

# Seeing is Believing: Identity, Inequality, and the Impact of Television on the Hispanic Achievement Gap\*

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## Abstract

Can identity reduce inequality? Using a spatial regression discontinuity arising from a FCC regulation, I investigate the impact of Spanish Language Television (SLTV) on Hispanic students in public schools. I find that SLTV improves academic performance and helps close the Hispanic achievement gap. I marshal three sources of evidence that each indicate an identity mechanism is at play: (1) more Hispanic students are labelled ‘limited English proficiency’ and bullied on the basis of their ethnicity in SLTV schools, (2) Hispanic students perform better academically in locales where SLTV programming focuses more on the Hispanic identity, and (3) Hispanics with access to SLTV differentially visit Hispanic branded establishments more frequently. Collectively, they suggest that identity is a mechanism through which SLTV reduces the Hispanic achievement gap.

**JEL Codes:** I24, J15, L82, Z13.

**Keywords:** Hispanic, television, education, identity

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# 1 Introduction

The Hispanic achievement gap is wide and persistent. Hispanics face the lowest high school and college completion rates out of all major ethnic and racial groups in the United States.<sup>1</sup> In this paper, I argue that Spanish Language Television (SLTV) is a media technology that has reduced educational inequality, and that moreover, these gains in Hispanic student performance can be attributed (at least in part) to a heightened sense of a Hispanic identity.

Despite the rise of the internet, broadcast Spanish Language TV remains an important fixture of Hispanic households. 78% of Spanish-dominant households watch SLTV (and 50% of multi-language Spanish-speaking homes do). In 2010, every single one of the top 10 shows watched by Hispanics were Spanish language programs (Pardo and Dreas, 2011). By investigating Spanish Language TV, I take a closer look at Hispanic communities and examine the ties between SLTV, identity, and education.

To identify the causal effect of SLTV, I follow Velez and Newman (2019) and exploit a spatial regression discontinuity arising from the Federal Communications Commission (FCC) regulation OET Bulletin No. 69. This regulation grants federal protection of a TV station’s broadcast signal only within a certain distance of a station’s main antenna. Thus, households and schools just inside a TV station’s coverage contour should be observably similar to those just outside the contour, except for the presence of broadcast and satellite TV. I argue that this allows me to identify the causal effect of SLTV, given several features: (1) contours are mechanically decided by a formula involving geographical features and antenna strength, (2) contours are large and tend to cut across suburban and ‘small town’ areas, rather than dense urban areas which corporations might try to capture for profitability reasons (urban centers fall squarely within contours), (3) SLTV stations were often built before this regulation was imposed, (4) demographic and other controls across the regression discontinuity are similar, and (5) Hispanics do not differentially migrate across contours, minimizing the possibility of selection. To further dispel concerns over potential confounds, I employ a difference-in-discontinuities design, comparing outcomes for Hispanic students against Asian students in schools with and without SLTV based on a 100 kilometer cut-off to SLTV coverage contours.<sup>2</sup>

I verify the relevance of this instrument’s first stage by employing the difference-in-discontinuities approach with the American Time Use Dataset. I find that Hispanics watch 10 minutes more of TV when within coverage contours, a plausible lower bound for the amount of extra Spanish Language TV watched if Hispanics substitute watching English programs with Spanish ones. I further show that Hispanics watch more TV with their children—Hispanic students, in other words. Notably,

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<sup>1</sup>See Tienda (2009). This achievement gap extends to many more educational outcomes, from test scores to disciplinary incidents to enrolment in advanced classes. Factors such as segregation (Cascio and Lewis, 2012), XXX, XXX exacerbate the achievement gap, whereas interventions such as providing free computers (Fairlie, 2012) XXX help close it. TODO: other cites on the achievement gap.

<sup>2</sup>I compare against Asian rather than white students because they are much less likely to identify as Hispanic.

non-Hispanics do not exhibit differential TV viewership across SLTV coverage contours.

Next, I utilize the Civil Rights Data Collection to analyze the effect of SLTV on Hispanic students in public schools. Academic outcomes improve across the board: compared to Asians, Hispanics with SLTV are 16% more likely to take the SAT or ACT, 27% more likely to enrol in calculus and higher math, and pass 8% more AP exams. These gains are also present in absolute terms, extend to other academic outcomes, and remain qualitatively similar under a variety of robustness tests, establishing that SLTV reduces the Hispanic achievement gap.

Given this finding, I then marshal three sources of evidence that each indicate an identity mechanism may drive these results. First, using the same data, I show that Hispanic students are differentially classified as having ‘limited English proficiency’ under SLTV despite greater general academic achievement, a likely outcome if these students shift from English to Spanish mastery due to the presence of SLTV. Furthermore, Hispanic students are also differentially bullied more on the basis of their ethnicity, directly indicating a more salient identity that other students may target. Second, I use archive.org’s TV transcript database to classify the proportion of programs in each SLTV station that focus on the Hispanic identity. I show that locales with a greater amount of SLTV programming focused on the Hispanic identity are associated with stronger Hispanic academic performance when compared against locales with fewer such programs on identity. However, a greater amount of programming focused on education & schools or positive role models for children each have a null effect on Hispanic performance. This indicates that the content of these television programs matter, and that identity is a primary channel through which these gains are attained. Finally, I use foot-traffic data from Safegraph to demonstrate the general strengthening of the Hispanic identity under SLTV. Hispanics with SLTV are differentially more likely to visit Hispanic branded restaurants and recreation establishments. Conducting a placebo exercise, I find that Hispanics with SLTV are no more likely to visit Brazilian, Greek, and Korean establishments. This speaks to the specific strengthening of the Hispanic identity versus a broader Latin American one. Collectively, these results suggest that identity is an important mechanism through which SLTV reduces inequality and the Hispanic achievement gap.

**Literature** Americans spend an average of three hours a day watching TV—more than any other activity bar sleep. Accordingly, a large literature has examined the impact that television has on education. Prior work has frequently been correlational and findings remain conflicted: one line of research contends that TV is as a distraction which ‘rots’ the mind and harms student outcomes (Zavodny, 2006),<sup>3</sup> while another line of inquiry has found consistent null effects.<sup>4</sup> I contribute to

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<sup>3</sup>See Aksoy and Link (2000), Hornik (1981), and Keith et al. (1986). This theory enjoys popular support (see Winn (2002) or Gentile (2004) which finds broad support for the theory among paediatricians). Huang and Lee (2010) and Nakamuro et al. (2015) use more sophisticated panel data approaches and also find negative (but smaller) effects.

<sup>4</sup>Gaddy (1986), Gortmaker et al. (1990), and Hu et al. (2020) take correlational approaches, while Munasib and Bhattacharya (2010) and Kureishi and Yoshida (2013) use self-reportedly weak instruments that may generate the null.

this literature by taking a quasi-experimental approach. Gentzkow and Shapiro (2008) are closest to this paper in using a difference-in-difference strategy to find that TV improves student test scores—particularly among nonwhite students and English language learners.

Others have studied the effect of television on Hispanic communities. Oberholzer-Gee and Waldfogel (2009) demonstrate that the presence of Spanish language local news increases Hispanic voter turnout, whereas Velez and Newman (2019) (who develop the instrument used in this paper) find that SLTV depresses voter turnout. Trujillo and Paluck (2012) run an experiment measuring trust in the government and the census based on a scripted soap opera scene. I extend on this literature by moving beyond the political realm, arguing that the consequences of SLTV are large in educational settings too, and also provide the first evidence on a mechanism through which SLTV operates: identity.

There is a growing literature that looks at how identity can influence behaviour. This has been studied through theory, in the lab, and the field.<sup>5</sup> However, the underlying forces that construct identity (rather than simply triggering them via priming or other short-term interventions) are less well understood. Bisin et al. (2010), Atkin, Colson-Sihra and Shayo (2019), and Bazzi et al. (2019) encompass some recent studies on this topic, and all come to the conclusion that intergroup tensions or differences lead to a strengthening of identity. Alesina, Giuliano and Nunn (2013) take the long view and show how gender norms can be traced back to early agricultural practices. I contribute to this literature by proposing a media-based channel through which identity may be strengthened and influence action. This is closest to work such as Jensen and Oster (2009) and Gentzkow and Shapiro (2004), which establish a link between media & gender norms and media & anti-Americanism respectively.<sup>6</sup>

Finally, in the education and psychology literature, the stereotype threat phenomenon pinpoints minority identities as a root cause of achievement gaps (Spencer, Logel and Davies (2016), Appel and Kronberger (2012)), leading to the rise of methods such as “situational disengagement” (Nussbaum and Steele, 2007). This paper suggests that a stronger sense of identity may not have uniformly negative consequences on Hispanic students, creating space for a more positive conception of identity.

**Layout.** Following this Introduction, Section 2 presents the data sources used. Section 3 describes the difference-in-discontinuities empirical strategy and establishes the first stage. Section 4 presents evidence that SLTV closes the Hispanic achievement gap. Section 5 presents evidence that an identity mechanism underlies these results. Finally, Section 6 concludes with a discussion of research

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<sup>5</sup>See Akerlof and Kranton (2000), Benjamin, Choi and Strickland (2007), Benjamin, Choi and Fisher (2010), and Bursztyn et al. (2019), among others.

<sup>6</sup>Other related work on the impact of mass media on social outcomes include Ferrara, Chong and Duryea (2012), Kearney and Levine (2015), Olken (2009), DellaVigna and Kaplan (2007), Yanagizawa-Drott (2014), and Putnam (2001). For an overview, see DellaVigna and La Ferrara (2015).

questions opened by the preceding analysis.

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## 2 Data

**Coverage contours** The central instrument in this paper is the discontinuity in coverage contours of SLTV stations introduced via FCC regulation OET Bulletin No. 69. To build the coverage contours of SLTV stations in the United States, I collect a list of the callsigns for all SLTV stations from TMS Media, a large provider of data on TV, movies, and other media.<sup>7</sup> There are 100 of these stations located across the United States. These callsigns are matched against data from the FCC’s OET Bulletin No. 69 and the FCC’s Consolidated DataBase System to directly obtain the coverage contour boundaries in 2015 as prescribed and regulated by the FCC.<sup>8</sup> Figure 1 presents an example of a coverage contour, while Figure 2 displays a map of all SLTV contours in the United States.

**Time use data** I collect time use data on 210,586 individuals from the American Time Use Dataset and construct the total amount of time spent watching TV, the time spent watching TV with children and parents, and demographic variables.

To merge to the county level, the area is said to fall within the coverage boundary if at least 50% of its area does,

Of these, 68,373 Table 1, Panel A presents summary statistics for this data.

**Public school data** I collect data on all 96,350 public schools across 17,280 school districts from the US Department of Education’s Civil Rights Data Collection (CRDC) dataset in 2015. In order to prevent discrimination and for transparency purposes, all public schools in the United States are required to report data to the CRDC on an annualized basis. This data contains information on various indicators of educational performance by demographic category, including SAT/ACT tests taken, calculus courses taken, AP tests passed, students classified under ‘Limited English Proficiency’, students bullied on the basis of ethnicity or race, as well as the number of teachers and students in the school.

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<sup>7</sup>A TV station is defined to be SLTV if at least one of the primary broadcasts languages are Spanish.

<sup>8</sup>2015 coverage contour data is used due to the ‘FCC Spectrum Repack’ that began in 2018, which relocates a number of signals, affecting the reception and coverage for a substantial number of stations.

Figure 3 contains a map of these schools, while summary statistics for the outcomes and controls are presented in Panel B of Table ??.

School level controls include the number of teachers, the number of total students, the number of Hispanic students, as well as dummies for whether the school contains a primary school, middle school, and high school. Demographic control variables are sourced at the county level (income, percent Hispanic, population) from IPUMs as described in the Data section. These schools are geolocated using ArcGIS.

**Geocoding** Location data for all outcomes was collected in the form of addresses written in text. To transform this into proper spatial data (coordinates with latitude & longitude), two geocoding tools were used: (1) ArcGIS, which has its own proprietary database of locations. Over 99% of addresses were successfully matched to one location and geocoded. This was used to geocode the schooling data, as well as portions of the campaign contribution data. (2) The US Census Geocoder, which contains the census database of locations. Over 80% of addresses were successfully matched to one location and geocoded.<sup>9</sup> This was used to geocode the business data, as well as portions of the campaign contribution data. It is unlikely for non-geocoded addresses to be correlated with the instrument, given the relatively narrow band around the contour retained for the spatial regression discontinuity.

For data that take the form of spatial points (such as the location of a school), determining its distance to the boundary and whether the datapoint falls within the coverage boundary is a straightforward process. For data aggregated into grid points (typically a grid composed of  $2 \times 2$  KM<sup>2</sup> chunks), we treat each any degree of intersection as the grid point falling within coverage, given its relatively small size. In locations covered by multiple SLTV stations, the distance to the boundary is taken as the distance to the closest boundary.

## 2.1 Controls and Other Non-Outcome Data

Controls at the county level are sourced from IPUMS and consist of basic relevant demographic information: population, income, percent of county that is Hispanic etc. County level data is mapped to its relevant location using census data as well.

Data on migration comes from the 2011-2015 American Community Survey (ACS), which reports the number of people moving from each origin county to destination county (aggregated over the four years).<sup>10</sup> This sample also contains migration flows by Hispanic origin, allowing us to determine whether they move based on geographic boundaries.

Finally, data attached to specific outcomes are discussed under their relevant section.

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<sup>9</sup>The US Census geocoder, unlike the ArcGIS geocoder, is free. However, due to the higher precision of the ArcGIS geocoder, data constructed from it is used wherever possible.

<sup>10</sup>Historically, approximately 15% of the ACS migration data has been allocated, or imputed based on salient characteristics (United States Census Bureau (2020a)).

### 3 Empirical Strategy

To isolate the causal effect of Spanish language television, I adapt the technique used in Velez and Newman (2019) and generalize it from two counties to the entirety of the US. Velez and Newman exploit a FCC (Federal Communications Commission) regulation which determines the distance from a TV station in which the station’s broadcast signal is protected from interference.

Digital and satellite TV stations operate by broadcasting signals from a central antenna, and the field strength at a given point resulting from this antenna is a mechanical product of several factors: The antenna’s ERP (Effective Radiated Power, which is the amount of input power given to the antenna adjusted for idiosyncrasies in the antenna that may boost or attenuate the effective power), the antenna’s HAAT (High Above Average Terrain), and the distance from the point to the antenna.

This signal declines in strength as one grows more distant from the station, making it subject to interference. The FCC regulation OET Bulletin No. 69 (FCC, (2004*a*)) protects signals for commercial TV stations from interference in a contour area for which service holds at 50% of locations 90% of the time.<sup>11</sup> An example of this coverage contour can be seen in Figure ??; note that they tend to be sizable enough to fully cover major metropolitan areas, with contours boundaries ending substantially beyond them.

This creates a natural spatial regression discontinuity, where the decaying strength of a signal due to distance from a station is combined with this cutoff in broadcast protection to create a split among people just inside and outside these coverage contours that are presumably comparable save for their access to broadcast TV. This minimizes the potential concern of omitted variable bias, as the groups we are comparing across this border should share many overarching characteristics.

In the case of Spanish Language TV in particular, this should allow us to examine its causal effect on Hispanic communities for spatially located outcomes. As mentioned, these contours are purely determined by an algorithm and only dependent on physical variables like local elevation and antennae strength. Thus, the precise regulatory boundaries are located in more or less random locations, and coverage is large enough that these contours tend to cut across towns and suburbs, rather than large cities — television networks are not constructing their antennas to be just large enough to only cover the most dense and populous areas. This implies that network executives, if they are aiming to maximize profit, ratings, or audiences, would not have these boundaries at the forefront of their calculus.

In order for the causal effect of SLTV to be identified, the actual coverage of the contours must be uncorrelated with any of the other determinants for the outcome variables with which we are interested. One reassurance is that the interference protection regulation, OET Bulletin 69, was only codified in 1977 — in contrast, Univision, the largest owner of SLTV stations, was

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<sup>11</sup>These contour lines are termed (50,90) lines. There is a small adjustment made for different channel numbers, which have varying noise-limited coverage.

founded in 1955, and had built a substantial number of their television stations and antennas by 1977.<sup>12</sup> Furthermore, the most recent Longley-Rice methodology used to determine TV service coverage was only adopted in 1997, making it even less likely that stations were built or adapted in response to the policy.<sup>13</sup> Nonetheless, one may be concerned that SLTV stations target areas with more Hispanic people, or wealthier communities, or more populous areas, all of which are factors that could affect the areas of interest. Hence, I include explicit controls for these variables in the regression.

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The instrument therefore consists of two variables interacted: First, a dummy for whether the outcome data falls within a SLTV station’s coverage contour boundaries, and second, the distance from the outcome of interest to the closest coverage boundary. To guarantee similarity between the people inside and outside the boundaries, only data points located within a distance of 100 KM of the boundary are kept.<sup>14</sup>

Several concerns that potentially remain:

- *Can we guarantee that it is Hispanic people who watch SLTV?* If it were the case that non-Hispanic people were frequent viewers of SLTV, the interpretation of the main effects would potentially be different: we would be looking at the effect of SLTV on all people. Thus, though outcomes restrict the analysis to how the lives of Hispanic people change, this could be driven by, for instance, white people treating Hispanic people differently due to having viewed SLTV. However, only 4% of total SLTV station programming watched can be attributed to non-Hispanic people, a number that is only as high as it is because some SLTV stations also broadcast in English (FCCFCC (2016)). Similarly, < 1% of all programming watched by non-Hispanics is in the Spanish language.
- *How do we account for the possibility of selection?* It is theoretically possible that Hispanic people move in response to these television coverage contour boundaries, and that the effects seen are therefore a result of Hispanic people self-sorting. If this were true, it would be a fairly remarkable result—people moving in significant quantities for access to better television in a way that influences life outcomes ranging from education to business to politics. However, as the subsection on migration beneath demonstrates, the selection story does not appear to be borne out by the data.

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<sup>12</sup>Though Telemundo, the second largest owner of SLTV, was technically founded in 1984, the stations it initially acquired were built in 1954. It also primarily expanded through the acquisition of existing stations, rather than building out its own new ones.

<sup>13</sup>See FCC (2004a) for details.

<sup>14</sup>Using a round number in kilometers rather than miles makes the cutoff less likely to be correlated with some real-world phenomena.



### 3.1 Main Specification

A standard regression thus looks like restricting the universe of observations to only those within a small radius of the contour boundary, where the key independent variable of interest is an indicator for the observation being inside or outside the boundary, interacted with the distance to the boundary:

$$Y_i = \beta_0 + \beta \mathbb{I}[InsideContour_i] \times Distance_i + \gamma X_i + \epsilon_i$$

where  $Y_i$  is an outcome for observation  $i$  and  $X$  is a vector of controls for the observation. The main coefficient of interest is  $\beta$ , and due to the nature of our instrument, we place the majority of interpretive weight on the indicator for being inside the television coverage contour.

The unit of observation depends on the set of outcomes we are looking at. For firm data, we aggregate our data into a set of grid points (typically roughly  $2 \times 2$  KM in size) so that we can compare the number of firms across areas.<sup>15</sup> For school data, the unit of observation is a single school, as we have school-level controls. I typically aggregate into grids by taking the sum of observations within grids (i.e., the number of Hispanic-owned businesses within a grid point), except where otherwise noted.

I prefer to leave standard errors robust, and separately check for robustness with respect to spatial autocorrelation for each main result. Other fixed effects/clustering options are treated similarly.

### 3.2 Spatial Autocorrelation

Spatial autocorrelation, or spatial dependence, occurs when our outcomes of interest are correlated with itself in space (Cliff and Ord, 1973). In general, this only means that I allow for  $Cov(Y_i, Y_j) \neq 0$  when  $i \neq j$  for locations  $i, j$ . For tractability, when given a dataset with  $n$  locations, I place more structure on the problem, constructing a  $n \times n$  spatial weights matrix  $W$  with entries  $w_{ij} = 1$  if locations  $i, j$  are considered neighbors, and  $w_{ij} = 0$  otherwise (Anselin and Bera, 1998). For data that takes the form of grids in space, I construct weights based on the rook criterion (grid points have unit weight if they share an edge), while for points in space, I assign unit weight to the four nearest neighbors as a comparable measure.

There are two primary models of spatial autocorrelation that I conduct robustness tests for:

**The Spatial Autoregressive Model** In this model, the spatial autocorrelation is directly accounted for in the specification:

$$Y = \beta_0 + \rho WY + \beta \mathbb{I}[InsideContour] \times Distance + \gamma X + \epsilon$$

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<sup>15</sup>In addition to providing cleaner interpretability, grouping data into ‘raster’ form is also less computationally intensive for the analysis.

This model is identical to the prior main specification, except for the addition of the  $\rho WY$  term, where  $W$  is the aforementioned spatial weights matrix, and  $\rho$  the autoregressive coefficient. In this model, spatial dependence affects the outcome variable only (e.g. a Hispanic business opening up may induce neighbors to not open businesses, due to an increased amount of competition in the area).

**The Spatial Error Model** In this model, the autocorrelation occurs in the error term:

$$Y = \beta_0 + \beta \mathbb{I}[InsideContour] \times Distance + \gamma X + \epsilon$$

$$\epsilon = \lambda W\epsilon + \nu$$

This model is identical to the main specification, except the error terms are now additionally correlated due to the addition of the  $\lambda W\epsilon$  term. In this model, spatial dependence enters through the presence of missing spatial covariates which may affect the outcome.<sup>16</sup>

### 3.3 Migration

While it is theoretically conceivable that Hispanics would move based on access to SLTV, causing results to be driven by selection and confounding the direct effect of television itself, I demonstrate that movement across these coverage contours is minimal.

As mentioned in Section ??, the migration data from the ACS is provided at the origin county-destination county level. Given the relative size of a county, to define whether a county is inside a coverage contour or not, we further impose that at least 95% of the area that the county encompasses must be inside of the coverage contour.<sup>17</sup> We present summary statistics for this sample in Table ??.

Tables A.1 and A.2 present the results on migration. These tables present results at the origin county - destination county level, tracking the Inverse Hyperbolic Sine (IHS) transformed values of the number of Hispanic migrants between the two counties.<sup>18</sup> Table A.1 restricts to only origin counties that are within 100 KM of a coverage contour (the standard cut-off distance used for later outcomes).<sup>19</sup> In panel A, this is further restricted to origin counties inside the television contour, and so the main variable of interest is the dummy for the destination county being outside the TV contour. We observe a clear negative and significant relationship for migrations that cross the coverage contour. We interact the distance to the origin/destination with the TV dummy to ensure

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<sup>16</sup>In particular, this allows us to further adjust for unique features of Hispanic communities, such as the geographic clustering of immigrants as Cutler, Glaeser and Vigdor (2008) and Cascio and Lewis (2012) find.

<sup>17</sup>Results are robust to different area cut-offs for a county to be considered inside the coverage contour.

<sup>18</sup>The IHS transform can be interpreted similarly to the Log transform (% changes), but has the added advantage of being able to handle cases when 0 is the observed value.

<sup>19</sup>There are 636 such counties. The average origin county has 20 destination counties for which there is significant enough cross-county Hispanic migration that the ACS reports data for it.

that we are controlling for all distance related effects, and control for county level characteristics including Log Population, Log Income, and percent of the county that is Hispanic for both origin and destination. All specifications also include origin fixed effects.

In panel B, we restrict to origin counties outside the television contour, and the main variable of interest is the dummy for the destination county being *inside* the TV contour. In this case, the point estimate is negative, although results are overall insignificant—this is sufficient for us to make our argument, given that so long as there are not positive coefficients, there is no evidence of migration across contour borders.

Table A.2 repeats the analysis, this time restricting to only destination counties within 100 KM of a coverage contour. Results closely echo those seen in the prior table, with negative coefficients associated with migration across coverage contours, significant when the destination is inside the contour and not when they are outside.

These results combined indicate that movement across coverage contours is not a major threat to identification. Even in cases where insignificant results are observed, the base rate of migration is not very high to begin with—in our origin county sample, an average of 84 Hispanic people are observed to move between each county-county pair (median: 25) over the five year period which the dataset spans. This also speaks to the magnitude of the coefficients observed, where the drop in 10 to 40% of migrants observed still falls within a plausible range. Though we do not have theories as to why people may be *averse* to moving across coverage contour boundaries, it is in and of itself an interesting result perhaps worth further investigation.

### 3.4 Evidence of a first stage: do Hispanics in SLTV coverage contours watch more television?

Over 85% of Hispanic households own a television. A further 85% of SLTV viewership occurs over satellite or broadcast television—important because coverage contours are only applicable for these types of television.<sup>20</sup> Thus, there is a substantial population that may be affected by the presence of these coverage contours.

To test for viewership

American Time Use Survey

Compared to other viewers of television, Hispanics are also uniquely likely to watch television in a social context rather than watching alone—this is partially driven by the fact that non-Hispanic households have 40% more TV sets per person than Hispanic ones (Coghill and McGinnis, 2018). This social aspect, wherein SLTV is watched with family and friends, may be one way in which identity is reinforced through television.

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<sup>20</sup>See FCC (2016) and De La Merced and Gelles (2014). This fraction of broadcast TV viewership is substantially larger than the 24% national average.

## 4 The impact of Spanish language television on Hispanic educational performance

In this section, we examine the performance of Hispanics in public schools and find that while academic achievement generally increases and disciplinary issues generally decrease in response to SLTV, the opposite holds true when the measures are more directly to identity.

### 4.1 Results

Table ?? presents the standard specification for the education dataset, looking at the effect of television on schools within 100 KM of a coverage contour. For each of these measures of academic achievement, column (1) includes only county level controls, column (2) adds controls for school size (number of students and teachers), and column (3) adds controls for whether the school contains primary/middle/high school divisions. Panel A examines the effect of television on the IHS of the number Hispanic students considered gifted, while panels B and C look at the effect on the number of Hispanic students enrolled in an AP course or passing at least one AP course respectively. The coefficient of interest, the dummy for whether the school is located within a coverage contour or not, is significant at the 5% level for all columns and panels. The effect sizes are modest, but non-trivial: an approximately 1.5% increase in the number of gifted students, and increases on the order of roughly 5% for the number of students involved in Advanced Placement curricula.

Table ?? examines the effect of SLTV on disciplinary incidents: Panel A presents the effect on the number of Hispanic students ever given an out of school suspension over the prior school year, while Panel B presents this on the number of Hispanic students considered chronically absent. These results are all significant at the 1% level for all columns and panels. The effect sizes are comparable to that regarding academic achievement, displaying a 1.5% decrease in the number of students suspended, and a 7% decrease in the number of students who are chronically absent.

Table ?? examines the effect of SLTV on outcomes more directly tied to identity: Panel A presents the effect on the number of students categorized as having Limited English Proficiency. These effects are significant at the 1% level, and represent a 3-4% increase in the number of students designated under this category. Panel B, on the other hand, presents the effect on the number of Hispanic students who are ever victims of harassment on the basis of their ethnicity. These results are significant at the 10% and 5% levels, and account for a small .2% bump in the number of such cases.

**Robustness** To test the robustness of these results, we present Table A.6, which uses as its outcome variable the number of Hispanic students passing the AP. We choose to present robustness on this outcome in particular due to its lower sample size — it is a priori the most likely to be underpowered. Column (1) presents the baseline results (it is identical to column (3) of Table

??), while column (2) includes the interaction of the TV dummy with the distance to the boundary squared. This is plausibly relevant to the main effect, given that television signals decay in strength in proportion to the square of the distance. Columns (3) and (6) reduce the cutoff distance from the boundary to one half and one third of the original 100 KM limit. Column (4) includes county level fixed effects. Column (5) additionally controls for the total number of APs passed by all students. The robustness checks hold up across the board with all columns maintaining significance, although the 33 KM boundary limit is close to underpowered. Robustness checks on the other outcome variables of interest hold up to a similar analysis.

Finally, we may be concerned about the potential effects of spatial autocorrelation in the data. A Moran’s I test using 4 nearest neighbours between the schools indicate that there is spatial autocorrelation at any reasonable level for  $\alpha$ . Hence, Table A.7 presents two alternate models that control for the effects of spatial autocorrelation. Column (2) uses a spatially autoregressive lag model, wherein the outcome variable may be correlated with its neighbours. Column (3) uses a spatially autoregressive error model, wherein the presence of missing spatial covariates (causing correlated errors) is adjusted for. In both cases, the alternate models yield results that closely resemble the standard specification in column (1).

## 4.2 Discussion

**Evidence of Identity as a Mechanism** The results in Table ?? provide some concrete evidence that identity changes as a result of the effect of television. We believe that access to SLTV reinforces Hispanic identities, making them more salient to the Hispanic individuals consuming the broadcast programs. The most direct evidence for this stems from the results on harassment and bullying based on ethnicity. Given that very few non-Hispanic people view SLTV programming, the fact that more Hispanic students are bullied on the basis of their ethnicity suggests that some change must be occurring within the students along this dimension.<sup>21</sup>

A substantial literature has shown that increased visibility of (non-majority) ethnicities is associated with greater amounts of bullying,<sup>22</sup> consistent with the results that we see. Though it is impossible to rule out all other stories (perhaps children who watch more TV overall are more likely to be victims of bullying—but this is not supported by the literature. If anything, there is support for television causing children to become bullies (Kuntsche et al., 2006), but this is not borne out in our data), the most parsimonious explanation is one in which television increases identity salience and hence ethnicity-based bullying.

We make a similar argument in the interpretation of the greater number of Hispanic students

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<sup>21</sup>This increase in bullying does not appear to be the result of ‘retaliation’ to Hispanic students bullying others: the coefficient only attenuates slightly when further controlling for the total number of students bullied, and running the main specification with the number of Hispanic students as perpetrators of race/ethnicity based bullying yields an insignificant negative coefficient.

<sup>22</sup>See Scherr and Larson (2009) for a review of this literature.

classified as having Limited English Proficiency. This increase demonstrates that these students possess a lower degree of command over the English language, suggesting two possibilities: either (1) that academic/linguistic abilities are lowered across the board, or that (2) there is some substitution in ability towards the Spanish language instead. Given that academic abilities appear to be *enhanced* by the presence of SLTV, the substitution story appears more plausible to us.<sup>23</sup> Unfortunately, we do not have direct evidence on the Spanish-speaking abilities of students, and so recognize that this is not a settled matter. Thus, while the evidence presented is fairly suggestive, more research could be done on this matter.

**Effects on Academic Achievement and Discipline** We next turn our attention to the results presented in Tables ?? and ?. The results on academic achievement unambiguously show that, for the top end of Hispanic students, performance is bolstered by the presence of SLTV. This effect appears to hold across students of all ages — while gifted programs are typically aimed at students in primary and middle schools, AP courses and exams are almost exclusive taken by high schoolers.

The number of observations recorded for these regressions is worth addressing: compared to the 40,000 schools seen in other regressions, there are only 26,000 seen for gifted students, and fewer than 10,000 for the AP results. In the case of gifted programs, this drop is due to the fact that schools which do not have gifted student programs were omitted from the sample. We find it unlikely that the presence of a gifted program in a school is correlated with the the school being placed just inside or outside a television coverage contour, and so do not believe that this omission introduces any bias. Similarly, in the case of the AP results, only 9,765 of the schools in the sample are high schools with 12th graders enrolled in them—hence, the observed 6,089 schools opting to self-report AP course results is still sizable. Though the number of schools reporting AP exam results is substantially lower and may be concerning for this result, this can at least partially be attributed to the fact that students directly receive their AP scores, and the schools at which they are enrolled may not always have access to their AP scores. Furthermore, given that overall AP scores do not meaningfully change, it is unlikely that there is substantial selection into score reporting over the concerns of Hispanic students passing AP scores—especially because there are no real-world incentives or benefits attached to doing so.

Noting that increases in AP enrolment are predictive of higher rates of college enrolment and degree attainment (Speroni, 2011), it is likely that SLTV can have downstream effects beyond simply greater academic attainment in the short term. Running counter to the mainstream narrative, these increases in academic performance match the results found by Gentzkow and Shapiro (2008), who find that television increases test scores for preschoolers (and in particular, preschoolers from households where English is not the dominant language).

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<sup>23</sup>Granted, the measures of academic ability measure only the performance of students at the top end. But given the existence of these results, a countervailing narrative in which SLTV decreases the academic performance for other Hispanic students would need require a mechanism that could produce such differential effects.

Similarly, these increases in disciplinary outcomes can ameliorate the serious downstream effects that exist beyond the disciplinary event itself: the literature suggests that not only are suspended students at immediate risk of academic harm and further disciplinary issues (Arcia, 2006), but that these students are also more likely to be incarcerated as adults (Wolf and Kupchik, 2017). Non-disciplined students appear to suffer from spillover effects in their academic performance as well (Perry and Morris, 2014).

On the whole, this suggests that the lives of Hispanic students living may materially improve along academic and social dimensions as a result of SLTV.

**The Difference Between ‘Identity’ and Other Outcomes** It appears that while Hispanic discipline issues are generally improved by SLTV, this does not extend to the measure directly tied to identity: bullying and harassment based on ethnicity. Similarly, while academic achievement is generally improved by SLTV, this finding does not also generalize to LEP rates. This puzzle—explaining how identity driven results move in opposite directions from the others—is not easily resolved without relying on identity in some form.

Though we do not have a rigorous argument that can fully resolve this puzzle, we suggest that a substitution effect based on SLTV affecting identity can explain much of the results seen. That is, SLTV might in the immediate affect the identity based mechanisms that we see (more social issues, worse academic performance on metrics tied to identity), but that student performance in other non-identity tied outcomes might in turn shift to make up for the difference. If this were the case, we would expect to see results in line with what we see. An alternative explanation not relying on identity would still need to be able to explain why most academic and disciplinary measures point in one direction, whereas the ones more tightly linked to identity reverse.

## 5 The identity mechanism

SLTV programming is also more likely to contain content that is directly salient to a Hispanic person’s identity. This occurs not only because of the language of the broadcast, but also its content: roughly 20% of programming on SLTVs are telenovelas produced in foreign (Latin American) countries, with a similar proportion of programming dedicated to non-locally produced news and paid programming.<sup>24</sup>

We marshal three

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<sup>24</sup>For more information, see FCC (2016).

## 5.1 Tradeoffs and identity

## 5.2 The content of TV programs: narrowing down mechanisms

Table A.5 provides further evidence that no direct time spent on education

## 5.3 Foot-traffic and identity

**Firm Name Classification** Unlike the names of firm principals, there is no readily available or standardized method to determine whether a firm’s name is a ‘Hispanic name’ or not. Although a machine learning approach is still theoretically possible under these circumstances, a quick visual inspection of the data revealed that a relatively low percentage of firms had names that were explicitly tied to a Hispanic identity—hence, many approaches would likely identify a significant number of false positives.

In order to be conservative and ensure that firms identified as bearing Hispanic names actually are such, we construct a measure that classifies a firm name as Hispanic if it contains certain keywords that are explicitly associated with a Hispanic identity. These keywords are split into three major categories: (1) References to countries in Latin America or Latin America itself. Firms that include the base forms of country names in Latin America are considered to be explicitly referencing a Hispanic identity (examples include: ‘Cuban Guys 102, LLC’ , ‘Bravo Latino Brands, LLC.’) (2) Names containing common one of the top 50 most Spanish words that are not also present in English (examples include: ‘La Joya Estates, Ltd.’, ‘Conselho Nacional De Saude Mental E Medicina Psicossomatica Inc.’), and (3) Names containing common Hispanic foods. (examples include: ‘Charlie Cactus Tacos, LLC’, ‘Taqueria Casas 2 Inc.’) Due to the lack of a systemic means to construct this last category, I conduct robustness checks dropping this category; results do not substantially change when omitting this third category. Table ?? contains a list of these keywords as well as some additional detail on the classification process.

Out of our sample, 1.1% of firms meet this criteria (1% if omitting the food-based names). A manual check of firms that are classified as Hispanic also confirms that the firm name classification process succeeds.

## 6 Conclusion

In this paper, we provide a number of high-level results: we show that SLTV has a substantial impact on reducing the inequality that Hispanics face as entrepreneurs and students. From a business standpoint, SLTV increases Hispanic firm ownership, while also increasing the total number of firms bearing Hispanic names, pointing to an expansion in demand for goods and services linked to the Hispanic identity. From an educational standpoint, SLTV further improves the academic performance of top achievers while decreasing the occurrence of disciplinary issues among Hispanic



students; instances in which this is violated are instances that one would expect to arise from a stronger sense of identity being reinforced.

Undergirding these findings is the consistent notion that identity is strengthened from the presence of television, and though we cannot ever perfectly confirm that this is the case, we believe the cumulative weight of the results is suggestive. However, this would be a prime area for future work to be done: we think that a more precise and direct effect on identity from the media (for both Hispanics and other minorities), would be of value—especially if one could show its relative influence and power over time.

Political consequences? Not a monolith, what about subgroups? How do these interact with other dimensions along which the achievement gap has been observed, such as socioeconomic status or gender?

More broadly speaking, we think that looking at the spillover effects of identity for both those within the in-group and those in the out-group would be of interest (how are Hispanic people who don't watch SLTV be affected by peers who do? How do white people, or other minorities react?). Finally, it may also be interesting to examine the role that media as a whole plays on identity, and whether Spanish Language Television serves as a complement or substitute with other forms of media.

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Figures and Tables

Figure 1: Coverage Map for TV Station WUVC-DT

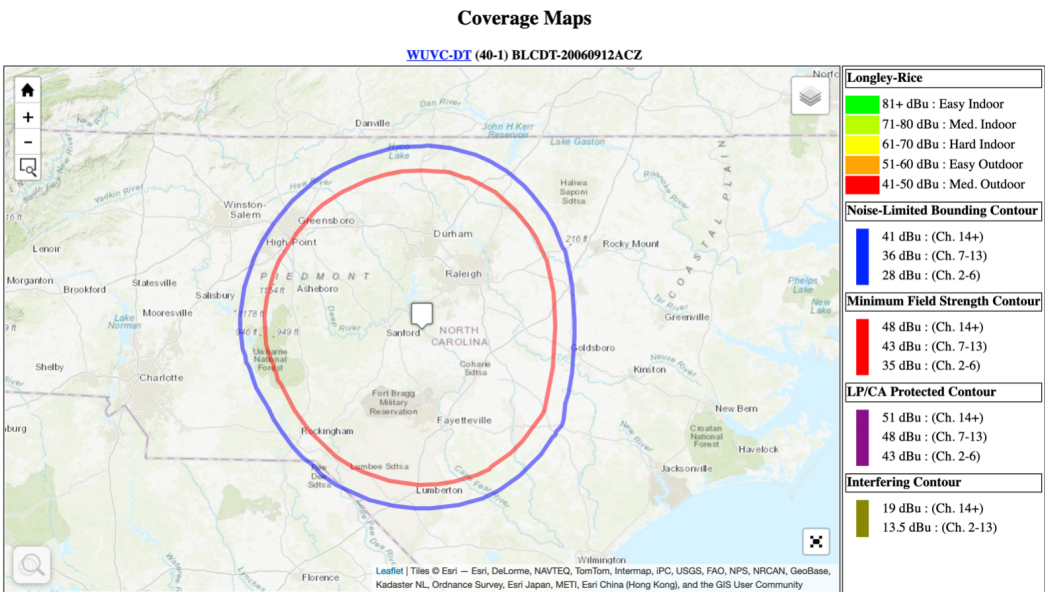


Figure 2: The Coverage Contours of Spanish Language TV stations

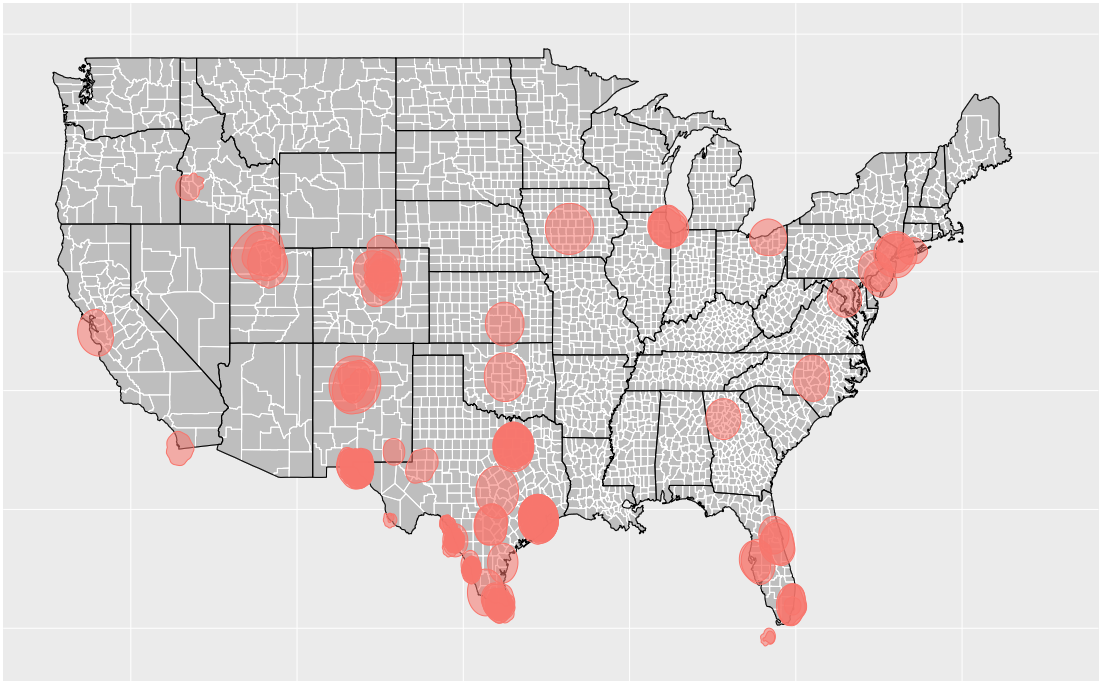


Figure 3: Map of School Districts in the US

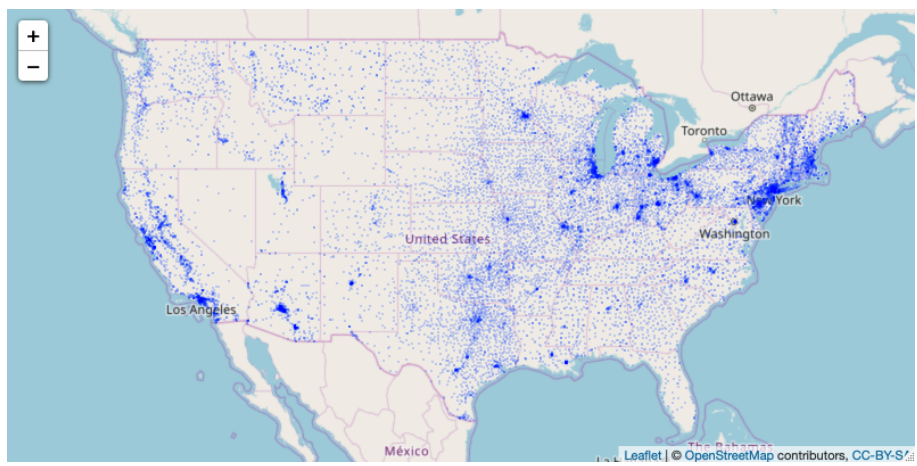


Table 1: Summary statistics

	<i>All</i>	<i>No SLTV</i>	<i>SLTV</i>
	(1)	(2)	(3)
Panel A: American Time Use Survey			
Hispanics	0.251 (0.434)	0.254 (0.432)	0.248 (0.436)
Minutes of TV watched	170.846 (177.361)	172.140 (177.897)	169.649 (176.858)
TV watched with children	19.061 (63.577)	19.139 (63.481)	18.990 (63.666)
TV watched with parents	1.644 (14.243)	1.773 (14.721)	1.526 (13.785)
Observations	68,373	32,844	35,529
Panel B: Schools, Civil Rights Data Collection			
IHS(SAT/ACTs taken)	1.719 (1.926)	1.233 (1.515)	2.006 (2.079)
IHS(calculus taken)	1.907 (1.717)	1.197 (1.373)	1.760 (2.333)
IHS(APs passed)	4.081 (0.951)	3.564 (0.706)	4.174 (0.960)
IHS(limited English proficiency)	2.061 (1.943)	1.503 (1.660)	2.349 (2.015)
IHS(harassment based on ethnicity or race)	0.032 (0.229)	0.016 (0.163)	0.041 (0.257)
Log income	9.547 (0.303)	9.430 (0.200)	9.608 (0.328)
Log population	12.484 (1.576)	11.559 (1.471)	12.964 (1.405)
Fraction county Hispanic	0.107 (0.160)	0.037 (0.079)	0.143 (0.179)
# School teachers	39.591 (30.764)	32.684 (24.090)	43.169 (33.146)
# Hispanic students	164.343 (259.096)	68.500 (117.433)	214.011 (295.883)
# Total students	581.524 (482.595)	478.166 (383.924)	635.086 (518.467)
Observations	83,004	22,504	60,500
Panel C: Schools, archive.org TV transcripts			
% programs on identity	-	-	0.108 (0.017)
% programs on education	-	-	0.150 (0.028)
% programs with role models	-	-	0.005 (0.008)
Observations	-	-	60,500
Panel D: Establishments, Safegraph foot traffic			
Restaurants — IHS(visitors)	2.673 (2.273)	2.183 (2.291)	3.685 (3.685)
Restaurants — Hispanic dummy	0.116 (0.321)	- -	- -
Observations	203,236	101,806	101,806
Recreation — IHS(visitors)	2.642 (2.259)	1.943 (2.106)	3.341 (2.190)
Recreation — Hispanic dummy	0.107 (0.103)	- -	- -
Observations	70,096	35,048	35,048

*Notes:* The table presents means (and standard deviations). Column 1 shows data for all observations. Columns 2 and 3 show data for the subsample without and with Spanish Language TV (SLTV) coverage, respectively. All panels only keep observations within 100 KM of the SLTV coverage contour boundary. Data in Panel A are at the individual level from the American Time Use Survey. Data in Panel B are at the school level from the Civil Rights Data Collection. Data in Panel C are at the school level from the archive.org TV transcript database—columns 1 and 2 are omitted because transcript data only applies where there is television. Data in Panel D are at the establishment level from the Safegraph traffic data—columns 2 and 3 are omitted for the location dummy because although visitor home location is used to instrument for the presence of TV, the location of the establishment is not.

Table 2: Effect of TV contour regulation on TV watched by ethnicity

	<i>Minutes of TV watched</i>			
	(1)	(2)	(3)	(4)
Panel A: Total TV watched				
TV dummy $\times$ Hispanic	10.822*** (3.013)	9.050*** (3.021)	11.060*** (3.038)	10.362*** (3.034)
TV dummy	-1.341 (1.594)	-0.172 (1.597)	0.948 (1.605)	2.039 (1.605)
Panel B: TV watched with children				
TV dummy $\times$ Hispanic	3.171** (1.410)	2.857** (1.411)	3.211** (1.412)	3.172** (1.412)
TV dummy	-0.008 (0.592)	0.206 (0.592)	0.411 (0.598)	0.470 (0.599)
Indiv. demographic	Yes	Yes	Yes	Yes
County log(income)	Yes	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes	Yes
County log(pop.)	No	No	Yes	Yes
Foreign born $\times$ Hispanic	No	No	No	Yes

*Notes:* The table presents coefficient estimates from regressions at the individual level, only keeping those living in a county within 100 KM of a Spanish language TV contour boundary. The dependent variable in Panel A is the total number of minutes of TV watched and in Panel B the number of minutes of TV watched with children. TV dummy is an indicator variable for a person living in a county with access to Spanish language television based on the FCC regulation OET Bulletin 69, which is interacted with an indicator for whether the individual is Hispanic. Columns 1-4 include demographic controls for sex, age, and age squared, as well as the mean log(income) of the county. Columns 2-4 control for the percentage of the county that is Hispanic. Columns 3-4 control for the county's log(population). Column 4 controls for whether the individual is foreign born interacted with a Hispanic dummy. Standard errors are robust. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.



Table 3: Effect of Spanish language TV on Hispanic vs. Asian academic achievement

	(1)	(2)	(3)
Panel A: IHS(SAT/ACTs taken)			
TV dummy $\times$ Hispanic	0.160*** (0.011)	0.160*** (0.010)	0.160*** (0.010)
TV dummy	-0.057*** (0.008)	-0.055*** (0.007)	-0.059*** (0.007)
N	21,610	21,610	21,610
Panel B: IHS(calculus taken)			
TV dummy $\times$ Hispanic	0.272*** (0.012)	0.272*** (0.011)	0.272*** (0.011)
TV dummy	-0.098*** (0.010)	-0.094*** (0.010)	-0.097*** (0.010)
N	11,460	11,460	11,460
Panel C: IHS(APs passed)			
TV dummy $\times$ Hispanic	0.079*** (0.014)	0.081*** (0.014)	0.080*** (0.014)
TV dummy	-0.002 (0.013)	-0.0001 (0.013)	0.0001 (0.013)
N	3,757	3,757	3,757
County controls	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

*Notes:* The table presents coefficient estimates from regressions at the school-ethnicity level, only keeping schools within 100 KM of a Spanish language TV contour boundary. The dependent variable are inverse hyperbolic sine transformed counts of the number of students taking the SAT or ACT in Panel A, the number of students enrolled in calculus in Panel B, and the number of Advanced Placement tests passed in Panel C. TV dummy is an indicator variable for a person living in a county with access to Spanish language television based on the FCC regulation OET Bulletin 69, which is interacted with an indicator for whether the demographic is Hispanic (the omitted group are Asians). Columns 1-3 include county level controls for log(income), log(population), and percentage of the county that is Hispanic, as well as school level controls for the number of Hispanic and Asian students enrolled. Columns 2-3 control for the number of teachers and total number of students at the school. Column 3 controls for indicators denoting whether the school contains a primary, middle, and high school division. Standard errors are robust. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4: Effect of Spanish language TV on Hispanic vs. Asian identity outcomes

	(1)	(2)	(3)
Panel A: IHS(limited English proficiency)			
TV dummy $\times$ Hispanic	0.304*** (0.005)	0.304*** (0.005)	0.304*** (0.005)
TV dummy	-0.092*** (0.004)	-0.091*** (0.004)	-0.100*** (0.004)
N	83,004	83,004	83,004
Panel B: IHS(bullied based on ethnicity or race)			
TV dummy $\times$ Hispanic	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)
TV dummy	0.001** (0.0004)	0.001*** (0.0004)	0.001*** (0.0004)
N	52,068	52,068	52,068
County controls	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

*Notes:* The table presents coefficient estimates from regressions at the school-ethnicity level, only keeping schools within 100 KM of a Spanish language TV contour boundary. The dependent variable are inverse hyperbolic sine transformed counts of students classified as having limited English proficiency in Panel A and the number of students bullied on the basis of their ethnicity or race in Panel B. TV dummy is an indicator variable for a person living in a county with access to Spanish language television based on the FCC regulation OET Bulletin 69, which is interacted with an indicator for whether the demographic is Hispanic (the omitted group are Asians). Columns 1-3 include county level controls for log(income), log(population), and percentage of the county that is Hispanic, as well as school level controls for the number of Hispanic and Asian students enrolled. Columns 2-3 control for the number of teachers and total number of students at the school. Column 3 controls for indicators denoting whether the school contains a primary, middle, and high school division. Standard errors are robust. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Differential effect of Spanish language TV by program content on Hispanic vs. Asian academic achievement

	(1)	(2)	(3)
Panel A: IHS(SAT/ACTs taken)			
TV $\times$ Hispanic $\times$ % programs on identity	2.313** (0.943)		
TV $\times$ Hispanic $\times$ % programs on education		-0.516 (0.626)	
TV $\times$ Hispanic $\times$ % programs with role models			-2.085 (2.151)
N	21,610	21,610	21,610
Panel B: IHS(calculus taken)			
TV $\times$ Hispanic $\times$ % programs on identity	2.788*** (1.034)		
TV $\times$ Hispanic $\times$ % programs on education		0.829 (0.666)	
TV $\times$ Hispanic $\times$ % programs with role models			1.616 (2.463)
N	7,112	7,112	7,112
Panel C: IHS(APs passed)			
TV $\times$ Hispanic $\times$ % programs on identity	1.721 (1.280)		
TV $\times$ Hispanic $\times$ % programs on education		0.903 (0.922)	
TV $\times$ Hispanic $\times$ % programs with role models			-1.184 (2.989)
N	3,168	3,168	3,168
County controls	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

*Notes:* The table presents coefficient estimates from regressions at the school-ethnicity level, only keeping schools within 100 KM of a Spanish language TV contour boundary. The dependent variable are inverse hyperbolic sine transformed counts of the number of students taking the SAT or ACT in Panel A, the number of students enrolled in calculus in Panel B, and the number of Advanced Placement tests passed in Panel C. % programs on identity, education, and role models are coded based on TV channel network transcripts. TV dummy is an indicator variable for a person living in a county with access to Spanish language television based on the FCC regulation OET Bulletin 69, which is interacted with program content and an indicator for whether the demographic is Hispanic (the omitted group are Asians). Columns 1-3 include county level controls for log(income), log(population), and percentage of the county that is Hispanic, as well as school level controls for the number of Hispanic and Asian students enrolled. Columns 2-3 control for the number of teachers and total number of students at the school. Column 3 controls for indicators denoting whether the school contains a primary, middle, and high school division. Standard errors are robust. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Effect of Spanish language TV on Hispanic foot traffic

	<i>IHS(visitors to location)</i>			
	(1)	(2)	(3)	(4)
Panel A.1: Restaurants — Hispanic dummy				
TV $\times$ Hispanic $\times$ Hispanic food	0.872*** (0.057)	0.872*** (0.057)	0.872*** (0.057)	0.872*** (0.056)
Panel A.2: Restaurants — Korean dummy				
TV $\times$ Hispanic $\times$ Korean food	0.233 (0.225)	0.233 (0.225)	0.233 (0.225)	0.233 (0.223)
Panel A.3: Restaurants — Greek dummy				
Hispanic $\times$ TV $\times$ Greek food	-0.305 (0.215)	-0.305 (0.214)	-0.305 (0.214)	-0.305 (0.211)
Panel A.4: Restaurants — Brazilian dummy				
TV $\times$ Hispanic $\times$ Brazilian food	0.058 (0.525)	0.058 (0.530)	0.058 (0.530)	0.058 (0.526)
N	203,236	203,236	203,236	203,236
Panel B.1: Recreation — Hispanic dummy				
TV $\times$ Hispanic $\times$ Hispanic brand	0.569* (0.303)	0.569* (0.304)	0.569* (0.304)	0.569* (0.302)
Panel B.2: Recreation — Korean dummy				
TV $\times$ Hispanic $\times$ Korean brand	0.190 (1.020)	0.190 (0.989)	0.190 (0.977)	0.190 (0.804)
Panel B.3: Recreation — Greek dummy				
Hispanic $\times$ TV $\times$ Greek brand	-0.286 (4.317)	-0.286 (4.460)	-0.286 (4.397)	-0.286 (3.905)
Panel B.4: Recreation — Brazilian dummy				
TV $\times$ Hispanic $\times$ Brazilian brand	0.328 (0.598)	0.328 (0.598)	0.328 (0.599)	0.328 (0.610)
N	69,980	69,980	69,980	69,980
County log(income)	Yes	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes	Yes
County log(pop.)	No	No	Yes	Yes
County FE	No	No	No	Yes
NAICS code FE	No	No	No	Yes

*Notes:* The table presents coefficient estimates from regressions at the establishment-visitor identity level, where a visitor identity is one of 4 categories (Hispanic or not  $\times$  TV or not), only keeping locations within 100 KM of a Spanish language TV contour boundary. The dependent variable are inverse hyperbolic sine transformed counts of visitors to a given location from the ethnicity group. Panel A restricts the universe of locations to food service establishments, while Panel B restricts to arts, entertainment, and recreation establishments. TV dummy is an indicator variable for visitors to the location with home access to Spanish language television based on the FCC regulation OET Bulletin 69, which is interacted with an indicator for whether the visitor group is Hispanic (the omitted group are non-Hispanics). Panels A.1 and B.1 interact these variables with an indicator for Hispanic establishments, Panels A.2 and B.2 interact these variables with an indicator for Korean establishments, Panels A.3 and B.3 interact these variables with an indicator for Greek establishments, and Panels A.4 and B.4 interact these variables with an indicator for Brazilian establishments. Columns 1-4 include controls for the mean log(income) of the county. Columns 2-4 control for the percentage of the county that is Hispanic. Columns 3-4 control for the county's log(population). Column 4 adds fixed effects for the county and NAICS code. Standard errors are robust. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

## ONLINE APPENDIX

### Appendix A Auxiliary data sources

In addition to the primary data sources described in Section 2, we also use a number of auxiliary data sources for the empirical analysis.

#### American Time Use (ATUS)

**Civil Rights Data Collection (CRDC)** The outcome data from the CRDC can be split into two categories:

- **Academic Achievements:** We focus on two outcomes that track the effect of television on the top end of the academic distribution of students: the number of Advanced Placement (AP) classes students enrol in and pass, as well as the number of students placed into gifted programs, and one outcome on the bottom: the number of students with Limited English Proficiency (LEP).

The AP program is administered by the College Board, and defines a standardized college-level curriculum that is taught to high school students in AP Classes. In conjunction with AP Classes, AP Exams are national examinations which are designed to test mastery of material taught in AP classes. These exams are scored on a scale ranging from 1 to 5, with scores below a 3 marked as a failed exam. Even among the students who select into these classes (22% in 2015<sup>1</sup>), a substantial number of students who take these exams fail them - approximately 35% (College Board (2020*b*)).

Gifted and talented programs are “programs during regular school hours that provide special educational opportunities including accelerated promotion through grades and classes and an enriched curriculum for students who are endowed with a high degree of mental ability or who demonstrate unusual physical coordination, creativity, interest, or talent.” (CRDC (2016)) These programs, while not mandatory, are common across school districts, and vary in their implementation.

LEP students (also called English Learner students) are students that, as a result of their limited command over the English language, have difficulty participating in regular school activities.<sup>2</sup> 9% of all public school students are considered LEP, and while students are placed into the program is at the discretion of individual school districts, all districts must provide language assistance services and have staff qualified to implement the LEP programs.<sup>3</sup>

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<sup>1</sup>Data computed from number of high school graduates in 2015 (National Student Clearinghouse Research Center, (2015*a*)), and number of seniors who sat an AP exam in 2015. This is how the College Board currently tracks national AP participation (no comparable summary statistic was released in 2015) (College Board, (2015*b*))

<sup>2</sup>The specific definition of a LEP student depends on individual state regulation, but must also satisfy the criteria outlined under Title IX of the Elementary and Secondary Education Act (US Department of Education, (2004*b*)). The most salient features of Title IX are that students must either not speak English as a native language or come from an environment where non-English languages are dominant, and also face substantial difficulty in engaging with others on the basis of their English ability.

<sup>3</sup>Department of Justice and Department of Education, (2015*c*) contains a full enumeration of the responsibilities school districts have. It further includes requirements such as ensuring equal access to various school programs etc.

- **Disciplinary Issues:** Three forms of academic discipline are considered as outcome variables: the number of out of school suspensions, the number of absences, and the amount of harassment and bullying on the basis of race/ethnicity experienced by students.

Out of school suspensions are instances “in which a child is temporarily removed from his/her regular school for at least half a day (but less than the remainder of the school year) for disciplinary purposes to another setting (e.g., home, behavior center).” (CRDC, (2016)) We consider only students without disabilities, and note that depending on school policy, educational services may still be provided during this time.<sup>4</sup>

A chronically absent student is one “who is absent 15 or more school days during the school year. A student is absent if he or she is not physically on school grounds and is not participating in instruction or instruction-related activities at an approved off-grounds location for at least half the school day.” (CRDC, (2016)) Each day for which a student is absent for 50 percent or more of the school day is counted. Absences are counted regardless of whether they are excused or not, and so include absences due to illness, needing to care for a family member, or simple truancy.

Harassment or bullying on the basis of race, color, or national origin “refers to intimidation or abusive behavior toward a student based on actual or perceived race, color, or national origin. Harassing conduct may take many forms, including verbal acts and name-calling, as well as non-verbal behavior, such as graphic and written statements, or conduct that is physically threatening, harmful or humiliating. The conduct can be carried out by school employees, other students, and non-employee third parties. Bullying on the basis of race, color, or national origin constitutes racial harassment.” (CRDC, (2016)) Though there are other categories of bullying and harassment reported (and other types of infractions and disciplinary measures taken), these are less directly relevant to the question at hand.

Notably, all the outcome information described above is also provided for Hispanic subpopulations — hence, the outcome of interest is generally the number of Hispanic students passing AP tests, or being bullied on the basis of their ethnicity, etc. These variables are all reported at the school level.

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<sup>4</sup>Students with disabilities served under IDEA face substantially different suspension policy.

## Appendix B Additional figures and tables

Table A.1: Influence of Spanish Language Television on Migration Between Counties - Origin Sample

Panel A: Origin County Inside Contour	IHS(# Hispanic Migrants)		
	(1)	(2)	(3)
Dummy: Destination Outside TV Contour	-0.387*** (0.048)	-0.286*** (0.044)	-0.280*** (0.044)
TV Dummy $\times$ Distance to Origin	-0.003** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
TV Dummy $\times$ Distance to Destination	0.001 (0.001)	-0.002* (0.001)	-0.002 (0.001)
Distance from Contour to Origin (KM)	0.001 (0.002)	0.003* (0.002)	0.003 (0.002)
Distance from Contour to Destination (KM)	-0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Origin Log(Population)	0.146*** (0.020)	0.161*** (0.017)	0.150*** (0.021)
Destination Log(Population)	0.150*** (0.014)	0.136*** (0.013)	0.125*** (0.016)
Origin % Hispanic		0.792*** (0.103)	0.881*** (0.141)
Destination % Hispanic		1.485*** (0.122)	1.573*** (0.141)
Origin Log(Income)			0.093 (0.094)
Destination Log(Income)			0.090 (0.078)
Observations	8,479	8,479	8,479
Panel B: Origin County Outside Contour			
Dummy: Destination Inside TV Contour	-0.078 (0.108)	-0.123 (0.096)	-0.120 (0.096)
TV Dummy $\times$ Distance to Origin	-0.003* (0.002)	-0.004*** (0.001)	-0.004*** (0.001)
TV Dummy $\times$ Distance to Destination	-0.004*** (0.001)	-0.002 (0.001)	-0.002 (0.001)
Distance from Contour to Origin (KM)	-0.0003 (0.001)	0.001 (0.001)	0.001 (0.001)
Distance from Contour to Destination (KM)	-0.001*** (0.0002)	-0.001*** (0.0003)	-0.001*** (0.0003)
Origin Log(Population)	0.164*** (0.017)	0.131*** (0.021)	0.094*** (0.026)
Destination Log(Population)	0.150*** (0.023)	0.128*** (0.020)	0.125*** (0.021)
Origin % Hispanic		1.328*** (0.295)	1.611*** (0.329)
Destination % Hispanic		1.485*** (0.293)	1.481*** (0.318)
Origin Log(Income)			0.407** (0.193)
Destination Log(Income)			0.003 (0.087)
Observations	4,062	4,062	4,062
Origin F.E.	Yes	Yes	Yes

*Notes:* The table presents coefficient estimates from regressions at the county-county level, only keeping origin counties within 100 KM of a contour boundary. The dependent variables are inverse hyperbolic sine transformed counts of Hispanic migrants from the origin county to the destination county. The key dependent variable of interest is the TV Dummy, which tracks whether the destination county is inside or outside the TV contour. This is interacted with the distance to the boundary for both the origin and destination county. County controls include log income, log population, and percentage county Hispanic for both origin and destination county. All regressions also contain origin county fixed effects. Standard errors are given in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.



Table A.2: Influence of Spanish Language Television on Migration Between Counties - Destination Sample

Panel A: Destination County Inside Contour	IHS(# Hispanic Migrants)		
	(1)	(2)	(3)
Dummy: Origin Outside TV Contour	-0.410*** (0.088)	-0.356*** (0.082)	-0.349*** (0.081)
TV Dummy $\times$ Distance to Destination	-0.007*** (0.003)	-0.008*** (0.003)	-0.008*** (0.003)
TV Dummy $\times$ Distance to Origin	-0.002 (0.002)	-0.004** (0.002)	-0.004* (0.002)
Distance from Contor to Destination (KM)	0.002 (0.002)	0.004** (0.002)	0.004** (0.002)
Distance from Contour to Origin (KM)	0.001 (0.002)	0.004 (0.002)	0.003 (0.002)
Destination Log(Population)	0.179*** (0.019)	0.181*** (0.016)	0.175*** (0.019)
Origin Log(Population)	0.115*** (0.018)	0.117*** (0.017)	0.102*** (0.020)
Destination % Hispanic		1.384*** (0.183)	1.428*** (0.205)
Origin % Hispanic		0.813*** (0.182)	0.949*** (0.203)
Destination Log(Income)			0.041 (0.099)
Origin Log(Income)			0.138 (0.109)
Observations	4,338	4,338	4,338
Panel B: Origin County Outside Contour			
Dummy: Origin Inside TV Contour	-0.140 (0.152)	-0.194 (0.144)	-0.193 (0.144)
TV Dummy $\times$ Distance to Destination	-0.004* (0.002)	-0.007*** (0.002)	-0.007*** (0.002)
TV Dummy $\times$ Distance to Origin	-0.007** (0.003)	-0.004 (0.003)	-0.004 (0.003)
Distance from Contor to Destination (KM)	-0.0003 (0.002)	0.002 (0.001)	0.002 (0.001)
Distance from Contour to Origin (KM)	-0.001*** (0.0004)	-0.002*** (0.0004)	-0.002*** (0.0004)
Destination Log(Population)	0.253*** (0.041)	0.169*** (0.023)	0.153*** (0.030)
Origin Log(Population)	0.182*** (0.035)	0.181*** (0.030)	0.181*** (0.034)
Destination % Hispanic		2.324*** (0.389)	2.471*** (0.411)
Origin % Hispanic		1.276** (0.602)	1.253** (0.584)
Destination Log(Income)			0.181 (0.196)
Origin Log(Income)			-0.015 (0.192)
Observations	1,659	1,659	1,659
Destination F.E.	Yes	Yes	Yes

*Notes:* The table presents coefficient estimates from regressions at the county-county level, only keeping destination counties within 100 KM of a contour boundary. The dependent variables are inverse hyperbolic sine transformed counts of Hispanic migrants from the origin county to the destination county. The key dependent variable of interest is the TV Dummy, which tracks whether the destination county is inside or outside the TV contour. This is interacted with the distance to the boundary for both the origin and destination county. County controls include log income, log population, and percentage county Hispanic for both origin and destination county. All regressions also contain destination county fixed effects. Standard errors are given in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A.3: Effect of Spanish language TV on Hispanic vs. Asian academic achievement

	(1)	(2)	(3)
Panel A: IHS(gifted students)			
TV dummy $\times$ Hispanic	0.239*** (0.004)	0.239*** (0.004)	0.239*** (0.004)
TV dummy	-0.107*** (0.004)	-0.098*** (0.004)	-0.099*** (0.004)
N	52,130	52,130	52,130
Panel B: IHS(advanced math courses)			
TV dummy $\times$ Hispanic	0.250*** (0.011)	0.250*** (0.010)	0.250*** (0.010)
TV dummy	-0.100*** (0.010)	-0.097*** (0.009)	-0.099*** (0.009)
N	14,354	14,354	14,354
Panel C: IHS(biology courses)			
TV dummy $\times$ Hispanic	0.260*** (0.010)	0.260*** (0.009)	0.260*** (0.009)
TV dummy	-0.099*** (0.009)	-0.098*** (0.008)	-0.100*** (0.008)
N	19,008	19,008	19,008
Panel D: IHS(physics courses)			
TV dummy $\times$ Hispanic	0.311*** (0.010)	0.311*** (0.010)	0.311*** (0.010)
TV dummy	-0.070*** (0.009)	-0.068*** (0.008)	-0.068*** (0.008)
N	13,952	13,952	13,952
Panel E: IHS(chemistry courses)			
TV dummy $\times$ Hispanic	0.290*** (0.010)	0.290*** (0.009)	0.290*** (0.009)
TV dummy	-0.094*** (0.009)	-0.090*** (0.008)	-0.091*** (0.008)
N	16,472	16,472	16,472
County controls	Yes	Yes	Yes
School size controls	No	Yes	Yes
School type controls	No	No	Yes

*Notes:* The table presents coefficient estimates from regressions at the school-ethnicity level, only keeping schools within 100 KM of a Spanish language TV contour boundary. The dependent variable are inverse hyperbolic sine transformed counts of the number of gifted students in Panel A, the number of students enrolled in an advanced math course in Panel B, the number of students enrolled in a biology course in Panel C, the number of students enrolled in a physics course in Panel D, and the number of students enrolled in a chemistry course in Panel E. TV dummy is an indicator variable for a person living in a county with access to Spanish language television based on the FCC regulation OET Bulletin 69, which is interacted with an indicator for whether the demographic is Hispanic (the omitted group are Asians). Columns 1-3 include county level controls for log(income), log(population), and percentage of the county that is Hispanic, as well as school level controls for the number of Hispanic and Asian students enrolled. Columns 2-3 control for the number of teachers and total number of students at the school. Column 3 controls for indicators denoting whether the school contains a primary, middle, and high school division. Standard errors are robust. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A.4: Effect of TV contour regulation on TV watched by ethnicity — parents and foreign born residents

	<i>Minutes of TV watched</i>			
	(1)	(2)	(3)	(4)
Panel A: TV watched with parents				
TV dummy $\times$ Hispanic	0.481** (0.241)	0.507** (0.242)	0.523** (0.244)	0.522** (0.244)
TV dummy	-0.318** (0.135)	-0.336** (0.136)	-0.327** (0.135)	-0.328** (0.135)
N	91,315	91,315	91,315	91,315
Panel B: TV watched by foreign born residents				
TV dummy $\times$ Hispanic	12.248* (6.955)	11.822* (6.957)	11.268 (6.989)	
TV dummy	0.910 (4.581)	0.950 (4.581)	2.695 (4.743)	
N	8,929	8,929	8,929	
Indiv. demographic	Yes	Yes	Yes	Yes
County log(pop)	Yes	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes	Yes
County log(income)	No	No	Yes	Yes
Foreign born $\times$ Hispanic	No	No	No	Yes

*Notes:* The table presents coefficient estimates from regressions at the individual level. Panel A uses the number of minutes of TV watched with parents as the outcome, while Panel B uses the total number of minutes of TTV watched and restricts the sample to those who were born in a foreign country. TV dummy is an indicator variable for a person living in a county with access to Spanish language television based on the FCC regulation OET Bulletin 69, which is interacted with an indicator for whether the individual is Hispanic. Columns 1-4 include individual demographic controls for sex, age, and age squared, as well as the mean log(income) of the county. Columns 2-4 control for the percentage of the county that is Hispanic. Columns 3-4 control for the county's log(population). Column 4 controls for whether the individual is foreign born interacted with a Hispanic dummy. Standard errors are robust. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A.5: Effect of TV contour regulation on time spent on child's education by ethnicity

	<i>Minutes spent on child's education</i>			
	(1)	(2)	(3)	(4)
Panel A: Total TV watched				
TV dummy $\times$ Hispanic	0.060 (0.301)	0.105 (0.301)	0.178 (0.302)	0.179 (0.302)
TV dummy	0.194 (0.154)	0.164 (0.154)	0.205 (0.155)	0.202 (0.155)
Indiv. demographic	Yes	Yes	Yes	Yes
County log(income)	Yes	Yes	Yes	Yes
County % Hispanic	No	Yes	Yes	Yes
County log(pop.)	No	No	Yes	Yes
Foreign born $\times$ Hispanic	No	No	No	Yes

*Notes:* The table presents coefficient estimates from regressions at the individual level, only keeping those living in a county within 100 KM of a Spanish language TV contour boundary. The dependent variable is the number of minutes spent on household children's education (e.g. helping with homework or talking with teachers). TV dummy is an indicator variable for a person living in a county with access to Spanish language television based on the FCC regulation OET Bulletin 69, which is interacted with an indicator for whether the individual is Hispanic. Columns 1-4 include demographic controls for sex, age, and age squared, as well as the mean log(income) of the county. Columns 2-4 control for the percentage of the county that is Hispanic. Columns 3-4 control for the county's log(population). Column 4 controls for whether the individual is foreign born interacted with a Hispanic dummy. Standard errors are robust. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A.6: Robustness of Influence of Spanish Language Television on Hispanic Students Passing the AP

	<i>IHS(# Hispanic Students Passing AP)</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
TV Dummy	0.039*** (0.013)	0.049*** (0.017)	0.044*** (0.016)	0.044*** (0.017)	0.036*** (0.013)	0.032* (0.018)
TV Dummy $\times$ Distance to Boundary	0.0003 (0.0002)	0.0001 (0.001)	0.001 (0.001)	0.001* (0.0004)	0.0001 (0.0004)	0.001 (0.001)
Distance to Boundary (meters)	0.001 (0.001)	0.012*** (0.003)	0.006*** (0.002)	0.006*** (0.002)	0.003** (0.002)	0.001 (0.004)
# Hispanic Students	0.001*** (0.00004)	0.001*** (0.00004)	0.001*** (0.00005)	0.001*** (0.0002)	0.001*** (0.00004)	0.001*** (0.0001)
Total APs Passed					0.003*** (0.0001)	
Observations	2,205	2,205	1,525	1,525	1,525	1,095
County/School Controls	Yes	Yes	Yes	Yes	Yes	Yes
Distance Cutoff (KM)	100	100	50	50	50	33 $\frac{1}{3}$
Distance <sup>2</sup> Interaction	No	Yes	No	No	No	No
County F.E.	No	No	No	Yes	No	No

*Notes:* The table presents coefficient estimates from regressions at the school level. The dependent variable is the inverse hyperbolic sine transformed counts of Hispanic students who have passed an AP exam. The key independent variable of interest is the TV Dummy, which tracks whether the school is within a coverage contour boundary for a Spanish language television station. This is interacted with the distance to the boundary. County and school controls include log income, log population, percentage county Hispanic for the county which the school is located in, and the number of teachers, total number of students at the school, and dummies for whether the school contains a primary, middle, and high school division. Various distance cut-offs to the boundary are presented, as well as the TV dummy interacted with the square of the distance. All regressions also control for the number of Hispanic students enrolled at the school. Standard errors are given in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A.7: Spatial Robustness of Influence of Spanish Language Television on Hispanic Victims of Ethnicity-Based Harassment

	<i>IHS(# Hispanic Victims of Harassment)</i>		
	(1)	(2)	(3)
TV Dummy	0.003** (0.001)	0.002*** (0.001)	0.003* (0.002)
TV Dummy $\times$ Distance to Boundary	-0.0001** (0.00002)	-0.0001*** (0.00001)	-0.0001** (0.00003)
Observations	40,811	40,811	40,811
Log Likelihood		-4,304.916	-4,299.820
$\sigma^2$		0.072	0.072
Akaike Inf. Crit.		8,629.833	8,619.640
Wald Test (df = 1)		686.149***	686.981***
LR Test (df = 1)		657.312***	667.505***
County/School Controls	Yes	Yes	Yes
Model	OLS	SAR Lag	SAR Error

*Notes:* The table presents coefficient estimates from regressions at the school level, only keeping schools within 100 KM of a contour boundary. The dependent variable is the inverse hyperbolic sine transformed counts of Hispanic students who are bullied or harassed on the basis of their ethnicity. The key dependent variable of interest is the TV Dummy, which tracks whether the school is within a coverage contour boundary for a Spanish language television station. This is interacted with the distance to the boundary. County and school controls include log income, log population, percentage county Hispanic for the county which the school is located in, and the number of Hispanic students in the school. Additionally controlling for number of teachers, total number of students at the school, and dummies for whether the school contains a primary, middle, and high school division yields similar coefficients, although standard errors cannot be estimated due to computational limitations. The SAR Lag model is a spatial autoregressive lag model and the SAR Error model is a spatial autoregressive error model, both with weight matrices based on 4 nearest neighbours. Standard errors are given in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% levels, respectively.