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Translator Networks and the New Geography of Religious Radio

Thomas A. Wikle and Jonathan C. Comer

Religious radio has grown substantially in recent years following changes allowing noncommercial organizations to establish remotely operated ''translator'' stations. In this article we examine the changing geography of religious radio emerging through the growth of translator networks by characterizing their spatial patterns and comparing socioeconomic characteristics of persons living in proximity to the five largest translator networks. Two types of networks emerge from the analysis: 1) networks that offer music and entertainment to attract younger, more affluent listeners, and 2) networks that extend the spatial coverage of syndicated programming carrying a stronger religious emphasis, often to more isolated communities.

Introduction

Broadcasting has included religious programming since the debut of AM radio in the early 1920s (Siedell, 1971; Smith, Ostroff, & Wright, 1998). However, while radio has remained an important venue for religious broadcasters, increasing costs have made it difficult for religious groups to build or purchase full-power stations. In the 1970s noncommercial organizations began using low power ''translator'' stations to reach areas where radio signals were blocked by terrain. Translators extended the reach of a full-power station by rebroadcasting its signal on an adjacent FM frequency. A decade later the stipulation that noncommercial translators be located near their parent station was dropped by the Federal Communications Commission (FCC), facilitating a new type of satellite-fed translator called a ''satellator.'' Using translators, evangelical broadcasters such as the Calvary Satellite Network have built networks extending the reach of their syndicated programming to hundreds of new locations, many in small communities that have never hosted a local station. This article explores the changing landscape of religious radio

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emerging through the expansion of religious translators in the US. To provide context for understanding recent changes we begin with a brief overview of religious radio in America.

Background

Erickson (1992) suggests that the popularity of evangelical radio in America has been spurred by perceptions that mainstream religions were ignoring social concerns such as crime and the erosion of moral values. During the 1990s evangelical broadcasters began exploring new approaches for increasing audience sizes. To better understand listener demographics, station managers initiated market surveys to target younger, college educated listeners (Apostolidis, 2002).[1] Music and entertainment was increasingly aired during the most popular time slots in lieu of preaching and other programming with a strictly religious tone (Perry & Carroll, 1996) making religious stations sound more like their secular counterparts (Abelman, 2005, 2006; Kelly, 2003). At the same time a new mix of Christian rock and pop known as Contemporary Christian Music (CCM) was gaining popularity (Arbitron Inc., 2007; Price, 1997). By transporting elements of religion into popular culture, CCM enabled listeners to enjoy secular culture while showing allegiance to their faith (Gormly, 2003; Hoover, 2001; Stout, 2001). As noted by Abelman (2006), while the number of stations of all types grew by only 4% between 2000 and 2005, the number of religious-formatted stations increased by 14%.[2]

Academic Research on Radio and Translators

Compared to other noncommercial media forms such as public television, noncommercial radio has been largely overlooked within scholarly literature (Barnard, 2000; Fornatale & Mills, 1980; Greer & Phipps, 2003; Hangen, 2002; Lochte, 2006; Schultze, 1990). A few studies have examined impacts of syndicated programs such as National Public Radio (Berry & Waldfogel, 1999; Fry, 1998; McCauley, 2005), the use of radio for promoting social or political agendas (Barker, 2002; Carpini, 1993; Lee, 2007) and the role of technology in maintaining social and cultural values (Meyrowitz, 1994). Geographic research focused on radio is also limited in scope. Studies have examined the spatial distribution of radio stations (Bell, 1965; Dimmick & Wang, 2005; Doucet, 1983; Greve, 1996; Innis, 1972), the decentralization of broadcasting (Hägerstrand, 1986), and radio's role in the context of other communications systems (Abler, 1974; Hillis, 1998).

Translators and Satellite Religiocasting

Along with changes aimed at attracting new types of listeners, evangelical broadcasters have looked for ways to expand into new geographic areas. In the late 1970s

religious organizations discovered low cost translator stations as alternatives to full power stations. Translators were first authorized by the FCC in 1970 to extend the range of FM stations into places inaccessible because of terrain obstructions (Faber, 1993).[3] Using low power levels, ''fill-in'' translators retransmitted signals from a parent station on an adjacent channel using low power levels.[4] Eventually broadcasters discovered they could extend the coverage area of a parent transmitter through chains of translator stations that carried signals to communities hundreds of miles away.[5] In terms of their relationship with full-power stations, FCC rules relegated translators to ''secondary status'' meaning that they could operate provided they did not interfere with a full-power station on the same frequency.

Representative of early translator networks, American Family Radio (AFR) began with a single full-powered station in Tupelo, Mississippi in 1987 and later grew through the construction of more than 170 translators in 28 states. Using local churches as partners AFR broadcasts ''Christian Classics,'' the conservative ''Home School Heartbeat,'' and the ''Phyllis Schafly Report.'' The organization's evangelical mission encourages people to ''change their culture to reflect Biblical truth.'' About 70% of AFR's programming is traditional Christian or inspirational music with the remainder devoted to preaching and talk programs.

During the late 1980s noncommercial broadcasters discovered a loophole in FCC rules allowing translators to operate without being linked to a parent radio station. The ''satellator'' evolved as a new type of translator using satellite-fed programming. Untethered from expensive parent stations, religious broadcasters could locate a satellator nearly anywhere a source of power was available (Green, 1998). In addition to flexibility in location, satellators offered a cost savings because they required no staff and minimal equipment. Religious organizations quickly realized the financial benefits of establishing satellators for reaching new contributors.

A limiting factor in the growth of translator networks has been the availability of licenses issued by the FCC. In 2003 the FCC opened the first filing window for new translator licenses since 1997 (Chernoff, 2003). Not anticipating significant interest, a fee was not required for submitting an application and no limit was placed on the number of applications that could be submitted by an organization or individual. As the deadline approached the FCC was flooded with more than 13,000 applications for construction permits, a figure nearly four times the number of translators licensed at the time. In their review of applications FCC officials discovered that more than 30% had been submitted by just two organizations. After uncovering other irregularities, the FCC issued a freeze on processing additional license applications in March 2005 but not before approving hundreds of applications, the majority submitted by religious organizations (Schulman, 2006).

Competition with Low Power FM Radio

As translator networks have expanded there has been increasing concern over their consumption of FM channels also used by community radio stations.[6] In

2000 the FCC created Low Power FM (LPFM) as a means of bringing local voices back to radio following consolidation in station ownership that took place during the late 1990s (Brand, 2004; Federal Communications Commission, 2000; Hazlett & Viani, 2005). In contrast to translators that are prohibited from offering local programming, LPFM stations are required to broadcast a minimum of 8 hours of local programming each day. In addition to competing for FM spectrum in populated areas, community radio advocates have argued that translators broadcasting only syndicated programming offer few benefits to local communities. Some advocacy groups have called for FCC rules that would favor new LPFM stations over translators (Amherst Alliance, 2006).

Fueled by the low cost of establishing new stations, the rapid growth of evangelical religious radio stations has extended the influence of Christian broadcasting organizations into isolated rural communities and small towns that have not previously hosted a radio station of any kind. In doing so evangelical groups have been successful in advancing evangelical objectives while also building financial support for programming.

Methods and Findings

To better understand the growth and local impacts of religious translators we explore spatial and demographic patterns associated with the largest translator networks. Our examination of translators has two main objectives. First, we seek to characterize distributions and patterns of growth associated with religious translators across space and time. For example, does the diffusion of stations begin at a parent (full power) station and then radiate outward? Are translator networks regional or national in scope and are stations concentrated near populated areas or are they more evenly distributed? Our purpose is to document the progression of the religious translator expansion across the United States. Geographic information system (GIS) software is used as both an analytical tool and a means to visualize spatial patterns corresponding to the largest translator networks. Second, as a means of understanding audiences targeted by religious broadcasters, we compare socioeconomic characteristics of persons living in proximity to stations operated by the five largest translator networks as well as LPFM stations operated by religious organizations. For this portion of the analysis we consider the extent to which evangelical broadcasters target locations based on economic and social characteristics of residents. This analysis provides an indirect measure of the presumed target audiences of broadcasters whose true intentions and market goals are difficult to ascertain since their public mission statements typically offer only evangelical and religious goals.

Information needed for our evaluation of station ownership and distribution comes from an FCC database (Federal Communications Commission, 2007) containing latitude and longitude coordinates for noncommercial FM translators. Following Lucas (2006), stations were categorized as having either a religious or non-religious focus based on information about each license holder. Additional information was

collected in cases where it was difficult to determine if a station had a religious affiliation. Of 6,468 noncommercial translators in the FCC database, 3,592 (55%) were categorized as religious. A similar process was used to identify 462 LPFM stations operated by religious organizations, mostly local churches.

Figure 1 shows the distribution of translators licensed to religious organizations for three periods, 1978–1992, 1993–2002, and 2003–2007. As the map shows, the majority of religious translators established before 1993 were located in the West and a few places in upper Midwest and Mid-Atlantic states. Religious translators had an early start in western states because of the need to reach places isolated by mountainous terrain. Several southern states, notably Georgia, South Carolina, Arkansas, and Oklahoma had no translators during this early period of network growth. The number of religious translators increased nearly six-fold between 1992 and 2002 as new stations were established in every U.S. state. No longer required to be linked in station chains, hundreds of satellators were established during this period, many located in isolated communities that had previously been without radio service of any kind.[7]

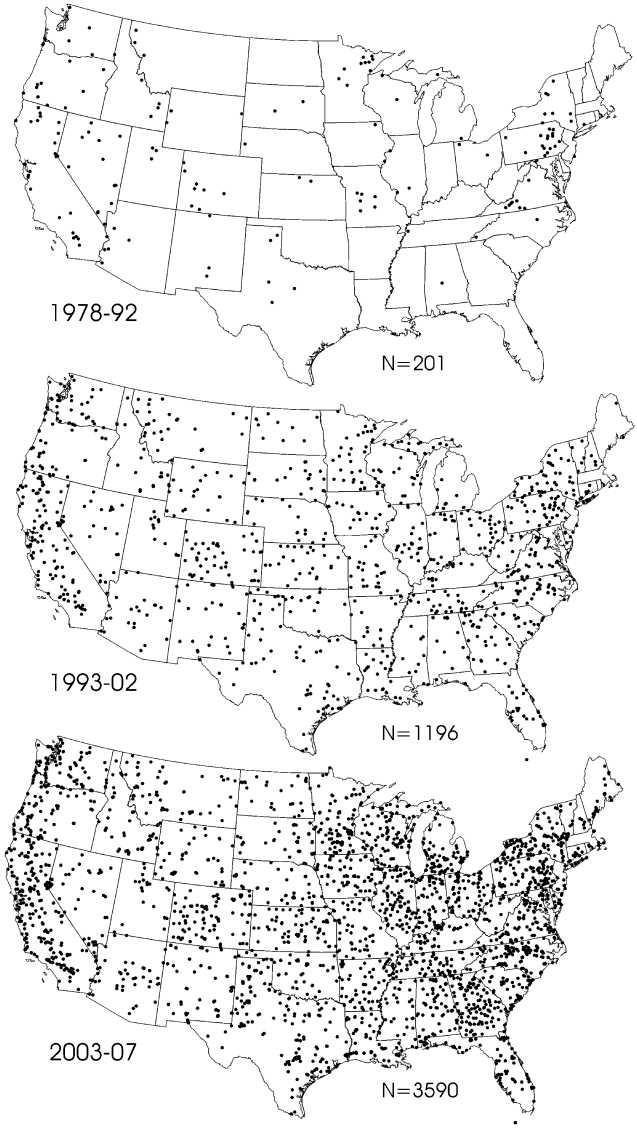
Translators added during the period 2003 to 2007 reflect applications approved by the FCC following the 2003 filing window. For many of these stations FCC license approval was expedited if there was no competition at a proposed station location. The emerging pattern shows the impact of FM spectrum crowding created by fewer opportunities for new stations in heavily populated urban areas such as Los Angeles. Table 1 provides a breakdown of religious translators by U.S. Census Region. In terms of the ratio of religious translators to each region's share of the U.S. population, the West, South, and Midwest have large populations and large numbers of translators, while the Northeast lags behind with 18% percent of the U.S. population but only 9% of religious translators.

Table 1
Distribution of Translators by Census Region

Census Region	Translator Stations		% of Total U.S. Population, 2006
	Number	% of Total	
West	1,177	33	23
Midwest	939	26	22
Northeast	309	9	18
South	1,167	32	37
US	3,592	100	100

Note. The original data for translator locations (latitude and longitude coordinates) are from "FM translator & booster stations," by the Federal Communications Commission, 2007, Washington, DC: Author.

Figure 1
Religious translators, 1978 to 2007.



Translator Networks

As previously noted, translator networks emerged as low cost alternatives for religious broadcasters seeking to expand into new territories. Table 2 provides a breakdown of the five largest religious translator networks. The largest and perhaps best known is the Calvary Satellite Network (CSN), established in 1992 as an extension of the Costa Mesa, California based Calvary Chapel. With its headquarters in Twin Falls, Idaho, CSN distributes inspirational programs such as ''Walk in the World'' and ''Searchlight'' as well as listener call-in shows and Christian rock. CSN's mission is to broadcast ''Biblical teaching'' and ''anointed praise and worship music'' 24 hours a day. As shown in Figure 2, CSN stations are concentrated in western states, especially California, Oregon, and Washington, with station enclaves in southern and Midwestern states.

Educational Media Foundation (EMF) was founded in the late 1980s to ''positively impact listeners'' through music, news and educational programming. EMF operates two types of stations. K-LOVE stations broadcast Contemporary Christian music with a focus on young married women and families while Air-1 stations offer a blend of Christian Rock targeting 18–34 year-olds. EMF stations are located throughout the US with concentrations in a few areas such as eastern Michigan and Ohio and western Colorado (Figure 2).

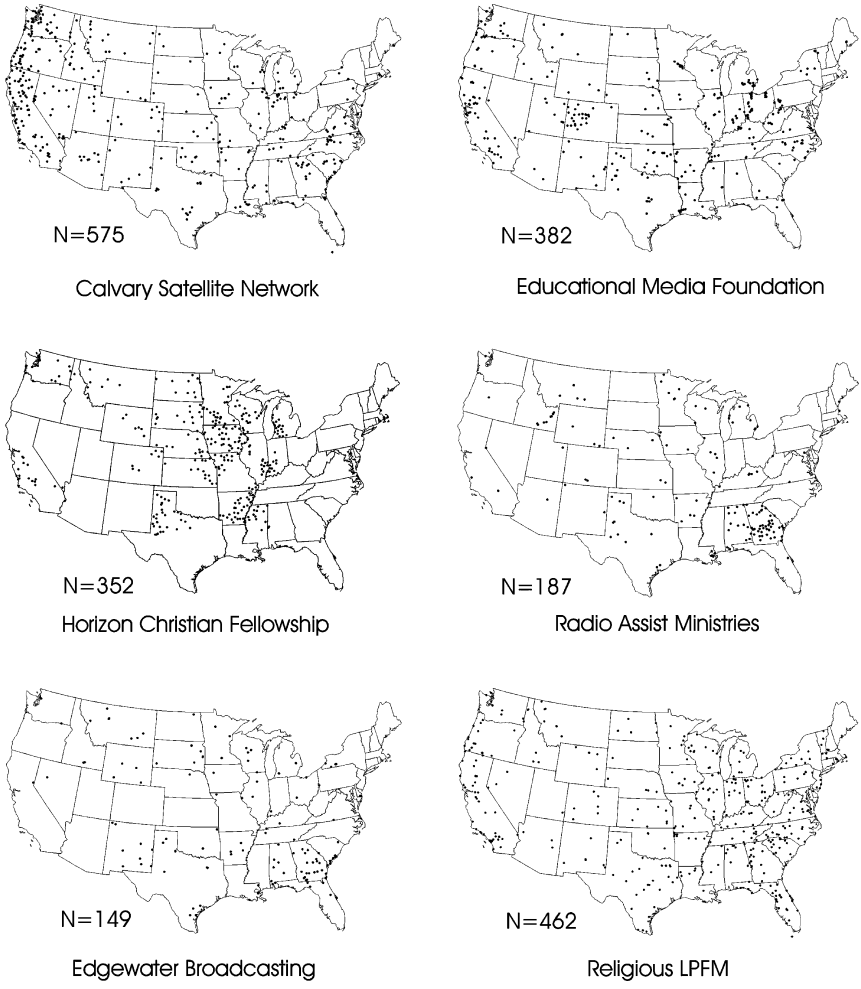
Some translator networks are marked by a more regional focus such as Horizon Christian Fellowship (HCF), which operates mostly in Midwestern states. While other networks have expanded on the fringes of urban areas where there is less competition from full-power stations, HCF has expanded within small, rural regions with a goal of reaching areas not otherwise covered by existing Christian stations or networks. Mike MacIntosh, the network's founder, notes that HCF targets ''the lost'' and ''those in hiding.'' Compared with CSN's national pattern of station distribution, HCF provides dense coverage across a few areas, notably southwestern Michigan, southeast Arkansas and a five state area centered on Iowa (Figure 2).

Table 2
Translators Held and FCC Applications Filed, 2003

Organization	Licenses Held	Applications Filed
Radio Assist Ministries (RAM)	187	2,454
Edgewater Broadcasting	149	1,766
Educational Media Foundation (EMF)	382	875
Calvary Satellite Network (CSN)	575	385
Horizon Christian Fellowship (HCF)	352	38

Note. The original data for translator operators are from ''FM translator & booster stations,'' by the Federal Communications Commission, 2007, Washington, DC: Author.

Figure 2
Translator networks, 2007.



Although intended to serve noncommercial organizations, the FCC's rules in place for the 2003 filing window unintentionally created opportunities for speculators to apply for translator licenses. Just two of these organizations, Radio Assist Ministries (RAM) and Edgewater Broadcasting, submitted more than 4,000 applications during the 2003 filing window (Anderson, 2006; RECNET, 2005) and later sold some licenses to other organizations. Rather than operate a radio network, RAM's mission is to assist ministries and other nonprofit organizations that wish to become involved in broadcasting. In addition to providing technical assistance, RAM donates or

sells station permits to like-minded evangelical groups. With close links to RAM, Edgewater's Bible-based programming includes talk shows that address social issues and Contemporary Christian Music. Edgewater's stations are distributed across a few southern and Midwestern states (Figure 2).

Figure 2 also shows the national distribution of 462 LPFM stations operated by churches and other local religious organizations. In contrast to translator stations, LPFM stations are prohibited from generating revenue through advertisements and must rely on volunteer staff and financial support from listener audiences. As noted in Wikle and Comer (2009) the overall distribution of LPFM stations operated by religious organizations mirrors national political and religious patterns, with higher numbers of stations found in the South and Midwest and lower numbers of stations found in the Northeast and Mountain West. Although LPFM stations operate independently, some national religious broadcasters such as CSN provide technical and programming assistance for establishing LPFM stations. In turn, many local religious groups operating LPFM stations broadcast syndicated programming provided by national religious networks along with required local programming. Through these partnerships organizations such as CSN have been able to establish a presence in daily LPFM radio programming without violating FCC policies that require stations to be locally owned and operated. In recent years LPFM proponents have raised concerns that religious translator stations may prevent the establishment of community-based LPFM stations. Although the degree to which translators compete with LPFM stations for individual locations has yet to be systematically evaluated, Wikle and Comer (2009) show that spectrum crowding on the FM dial has made it difficult for LPFM stations to be established in the nation's largest urban areas.

Comparing Translator Networks

An analysis of the socioeconomic characteristics of persons living near translators provides a way to examine how religious translator networks reach various types of listeners. Such comparisons may reveal differences in how translator networks emphasizing entertainment and networks offering more narrowly focused religious content target listeners. Two other groups are also investigated: for-profit organizations that resell translator construction permits (Radio Assist Ministries) and independent Low Power FM stations, many of which broadcast nationally-syndicated religious programming.

Population estimate data for 2003 (U.S. Census Bureau, 2003) are evaluated for block groups as a means of characterizing network market areas. Block groups are U.S. Census statistical areas having populations between 300 and 3,000 persons. Our evaluation focused on demographic characteristics of block groups containing translators as well as those having at least one LPFM station operated by a religious organization. Table 3 provides demographic information for five of the largest translator networks: Calvary Satellite Network (CSN), Educational Media Foundation

Table 3
Socioeconomic Indicator Averages, Block Groups With Stations and US Total, 2003

Network	Total Block Groups	Average Square Miles	Average Population	Population Density	Percent White	Median Age	Per Capita Income
CSN	419	176.9	1636.3	9.2	82.5	38.9	$22,665
EMF	347	72.2	1631.2	22.6	80.0	37.0	$21,938
HCF	335	87.5	1298.4	14.8	86.6	38.9	$19,427
RAM	153	39.5	1629.3	41.2	76.7	35.9	$19,083
Edgewater	137	56.3	1558.6	27.7	75.4	36.3	$19,139
LPFM	425	24.3	1660.3	68.4	81.2	38.1	$20,091
US	208,790	16.9	1383.4	81.6	73.5	36.7	$22,188

Note. The original data for translator operators are from ''FM translator & booster stations,'' by the Federal Communications Commission, 2007, Washington, DC: Author. Socioeconomic data for block groups are from ''Annual population estimates,'' by the U.S. Census Bureau, 2003, Washington, DC: Author.

(EMF), Horizon Christian Fellowship (HCF), Radio Assist Ministries (RAM), and Edgewater Broadcasting.

A closer look reveals that CSN has established translators in larger block groups with lower population densities and higher incomes compared to other large networks. This finding is consistent with CSN's early start in establishing translators for reaching isolated communities in mountainous western states. Compared to CSN, Edgewater and RAM have established stations in block groups with younger residents. With respect to racial and ethnic classifications, HCF has the highest percentage of White persons (86.6%).

Analysis of variance (ANOVA) provides a means to identify significant differences in socioeconomic characteristics of persons targeted by each network. Five independent, interval-ratio variables are each compared across the networks: (a) average population; (b) average block group size in square miles; (c) population density in persons per square mile; (d) median age; and (e) per capita income. ANOVA reveals significant differences between networks ($p < 0.0000$) for each variable. With the same degrees of freedom for each test, F values are compared to reveal where overall differences are the greatest. Average block group size (square miles) shows the largest differences ($F(5, 1810) = 10.12$), followed by median age (9.23), per capita income (9.15), population density (5.85), and average population (4.23).

Post hoc two-sample difference tests provide a method for examining variation among translator networks in greater detail. Socioeconomic data for five religious translator networks along with LPFM stations ($k = 6$ groups total) operated by religious organizations results in 15 pair-wise comparisons [$k * (k - 1)/2$] per variable

(Warner, 2008). For each of the five variables analyzed using ANOVA as noted above, then, 15 two-sample difference of means *t* tests are conducted using either the pooled variance estimate (PVE) or separate variance estimate (SVE) based on an initial *F* test of variance equivalence. For the other six socioeconomic variables for which proportions must be computed (percent female, percent White, percent Black, percent Asian, percent other, and percent Hispanic), 15 two-sample difference of proportion *z* tests are conducted. Because all possible pair-wise combinations are examined, there is an increased risk of Type I error. A common, very conservative method of reducing this risk is the Bonferroni correction, in which the experiment-wise significance level α (EW_α), here set initially at 0.01, is divided by the number of comparisons (15) to determine the per-comparison α (PC_α) level (Warner, 2008). As a result of the Bonferroni correction, the term *significant* is used to indicate a difference between proportions or means having a PC_α level < 0.0007.

Because the analysis involves 165 total difference tests (15 pair-wise comparisons for each of the 11 variables), a focused narrative is offered in lieu of tabular results. Relatively few significant differences are found between groups for the six proportions tests in terms of race or gender. The comparisons showed that block groups containing HCF network stations have significantly higher percentages of Whites than either Edgewater or RAM. Spatially, HCF has the least presence in the South. In contrast, RAM has a significantly higher proportion of Blacks when compared to other networks. Given the concentration of RAM stations in Georgia and Alabama, this result is not surprising.[8]

Compared to ethnic variables, there are abundant differences among the six networks when mean statistics are compared. For example, CSN's average block group size (square miles) is significantly larger than four of the other five networks, HCF being the exception. EMF and HCF are also found in significantly larger block groups compared to LPFM stations and just barely exceeded PC_α when compared to RAM stations. This finding reveals that LPFM and RAM stations are located in territorially smaller (and likely more urban) block groups compared to the other four networks. Another difference can be seen in population density, with CSN stations having fewer persons per square mile than the other five groups. This corresponds with CSN's significantly larger (in territory) and more rural block groups. The highest population density is associated with LPFM block groups. With an average density of 68.4 persons per square mile, block groups containing LPFM stations have higher densities compared to RAM (second highest with 41.2 persons per square mile) and especially CSN (with 9.2 persons per square mile). This is likely due to the fact that listener–supported LPFM stations have higher operating costs compared to translators and therefore require higher densities of listeners (donors) to defray costs. Age is also found to differ among translator networks with a significantly higher median age in CSN block groups compared to Edgewater, EMF, or RAM. Finally, 6 of the 15 pair-wise comparisons for per capita income are significantly different, in each case revealing that block groups with CSN and EMF stations are significantly wealthier than the other four groups. It is noteworthy that CSN differs in several ways from the other networks, being located in territorially the largest

block groups and having the lowest population densities. CSN stations also have proportionally fewer Blacks, the oldest potential listeners, and the highest incomes compared to other networks.

Conclusion

Originally licensed to extend radio signals to places blocked by terrain, translators have become the catalyst for a broadcast system distinct from full-power FM radio. Controlling more than half of all noncommercial translators in the US, religious broadcasters are the dominant force in operating translator networks with more than 3,300 stations established between 1992 and 2007. For evangelical broadcasters translators offer a tool for advancing their worldview, a means of generating revenue, and a venue for attempting to influence secular elements of society. The examination of translators presented here reveals how religious organizations capitalized on changes to FCC policies that control the establishment of FM translators. By allowing noncommercial organizations to construct satellite-fed stations the FCC unintentionally gave evangelical organizations a tool of unprecedented power. Beginning with a single full power station, religious broadcasters extended their reach by establishing national station networks. With a modest investment, the preacher in California could simultaneously reach listeners in Alabama, Montana, and Pennsylvania.

Without a more detailed study it may be difficult to explain strategies employed by broadcasters in the placement of individual translator stations. However, a sociodemographic examination of persons living adjacent to network stations suggests two basic types of networks. Using popular music to target younger, more affluent listeners, broadcasters such as the Educational Media Foundation offer programming similar to what is disseminated by secular stations. An emphasis on entertainment attracts a wide audience, enabling a religious broadcaster to reach persons who might not otherwise tune into a religious station such as the ''accidental listener'' sampling from the dial. A second type of translator station broadcasts content with a stronger religious focus. Included in this group are networks operating in rural and less ethnically diverse areas such as the Calvary Satellite Network and Horizon Christian Fellowship. These stations develop a base of listeners loyal to specific syndicated programs. Religious broadcasters have also extended the geographic coverage of nationally syndicated programming through partnerships with local churches and other religious organizations operating community-based LPFM stations. LPFM station operators blend nationally originating programming of a religious nature with community news and other locally originating content.

Despite their advantages to broadcasters, negative assessments of translators abound. Without an ability to broadcast local programming, translators offer few services that directly benefit communities. Among the most vocal critics of translators are proponents of community radio who argue that rapid growth of translator networks may reduce the availability of the FM spectrum for new LPFM stations.

At the same time religious broadcasters work to expand translator networks they continue searching for new ways for growing audience sizes. In recent years Internet radio, satellite radio, and mobile podcasting have become new frontiers for evangelical broadcasters. As these technologies become more widespread there is a potential for fewer people tuning into their local religious station, leading to questions about the long-term viability of translator networks. However, given revenue generated by translators, the low cost of operating a translator station, and the ubiquity of FM radio receivers, it is likely that religious broadcasters will continue expanding translators networks in the foreseeable future.

Notes

[1]A recent survey completed by the Pew Research Center (Pew Research Center, 2008) found that women make up two-thirds of listeners to religious radio.

[2]Despite being the largest Christian denomination in the US, the Catholic Radio Association (2008) reports that there are only 130 Catholic radio stations in the US.

[3]The identification of each translator station is tied to its full power parent station using a three letter/number suffix after the parent station call sign (i.e., KBDR-FM1).

[4]Translators use power levels limited to 250 watts compared to 50,000 or more watts of power used by full-power stations.

[5]Longer distances could be bridged using microwave links. For example, Temple University's WRTI used translators to bring jazz music to several locations in eastern Pennsylvania, New Jersey and northern Delaware.

[6]During the late 1990s full-power radio stations began a period of ownership consolidation that followed passage of the 1996 Telecommunications Act. Hundreds of stations were purchased by large radio corporations such as Clear Channel Communications leaving fewer independent stations offering community-based programming. In addition, more than one-third of radio stations changed hands, driving up the cost of purchasing a full-power station.

[7]For example, a religious translator in the remote village of Amber, Alaska has served 75 residents since 2007 (Voice for Christ Ministries, 2008).

[8]Alabama (29%) and Georgia (27%) rank 3rd and 5th in percent Black population by state in the 2000 U.S. Census of Population.

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