after Fox Business Network 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, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code *z* and time *t*; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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)
Treated × Post	-0.0969	-0.0846	-0.249**	-0.189**
	(0.0681)	(0.0649)	(0.107)	(0.0920)
Beneficial to Refinance × Treated × Post	0.223***	0.222***	0.258***	0.260***
	(0.0670)	(0.0673)	(0.0916)	(0.0830)
Constant	0.847***	1.864***	1.617***	3.595***
	(0.265)	(0.280)	(0.211)	(0.299)
Observations	810,639	810,639	810,639	810,639
R-squared	0.950	0.970	0.970	0.982
Control	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	No	No
Zip FE ×Time trend	No	No	Yes	Yes
County-Year FE	Yes	Yes	Yes	Yes

Table 5

Applicant characteristics

This table presents the results from estimating equation (1) for subsamples based on applicant characteristics. The dependent is the natural logarithm of the number of refinancing applications from a particular applicant category. Conventional/Non-conventional considers conventional vs. non-conventional (i.e. government supported) loans; White/Non-white considers applications from the white and non-white populations; Male/Female considers applications from male vs. female applicants; and Low income/High income considers applications from low (bottom tercile) income vs. high (top tercile) income applicants. The independent variable of interest is *Beneficial to Refinance × Treated × Post* where *Treated × Post* is an indicator equal 1 for all years t after Fox Business Network 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, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code z and time t; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code z and time t; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code z and time t; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code z and time t; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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 ***.

	(1A) Conventional	(1B) Non-conventional	(2A) White	(2B) Non-white	(3A) Male	(3B) Female	(4A) Low income	(4B) High income
Beneficial to Refinance × Treated × Post	0.219***	0.263***	0.219***	0.239***	0.223***	0.190***	0.205***	0.214***
	(0.00858)	(0.00783)	(0.00832)	(0.00752)	(0.00822)	(0.00714)	(0.00745)	(0.00750)
Diff (B - A)	-0.044		-0.02		0.033		0.009	
Z statistic (H0: A = B)	-3.71***		-1.75*		3.01***		1.23	
Constant	0.729***	0.252***	0.375***	0.611***	0.564***	0.0475	1.385***	-0.994***
	(0.0710)	(0.0481)	(0.0695)	(0.0612)	(0.0683)	(0.0634)	(0.0621)	(0.0736)
Observations	810,639	810,639	810,639	810,639	810,639	810,639	810,639	810,639
R-squared	0.948	0.903	0.945	0.931	0.946	0.935	0.936	0.931
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6

Mechanisms: Financial literacy, mortgage shopping and incomplete applications

This table examines the mechanisms driving the media-refinancing relation. The dependent variables measuring refinancing activity are: (i) is the natural logarithm of the number of refinancing applications (models 1 and 2); (ii) Google Search Volume Index (SVI) for the term "refinance"; and (iii) and the fraction of incomplete complete refinancing applications (i.e., those that are initiated but never finalized) relative to total applications in zip code z and time t (model 4). The independent variable of interest is *Beneficial to Refinance × Treated × Post* where *Treated × Post* is an indicator equal 1 for all years t after Fox Business Network 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 past 5 years, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. *Financial Literacy* is an indicator equal 1 if state s in year t is above median in financial literacy based on survey answers from the National Financial Capability Study (NFCS). *Bank Branch Density* is an indicator equal 1 if there is an above median number of branches in zip code z in year t. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code z and time t; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code z and time t; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code z and time t; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code z and time t; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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)
	Factor = Financial Literacy	Factor = Bank Branch Density		
	Log(Number of applications)	Log(Number of applications)	Google SVI for "refinance"	Share of Incomplete Applications
Treated × Post	-0.162**	-0.129*	0.180	-5.27e-05
	(0.0464)	(0.0651)	(0.767)	(0.000313)
Beneficial to Refinance × Treated × Post	0.361***	0.209***	4.285*	-0.000885**
	(0.0741)	(0.0655)	(2.278)	(0.000395)
Beneficial to Refinance × Treated × Post × Factor	-0.0637**	0.0693**		
	(0.0264)	(0.0247)		
Constant	2.204***	1.207***	12.19***	0.0628***
	(0.217)	(0.258)	(0.701)	(0.00352)
Observations	249,134	743,858	2,912	681,671
R-squared	0.975	0.958	0.738	0.562
Control	Yes	Yes	No	Yes
Zip FE	Yes	Yes	No	Yes
County-Year FE	Yes	Yes	No	Yes
Year FE	No	No	Yes	No
Designated Market Area FE	No	No	Yes	No

Table 7

Persistence of the treatment effect

This table presents the results from examining the persistence of the treatment effect. The dependent variables measuring refinancing activity are: (i) the natural logarithm of the number of refinancing applications; and (ii) the natural logarithm of the value of refinancing applications. The independent variable of interest is *Beneficial to Refinance × Treated × T-yr Post* where *Treated × T-yr Post* is an indicator equal 1 in the *T* years after Fox Business Network 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, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code *z* and time *t*; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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)
Treated × Post	-0.0944	-0.0815
	(0.0691)	(0.0658)
Beneficial to Refinance × Treated × 1-yr Post	0.158**	0.145**
	(0.0673)	(0.0669)
Beneficial to Refinance × Treated × 2-yr Post	0.198***	0.190***
	(0.0661)	(0.0666)
Beneficial to Refinance × Treated × 3-yr Post	0.251***	0.250***
	(0.0748)	(0.0770)
Beneficial to Refinance × Treated × 4-yr Post	0.242***	0.251***
	(0.0770)	(0.0798)
Beneficial to Refinance × Treated × 5-yr Post	0.250***	0.257***
	(0.0722)	(0.0729)
Constant	0.846***	1.863***
	(0.265)	(0.280)
Observations	810,639	810,639
R-squared	0.950	0.970
Control	Yes	Yes
Zip FE	Yes	Yes
County-Year FE	Yes	Yes

Table 8

Media exposure and refinancing activity: Supply side

This table presents the results from estimating equation (1) considering the supply side (i.e. approval rates). The dependent variables measuring refinancing activity are: (i) the approval rate (i.e. the ratio of approved applications to total applications in a given zip code); and (ii) the value weighted approval rate (i.e. the ratio of the value of approved applications to total value of applications in a given zip code). The independent variable of interest is *Beneficial to Refinance* × *Treated* × *Post* where *Treated* × *Post* is an indicator equal 1 for all years *t* after Fox Business Network 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, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code *z* and time *t*; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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)
	Approval rate	Value Weighted Approval rate	Approval rate	Value Weighted Approval rate
Treated × Post	-0.00116	-0.000982	-0.00211	-0.00202
	(0.00159)	(0.00185)	(0.00153)	(0.00150)
Beneficial to Refinance × Treated × Post	0.000622	0.00172	0.00195	0.00268
	(0.00219)	(0.00229)	(0.00245)	(0.00247)
Constant	0.297***	0.282***	0.334***	0.331***
	(0.0155)	(0.0158)	(0.0148)	(0.0158)
Observations	681,671	681,669	681,671	681,669
R-squared	0.766	0.717	0.796	0.750
Control	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	No	No
Zip FE ×Time trend	No	No	Yes	Yes
County-Year FE	Yes	Yes	Yes	Yes

Table 9
Alternative empirical specifications

This table presents the results from examining the treatment effect of Fox entry using alternative models. There are three alternative models we consider: (i) Fixed Effects (FE); (ii) Between Effects (BE); and (iii) Random Effects (RE). The sample period is restricted to only the years when *Beneficial to Refinance* is an indicator equal to 1 (i.e. 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, this rule corresponds to the following years). This corresponds to 2009, 2010, and 2011 from the time Fox initially entered the market. The dependent variables measuring refinancing activity is the natural logarithm of the number of refinancing applications. The independent variable of interest is *Treated × Post* where *Post* is an indicator equal 1 after the entry of Fox business channel in zip code z and time t; and *Treated* is an indicator equal 1 if zip code z experiences Fox entry during our sample period. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code z and time t; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code z and time t; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code z and time t; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code z and time t; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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)
	Log(Number of applications)			Log(Value of applications)		
	FE	BE	RE	FE	BE	RE
Treated × Post	0.0238***	1.109***	0.0729***	0.0311***	1.189***	0.131***
	(0.00332)	(0.0197)	(0.00362)	(0.00452)	(0.0214)	(0.00580)
Constant	1.44e-09***	-0.00271	-0.00646	-1.18e-09***	-0.00330	-0.00807
	(0)	(0.00432)	(0.00698)	(1.18e-10)	(0.00725)	(0.00825)
Observations	106,798	106,798	106,798	106,798	106,798	106,798
R-squared	0.020	0.725		0.033	0.886	
Control	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	Yes	Yes	No	Yes	Yes
Zip code FE	Yes	No	No	Yes	No	No

Table 10
Bloomberg and CNBC entry

This table presents the results from estimating equation (1) using Bloomberg and CNBC entry. The dependent variables measuring refinancing activity are: (i) the natural logarithm of the number of refinancing applications; and (ii) the natural logarithm of the value of refinancing applications. The independent variable of interest is *Beneficial to Refinance × Treated × Post* where *Treated × Post* is an indicator equal 1 for all years *t* after CNBC/Bloomberg TV 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, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code *z* and time *t*; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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)
	Bloomberg TV		CNBC	
	Log(Number of applications)	Log(Value of applications)	Log(Number of applications)	Log(Value of applications)
Treated × Post	0.0726	0.0528	0.0892**	0.0665*
	(0.0441)	(0.0393)	(0.0390)	(0.0358)
Beneficial to Refinance × Treated × Post	0.165***	0.161***	0.123**	0.127***
	(0.0506)	(0.0429)	(0.0456)	(0.0388)
Constant	1.499***	3.509***	0.903***	2.998***
	(0.216)	(0.303)	(0.211)	(0.295)
Observations	797,918	797,918	374,500	374,500
R-squared	0.970	0.982	0.971	0.985
Control	Yes	Yes	Yes	Yes
Zip FE ×Time trend	Yes	Yes	Yes	Yes
County-Year FE	Yes	Yes	Yes	Yes

Table 11
Validation of channel lineup position

This table presents the results of regressing business news *predicted* viewership on local 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; (ii) *Income per capita* which is income per head of population; (iii) *Employment* which is the natural logarithm of the total number of people employed in the zip code; (iv) *Wages* which is the natural logarithm of the total wage bill in the zip code; and (v) *Establishments* which is the natural logarithm of the number of business establishments along with zip code and year fixed-effects. Column 1 regresses predicted total viewership across all three channels on our main independent variable *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 *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 *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 Fox Business viewership on *Lineup position (Fox Business)* which is the natural logarithm of the lineup position for Fox Business 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 Fox Business Viewership
Lineup position	0.000116**			
	(5.40e-05)			
Lineup position (Bloomberg)		7.48e-05*		
		(4.30e-05)		
Lineup position (CNBC)			6.96e-05	
			(5.69e-05)	
Lineup position (Fox Business)				1.26e-05
				(3.99e-05)
Constant	0.130***	0.128***	0.130***	0.128***
	(0.000202)	(0.000204)	(0.000213)	(0.000196)
Observations	194,339	56,315	193,732	98,872
R-squared	0.960	0.988	0.960	0.980
Year FE	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	Yes	Yes

Table 12
Evidence from channel lineup position

This table presents the results from estimating equation (2). The dependent variables measuring refinancing activity are: (i) the natural logarithm of the number of refinancing applications; and (ii) the natural logarithm of the value of refinancing applications. The independent variable of interest is *Beneficial to Refinance ×* *Lineup Position* where *Lineup Position* is natural logarithm of the minimum channel position across the three business channels in zip code *z* and time *t*; 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 past 5 years, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iii) *Debt-to-Income Ratio* which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code *z* and time *t*; and (v) *Fraction non-conventional* which is the fraction of non-conventional loan applications (excluding refinancing) 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)
Beneficial to Refinance × Min log(Lineup)	-0.0364***	-0.0344***
	(0.00311)	(0.00379)
Constant	2.306***	3.600***
	(0.139)	(0.206)
Observations	442,539	442,539
R-squared	0.959	0.977
Control	Yes	Yes
Zip FE	Yes	Yes
County-Year FE	Yes	Yes

Table 13

The economic impact of media exposure on refinancing outcomes

This table presents the results from estimating equation (x). 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 *Availability of FBN* which is an indicator equal one if Fox Business Network is available to the borrower at the time of refinancing. Control variables are *Loan Amount* which is the natural logarithm of the loan outstanding and *Remaining Maturity* which is the natural logarithm of the number of monthly payments remaining on the loan. Robust standard errors clustered by three digit zip code and by year-month are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2)
	Reduction in Mortgage Rate	Reduction in Monthly Repayment
Availability of FBN	12.93***	10.82***
	(2.130)	(2.749)
Loan Amount	-24.95***	175.3***
	(0.207)	(0.267)
Remaining Maturity	-69.82***	-43.21***
	(0.483)	(0.624)
Credit Score	-0.369***	-0.425***
	(0.00143)	(0.00184)
Constant	1,147***	-1,361***
	(3.639)	(4.702)
Observations	1,416,452	1,416,437
R-squared	0.192	0.395
ZIP3 FE	Yes	Yes
State-Year-Month FE	Yes	Yes

Table 14

Measuring incentives to refinance

This table presents matched loan analysis of the impact of Fox Business entry on refinancing probabilities using a linear probability model. 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 Fox Business (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 Fox Business enters the treated zip code and when it enters the control zip code. The dependent variable in Column (1) is an indicator equal one if a loan in refinanced before the end of the sample in 2017. The dependent variable in Columns (2)-(6) is an indicator equal one if a loan refinances within the time gap (i.e., *Gap*) between when Fox Business enters the treated zip code and before it enters the control zip code. We define a series of indicators *Incentive (≥ X bp)* for X=100, 75, 50 and 25. These indicators are equal one 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 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)
	Refinance by 2017	Refinance within *Gap*	Refinance within *Gap*	Refinance within *Gap*	Refinance within *Gap*	Refinance within *Gap*
Treated	0.0153***	0.000725***	0.000149***	8.30e-05***	8.60e-05***	5.63e-05**
	(0.000389)	(6.03e-05)	(3.38e-05)	(2.98e-05)	(2.91e-05)	(2.80e-05)
Treated × Incentive (≥100bp)			0.00556***			
			(0.000504)			
Treated × Incentive (≥75bp)				0.00431***		
				(0.000368)		
Treated × Incentive (≥50bp)					0.00287***	
					(0.000253)	
Treated × Incentive (≥25bp)						0.00218***
						(0.000188)
Constant	0.0423***	0.000686***	0.000686***	0.000686***	0.000686***	0.000686***
	(0.000195)	(3.02e-05)	(3.01e-05)	(3.01e-05)	(3.01e-05)	(3.01e-05)
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

Figure 1
Business channel viewership
This figure plots business channel viewership overtime for the three major business channels as well as in total.

Figure 2
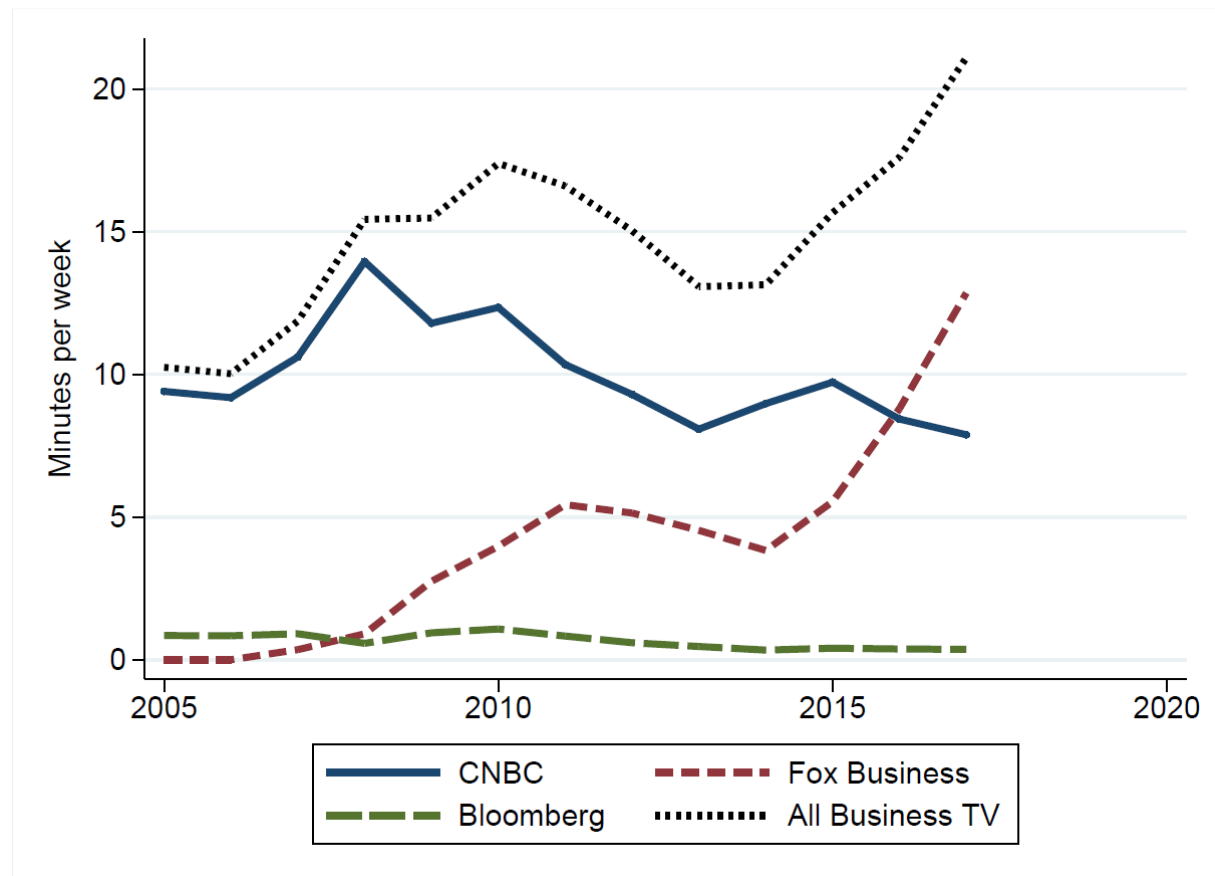**Scatter plot of lineup position against viewership**
This figure plots business channel ratings points (i.e. viewership) against the natural logarithm of minimum cable lineup position across the three business channels.
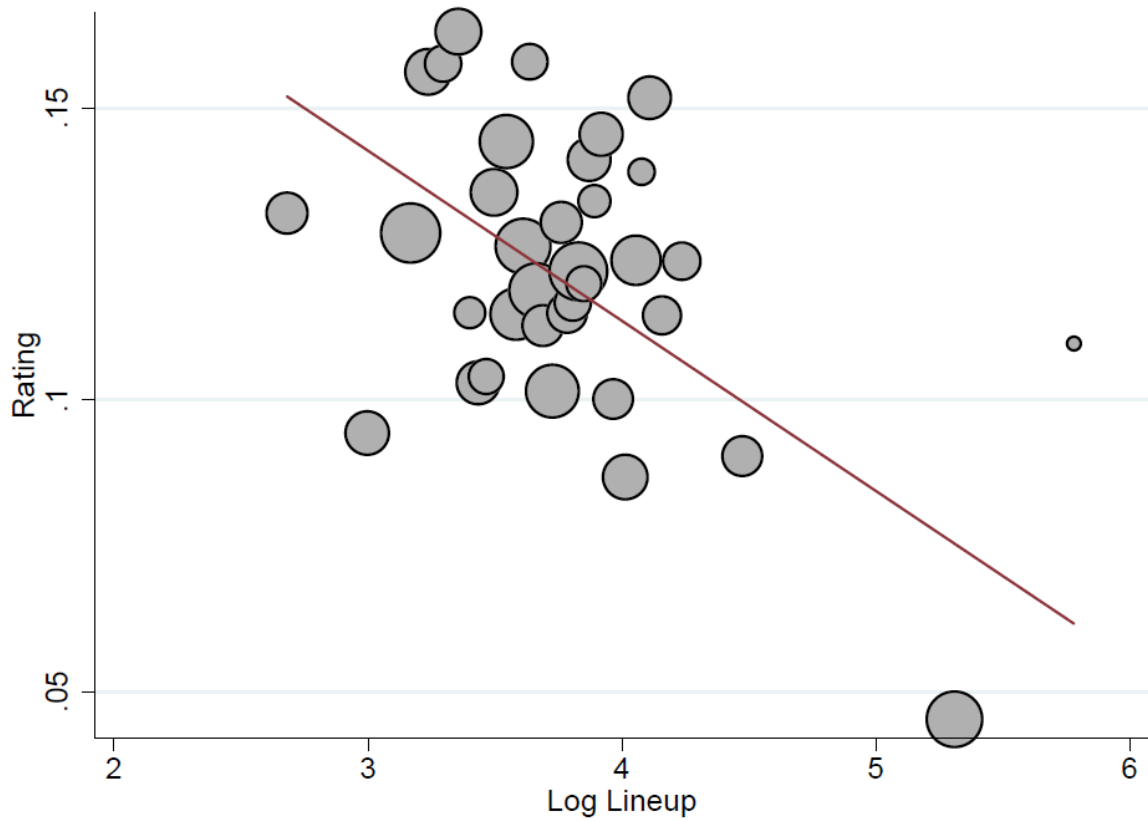
Figure 3
Fox Business Network Entry Pattern
This figure plots the staggered entry of Fox Business Network into Designated Market Areas (DMAs) overtime.
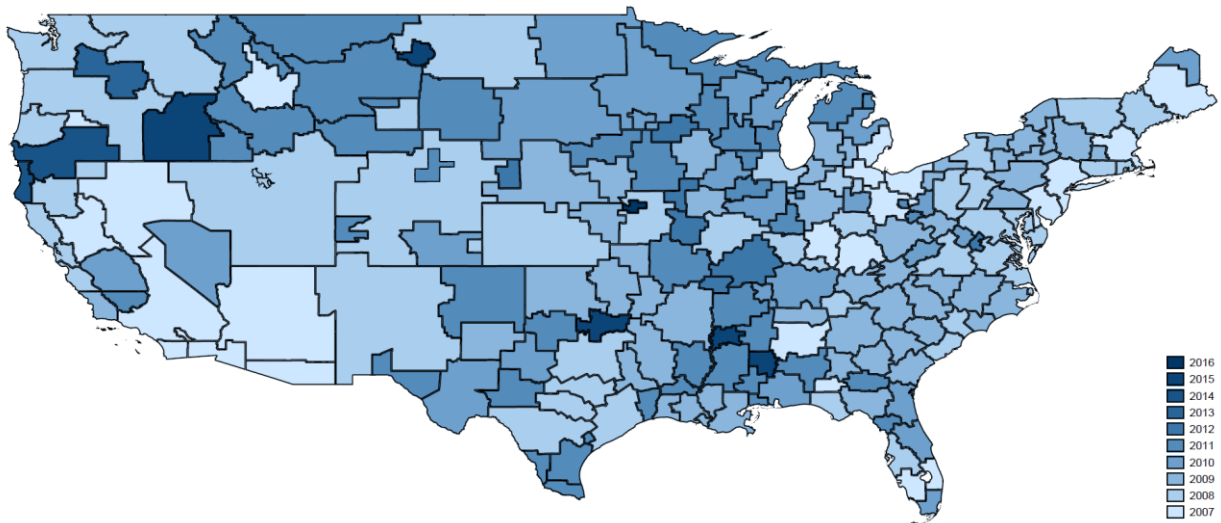
Figure 4
Parallel trends
This figure plots the pre-event time trend for two variables (i) the natural logarithm of the number of refinancing applications; (ii) the natural logarithm of the value of refinancing applications. Consistent with our regressions, the zip code-year observations are demeaned by subtracting the county-year average.
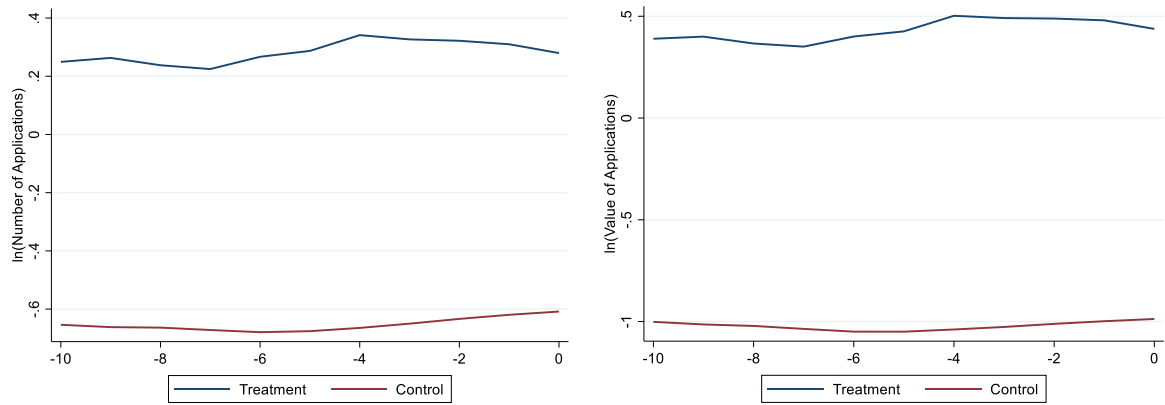
Figure 5
The benefits of refinancing
This figure plots the distribution of the interest rate reduction (left panel) and monthly repayment reduction (right panel) after refinancing. Data come from the Fannie Mae Single Family Loan Performance file.
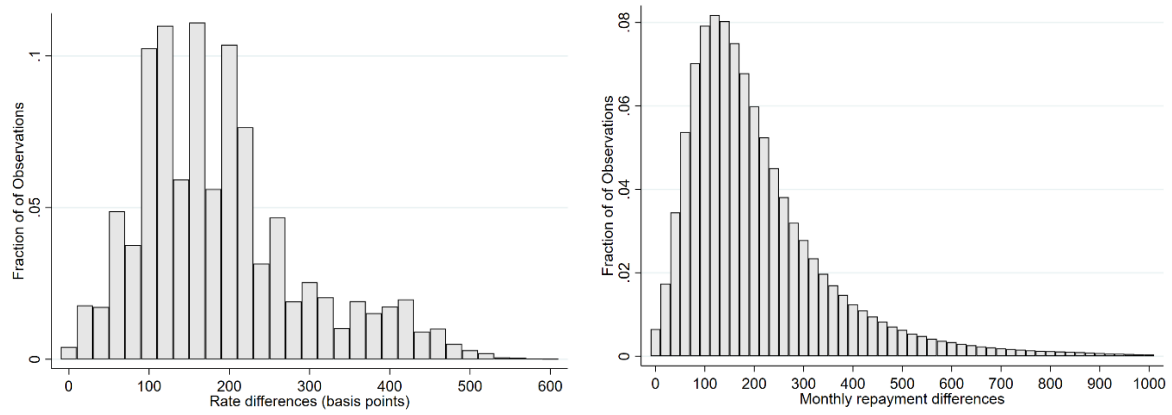
Figure 6

Incentives and the probability of refinancing

This figure presents two 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. The top panel 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. The middle panel 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 represent 95% confidence intervals. The bottom panel 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.
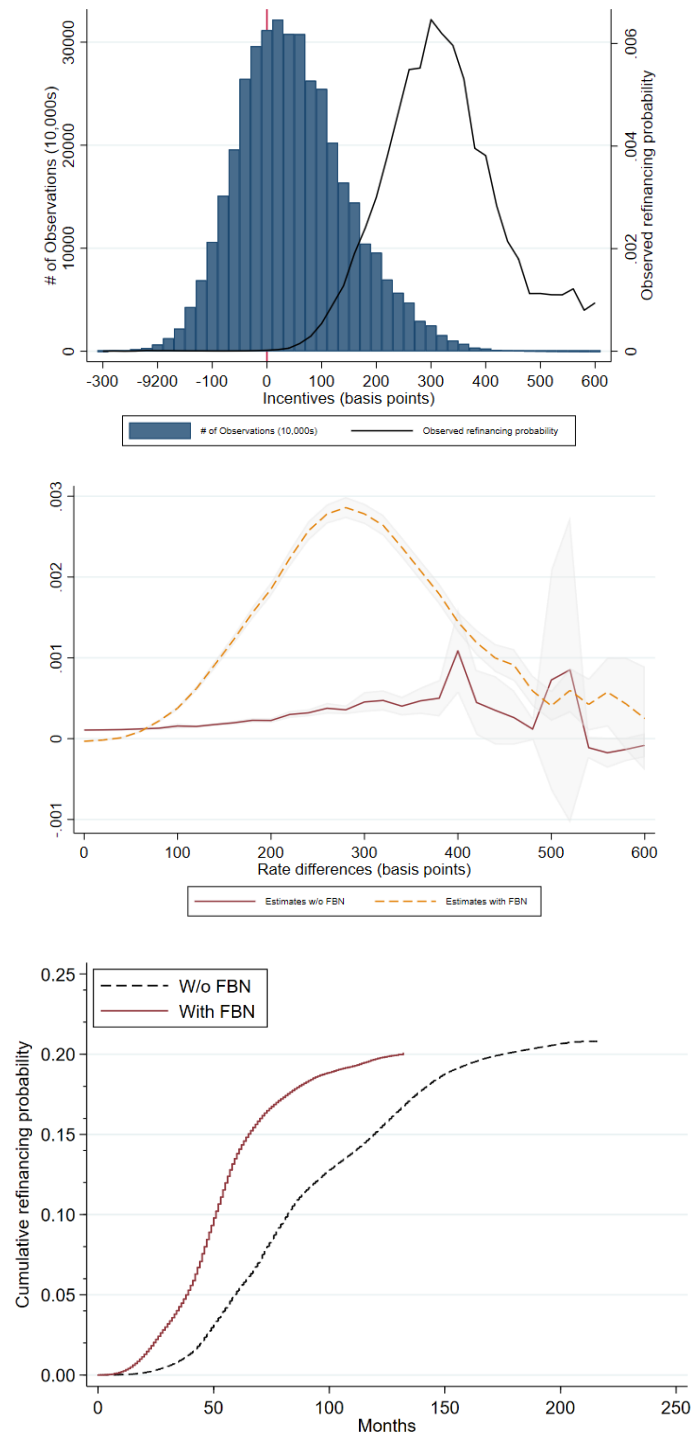
Appendix A: Survey Evidence

Table A.1

Where do borrowers get mortgage information from?

This table presents the results from the National Survey of Mortgage Originations (NSMO). 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. Wave 24 of the survey went into the field in the last quarter of 2019 and data are currently available up till the second quarter of 2018. 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: TV, radio, newspapers	12.5%	15.6%
Friends, relative, co-workers	41.4%	32.9%
Bankers or financial planners	34.1%	30.4%
Housing counsellors	5.1%	3.5%

Table A.2

Media use and borrower savviness

This table presents OLS regression results for four dependent variables 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; (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; (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 (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?" 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. The controls are defined as follows: *Age* is the age of the respondent. *Female* is an indicator equal 1 if the respondent is female. *White* is an indicator equal 1 if the respondent is white. *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 indictor equal 1 if the respondent resides in a metropolitan area. *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 *t*-statistics are in parentheses. Significance levels of 10, 5, and 1 percent are represented by *, **, and ***.

	(1)	(2) Evaluate Interest Rates Across Multiple Lenders	(3) Applied to Multiple Lenders	(4)
	Self-Initiated			Future Refinance
Media Use	0.030**	0.148***	0.073***	0.042***
	(2.32)	(9.92)	(6.58)	(3.42)
Age	-0.001*	0.000	-0.000	-0.002***
	(-1.71)	(0.14)	(-0.00)	(-5.69)
Female	-0.009	-0.061***	-0.029***	-0.017*
	(-0.89)	(-5.43)	(-3.52)	(-1.89)
White	0.074***	-0.064***	-0.039***	-0.081***
	(5.51)	(-4.20)	(-3.42)	(-6.46)
Number of borrowers	0.017*	-0.021*	-0.018**	-0.014
	(1.75)	(-1.86)	(-2.14)	(-1.56)
Financial Literacy Index	0.031***	-0.011*	-0.016***	-0.029***
	(5.56)	(-1.77)	(-3.42)	(-5.51)
Risk Aversion	-0.013*	-0.026***	-0.010*	-0.005
	(-1.87)	(-3.41)	(-1.79)	(-0.80)
Metro	-0.043***	0.015	-0.003	-0.001
	(-2.65)	(0.83)	(-0.20)	(-0.04)
Term	0.000	0.001	0.000	0.006***
	(0.22)	(0.90)	(0.70)	(7.85)
Rate Spread	-0.042***	-0.064***	-0.023***	0.018**
	(-4.90)	(-6.41)	(-3.14)	(2.24)
Combined LTV	-0.001***	-0.000	0.001**	-0.001**
	(-3.39)	(-0.24)	(2.04)	(-2.04)
Credit score	0.000*	0.000	-0.000**	-0.000***
	(1.83)	(0.30)	(-2.31)	(-4.38)
Constant	0.861***	0.572***	0.071	0.507***
	(4.50)	(2.61)	(0.44)	(2.81)
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	0.0429	0.0291	0.0714

Figure A.1

Media use by demographic characteristics

This chart presents the results from the National Survey of Mortgage Originations (NSMO). 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 charts below plot the fraction of respondents who answered either "a lot" or "a little" to using media as an information source, across various borrower characteristics. Panel A shows plots by financial literacy tercile (Chart (i)) and general education level (Chart (ii)). Panel B shows plots by borrower income group (Chart(iii)) and credit score (Vantage Score 3.0) tercile at origination. Panel C plots media use by race (Chart (v)) and age tercile (Chart (vi)).

Panel A

(i) Financial Literacy

(vii) Education

Panel B

(ii) Income Groups

(iii) Credit Score at Orgination

Panel C

(vi) Race

(iv) Age
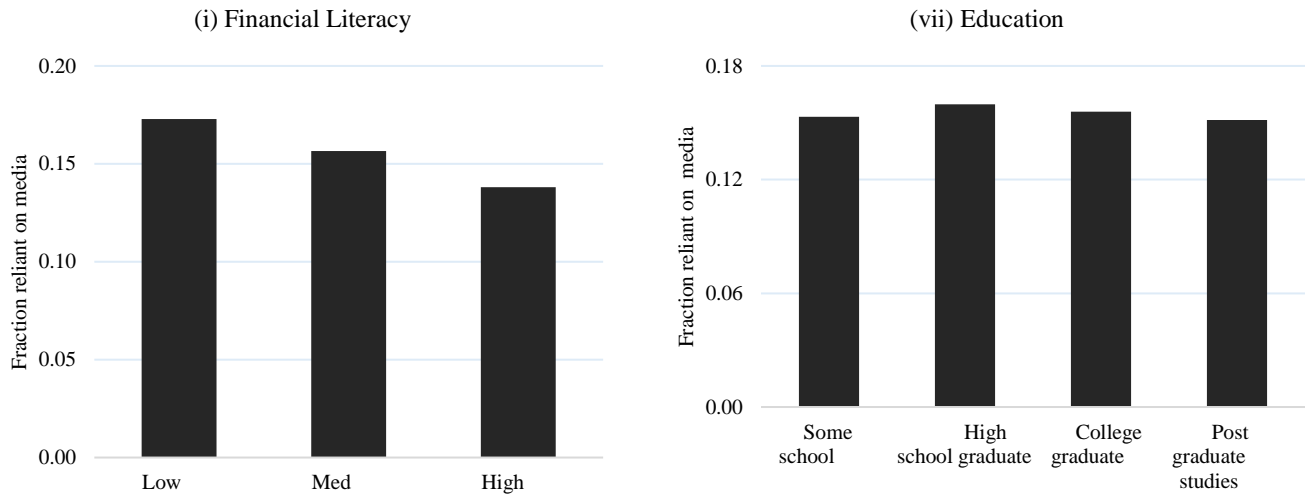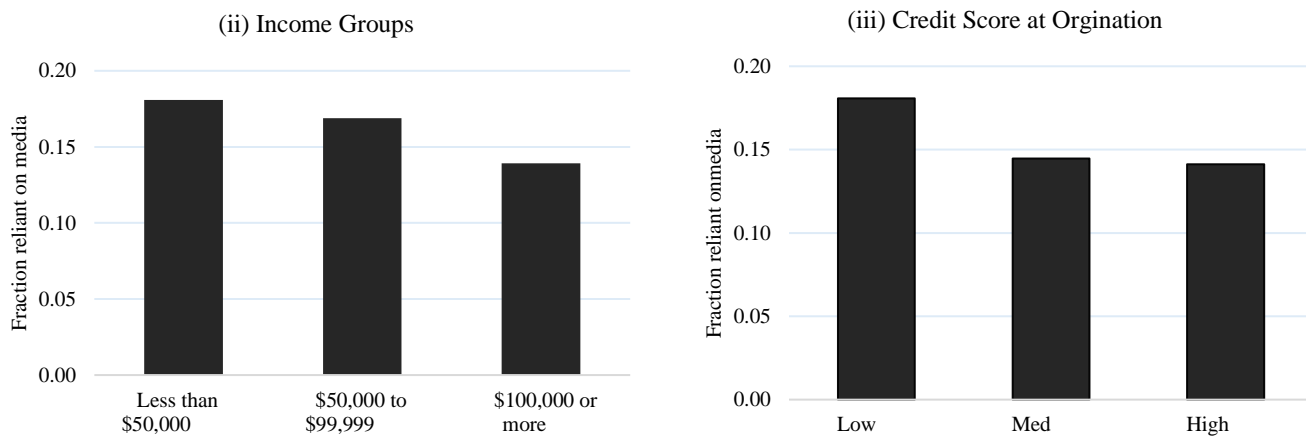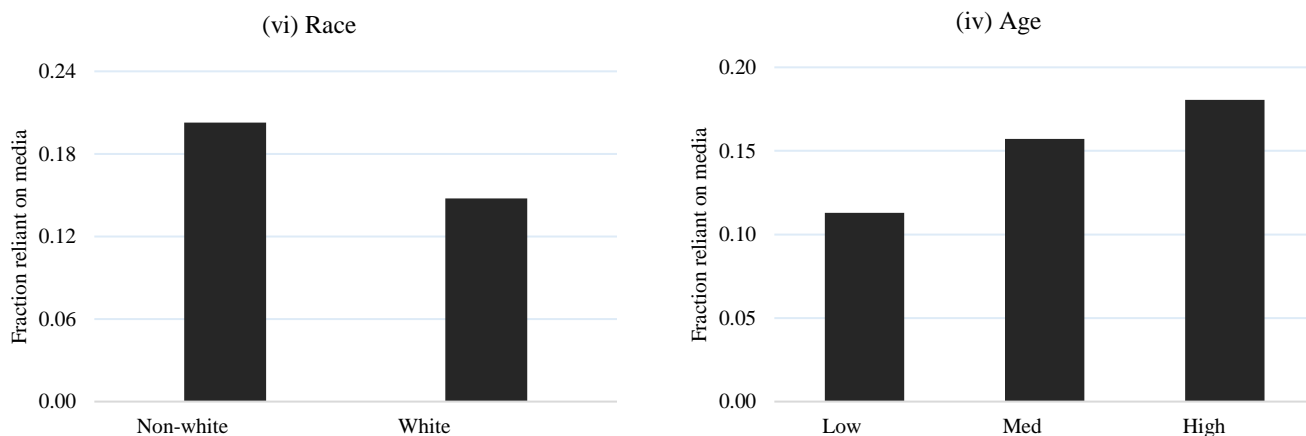
Appendix B: Sample Programming on Refinancing by Business TV Networks

B.1. Transcripts of Segments Dedicated to Refinancing

"Helping you save money on your mortgage"
Segment from Refi-Nation by Dagen McDowell
Fox Business Network, May 4, 2011. Run time 3.20 minutes
Available at https://video.foxbusiness.com/v/3883414/#sp=show-clips (accessed August 15, 2020)

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.

"When to refinance your home: What factors to take into account when considering refinancing"
Segment from Dave Ramsey Show
Fox Business Network, May 07, 2011. Run time 2.11 minutes
Available at https://video.foxbusiness.com/v/4213612/#sp=show-clips (accessed August 15, 2020)

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 Segments Dedicated to Refinancing

"As mortgage rates fall to a 3-year low, is not the time to refinance?"
Fox Business February 28, 2020.
Available at https://video.foxbusiness.com/v/6137155862001/#sp=show-clips (accessed May 22, 2020)

"Why now is the best time to refinance"
Fox Business May 4, 2011.
Available at https://video.foxbusiness.com/v/3883409/#sp=show-clips (accessed May 22, 2020);

"How to know when to refinance."
Fox Business News May 4, 2011.
Available at https://video.foxbusiness.com/v/3883414/#sp=show-clips (accessed May 22, 2020);

"Record number of homeowners can refinance—Here's how much you could save."
CNBC March 6, 2020.
Available at https://www.cnbc.com/video/2020/03/06/record-number-of-homeowners-can-refinanceheres-how-much-you-could-save.html (accessed May 22, 2020).

"What to know before you refinance"
CNBC February 5, 2009.
Available at https://www.cnbc.com/2009/02/05/what-to-know-before-you-refinance.html (accessed August 17, 2020)

"Refinance, please"
CNBC March 16, 2012
Available at https://www.cnbc.com/2012/03/16/refinance-please.html (accessed August 17, 2020)

"How low interest rates are impacting the home mortgage market"
BNN Bloomberg September 27, 2019
Available at https://www.bnnbloomberg.ca/investing/video/how-low-interest-rates-are-impacting-the-home-mortgage-market~1790978 (accessed August 17, 2020)

"Tempted by low mortgage rates? Consider fees, penalties for refinancing first"
BNN Bloomberg May 21, 2020
Available at https://www.bnnbloomberg.ca/tempted-by-low-mortgage-rates-consider-fees-penalties-for-refinancing-first-1.1439414 (accessed August 17, 2020)

Appendix C: Sample Construction

This appendix describes the construction of our main sample and compares its characteristics with those of geographic areas excluded by sample filters.

Table C.1
Sample construction
This table shows the sample selection criteria and provides the number of mortgage applications screened out by each sample filter. The sample consists of refinancing mortgage applications reported in the Home Mortgage Disclosure Act (HMDA) loan application registry from January 1990 to December 2017, excluding applications from households residing in zip codes with missing data on business TV viewership.

Sample	# Zip-years
Universe of HMDA mortgage applications in 1990-2017	845,257
- Zip-years with missing controls	5,053
- Home purchase and home improvement applications	18,788
- Missing geocode information to merge into media data	5,016
- Dropped observations when including county-by-year fixed effects	5,761
= Final Sample	810,639

Table C.2

Sample selection

This table compares the characteristics of refinancing applications and borrowers between our main sample and the areas excluded by our sample selection criteria. The main sample consists of refinancing mortgage applications reported in the Home Mortgage Disclosure Act loan application registry from January 1990 to December 2017, excluding applications from households residing in zip codes with missing data on business TV viewership. Sample selection criteria appear in Appendix Table B.1. The values reported are time-series averages over this period. Statistical significance levels for the test of the difference in means are indicated as follows: *=10%, **=5%, ***=1%.

Panel B: Borrower and loan characteristics	Our sample	Excluded sample	Difference	t-statistics
Number of applications	8,764,922	1,772,683	6,992,239	(5.36)***
Value of applications ($'000)	1,529,987.840	266,804.544	1,263,183.360	(5.26)***
Approval rate	.496	.503	-.0072	(.295)
Value Weighted Approval rate	.497	.494	.00339	(.154)
Borrower income ($'000 per year)	89	83.8	5.23	(1.1)
Loan amount ($'000)	165	154	11.2	(.76)
Debt-to-Income ratio	2.31	2.3	.00938	(.07)
Fraction non-white applications	.248	.244	.00371	(.157)
Fraction non-conventional applications	.105	.133	-.028	(1.25)
Fraction male applicants	.612	.635	-.0224	(1.05)
Fraction Hispanic applicants	.0964	.144	-.0472	(2.75)
Fraction African American applicants	.0608	.0442	.0166	(3.58)***
Fraction Asian applicants	.0343	.0299	.00442	(1.37)
Application incompletion rate	.0462	.0376	.00853	(1.59)
Loan acceptance rejection by borrower	.0543	.0539	.000385	(.0593)
Panel C: Zip code controls				
Borrower income ($'000 per year)	81.4	72.9	8.49	(1.78)*
Loan Amount ($'000)	144	132	12.4	(.903)
Debt-to-Income ratio	1.99	2.17	-.178	(1.62)
Fraction non-white applicants	.209	.202	.0071	(.641)
Fraction non-conventional applications	.231	.228	.00386	(.132)

Internet Appendix

Table IA1
County level determinants of Fox entry

This table presents analysis of the county level determinants Fox Business Network entry using a linear probability model. The dependent variable is an indicator equal one if Fox Business Network is available in county c at time t and zero otherwise. County variables include: *Availability of CNBC* which is an indicator equal one CNBC is available in the county; *Availability of Bloomberg* which is an indicator equal one if Bloomberg is available in the county; *FBN available in adjacent county* is an indicator equal one if the adjacent county has Fox Business Network; *Availability of Fox News* is an indicator equal one if Fox News is available in the county; *Number of vacant channel positions in lineup* is a measure of capacity constraints which is equal to the natural logarithm of the number of vacant channel positions int eh cable lineup. *Real Estate Price* which is the All-Transactions house price index (FRED); *Poverty* which is percent of people of all ages in poverty (Census); *Number of Establishments* which is the number of businesses in the county (Census); *Per Capita Income* is the county income per capita (FRED); *Median Income* which is the median county income (FRED); *Population* which is the natural logarithm of county population (Census); *Unemployment* which is the county unemployment rate (FRED); *Urban* which is an indicator equal 1 if the county is in a urban area (Census); *Democratic Vote Share* which is the fraction of voters who voted for the democratic party in the most recent Federal election; *GDP* which is county gross domestic product; *Crime* which is the combined violent and property crime incidents known to law enforcement; and *Subprime* which is the county level Equifax subprime credit population. 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) FBN	(2) FBN	(3) FBN
Availability of CNBC	0.124*	0.0746	0.101
	(0.0560)	(0.124)	(0.118)
Availability of Bloomberg	0.153***	0.208***	0.199***
	(0.0334)	(0.0455)	(0.0557)
FBN available in the adjacent county	0.0991*	0.113**	0.0224
	(0.0442)	(0.0353)	(0.0321)
Availability of Fox News	0.112	0.292	0.168
	(0.0705)	(0.173)	(0.189)
Number of vacant channel positions in lineup	0.0548***	0.0800**	0.0552**
	(0.0106)	(0.0255)	(0.0219)
Real estate price	0.000160	0.000676	-0.00203
	(0.000452)	(0.00118)	(0.00136)
Poverty	-0.00561	-0.00780*	-0.00506
	(0.00426)	(0.00375)	(0.00376)
Number of Establishments	-1.95e-05***	8.51e-05	-1.92e-05
	(4.20e-06)	(0.000154)	(0.000168)
Per Capita Income	-4.63e-06	-4.27e-06	1.41e-06
	(2.90e-06)	(5.02e-06)	(4.56e-06)
Median Income	4.32e-06**	-5.48e-06	-4.11e-06
	(1.75e-06)	(3.45e-06)	(3.16e-06)
Population	0.00117***	0.0280***	0.0258**
	(0.000240)	(0.00783)	(0.00896)
Unemployment	0.00305	-0.0190	-0.00427
	(0.00724)	(0.0151)	(0.00784)
Urban	0.106***	0.168	-0.310
	(0.0242)	(0.338)	(0.358)
Democrat Vote Share	0.235	0.758	0.923
	(0.177)	(0.932)	(0.687)
GDP	-5.89e-09***	1.08e-08	2.30e-08
	(1.16e-09)	(3.73e-08)	(2.30e-08)
Crime	1.23e-05***	-4.22e-05	-3.45e-05
	(2.94e-06)	(4.78e-05)	(4.49e-05)
Subprime	0.00227	0.00239	-0.00141
	(0.00267)	(0.00595)	(0.00590)
Constant	-0.509***	-1.865**	-1.267

	(0.115)	(0.713)	(0.724)
Observations	4,844	3,827	3,780
R-squared	0.134	0.452	0.594
County FE	No	Yes	Yes
Year FE	No	Yes	No
State-Year FE	No	No	Yes

Table IA2

Accepted and Rejected Applications

This table presents the results from estimating equation (1). The dependent variables measuring refinancing activity are: (i) the natural logarithm of the number of approved applications; and (ii) the natural logarithm of the number of rejected applications; (iii) the natural logarithm of the value of approved applications; and (iv) the natural logarithm of the value of rejected applications. The independent variable of interest is *Beneficial to Refinance × Treated × Post* where *Treated × Post* is an indicator equal 1 for all years *t* after Fox Business Network 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, this rule corresponds to the following years: 1992, 1993, 1994, 2002, 2003, 2004, 2009, 2010, 2011. Zip code control variables include: (i) *Borrower Income* which is average income of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (ii) *Loan Amount* which is average loan amount of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iii) Debt-to-Income Ratio which is debt-to-income ratio of mortgage applicants (excluding refinancing) in zip code *z* and time *t*; (iv) *Fraction non-white applications* which is fraction of applicants who are non-white (excluding refinancing) in zip code *z* and time *t*; and (v) Fraction non-conventional which is the fraction of non-conventional loan applications (excluding refinancing) 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(Num. of accepted apps)	(2) Log(Num. of rejected apps)	(3) Log(Value of accepted apps)	(4) Log(Value of rejected apps)
Treated × Post	-0.0971	-0.0621	-0.0935	-0.0602
	(0.0623)	(0.0814)	(0.0556)	(0.0739)
Beneficial to Refinance × Treated × Post	0.227***	0.218**	0.229***	0.214**
	(0.0553)	(0.0797)	(0.0527)	(0.0778)
Constant	0.573**	0.569*	1.350***	1.377***
	(0.220)	(0.294)	(0.258)	(0.337)
Observations	810,639	810,639	810,639	810,639
R-squared	0.945	0.943	0.964	0.962
Control	Yes	Yes	Yes	Yes
Zip FE	Yes	Yes	No	No
County-Year FE	Yes	Yes	Yes	Yes