Spatial Dimensions of Heirs' Property in Maverick County, TX

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As a form of tenancy in common, heirs' property presents numerous obstacles to owners' ability to build wealth. This is because the titles for such properties are unclear or "clouded" and cannot be uses as collateral for loans. The bulk of the heirs' property literature focuses on rural, African American landholdings in the Black Belt South, where the extent of heirships have been estimated to be as high as 41 percent. However, heirs' properties may also be pervasive in other persistently poor places such as colonia *communities along the U.S.-Mexico border in Texas. As with other forms of social vulnerability, we expect this type of property ownership to cluster and to be proximal to other indicators of vulnerability. A hot spot (Getis-Ord Gi*) analysis indicated autocorrelation of heirs' properties in Maverick County, TX and that the majority of these properties were proximal to* colonias*; heirs' properties were also negatively correlated with median household income at the census block group level.*

Resumen: *Como una forma de arrendamiento en común, la propiedad de los herederos presenta numerosos obstáculos a la capacidad de los propietarios para construir riqueza. Esto se debe a que los títulos para tales propiedades no están claros o "nublado" y no pueden usarse como garantía para préstamos. La mayor parte de la literatura de propiedad de los herederos se centra en las propiedades rurales, afroamericanas en el Cinturón Negro del Sur, donde se ha estimado que el alcance de las heredades es tan alto como el 41 por ciento. Sin embargo, las propiedades de los herederos también pueden estar presentes en otros lugares persistentemente pobres, tales como las comunidades de colonia a lo largo de la frontera entre Estados Unidos y México en Texas. Al igual que con otras formas de vulnerabilidad social, esperamos que este tipo de propiedad se agrupe y sea proximal a otros indicadores de vulnerabilidad. Un análisis de puntos calientes (Getis-Ord Gi *) indicó autocorrelación de las propiedades de los herederos en el Condado de Maverick, TX y que la mayoría de estas propiedades eran proximales a las colonias; Las propiedades de los herederos también se correlacionaron negativamente con la mediana del ingreso familiar en el grupo de bloque del censo.*

KEY WORDS: heirs' property, tenancy in common, Texas *colonias*

PALABRAS CLAVE: propiedad de herederos, arrendamiento en común, colonias de Texas

INTRODUCTION

Heirs' property is a type of tenancy in common which usually describes inherited, real property. The co-owners or heirs of the tenancy hold fractional interests in land that is not physically divided (Mitchell 2001, 2005). Such arrangements can be found in families with wealth spanning the socioeconomic spectrum (Waldeck 2013; Mitchell 2014). However, observers maintain that tenancies in common are more prevalent among lower income and

lower education populations, principally rural, southern African Americans, Native Americans, and Appalachian whites (Emergency Land Fund 1980; Shoemaker 2003; Mitchell 2005; Deaton 2005, 2007; Baab 2011; Johnson Gaither 2016).

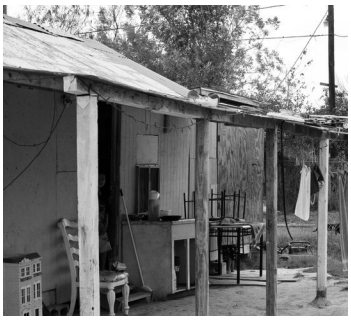
Heirships are typically created when individuals do not create wills or else those wills are not probated in a timely manner. The lack of estate planning can result in property with unclear titles, that is, property owned by numerous, sometimes unnamed individuals because of their kinship ties to common decedents. Although these lands may be in families for generations, it is very difficult for subsequent heirs to use the property for wealth building, for example as collateral to secure home mortgages or improvement loans. Such tenure can also undermine landowners' eligibility for land improvement programs sponsored by governmental agencies. As well, in areas where development pressure is intense, the lack of clear title could increase the likelihood that members of heirs' property-owning families would be displaced from their land (Chandler 2005; Rivers 2007). This is because any heir, no matter how small her interests, can bring legal suit requesting that heirs' property be divided and apportioned among the heirs according to their fractional interests. If a court deems that the best way to partition the land is via sale (such sales are often below fair market value), the property could be sold to someone outside of the family resulting in the eviction of family members who did not desire the partition (Mitchell et al. 2010). A high profile case in coastal South Carolina involving the extended Rivers family highlights an instance of such displacement (Grabbatin and Stephens 2011).

As indicated, heirs' properties are expected to be pervasive in communities with pervasive social vulnerabilities in terms of suppressed income and educational attainment. While these descriptors characterize well many southern, rural African American and central Appalachian communities, they are also fit characterizations of *colonia* settlements along the U.S.-Mexico border in southwest Texas. Way (2009); Ward et al.'s (2011); and Ward et al.'s (2012) examination of informal homeownership and social vulnerabilities in south Texas *colonias* suggests there may be widespread problems with titles in these communities because of both the unconventional nature of real property acquisition and the general lack of estate planning.

We concentrate on this form of land tenure for socially vulnerable populations other than African Americans by examining heirs' property ownership in Maverick County, TX and in *colonias* within the county. Aside from looking at this phenomenon outside the Black Belt South, this research extends heirs' property scholarship in two ways. First, by adding a spatial dimension to our analysis, we examine the degree of spatial clustering of heirs' property parcels in Maverick County to assess whether heirs' properties tend to concentrate geospatially. If they do, this would suggest that the potential for economic stability and growth is more attenuated in these places by constraints associated with heirs' properties. Secondly, we respond to Deaton's (2005, 2007) recommendation that heirs' property research look more closely at the link between that type of real property ownership and poverty indicators, particularly in places where there is considerable variation in socio-demographics. For example, correlations

Well-built home sponsored by Proyecto Azteca in Texas colonia. Photo from Proyecto Azteca. http://caseygrants.org/proyecto-azteca-building-homes-and-community-in-texas/.

between heirs' property and other vulnerability measures such as education, poverty rate, income, or type of home (e.g., manufactured housing) provide a broader picture of the intersection of various social vulnerabilities and their effects on people's ability to not only leverage assets but also their resiliency in the wake of natural or economic disasters. Again, because of uncertainties about who may be a *bona fide* heir, creditors will not (unless all heirs agree) accept heirs' property as collateral to secure loans; nor will public agencies advance credit or other assistance with heirs' property as the basis for security. For this reason, Deaton (2005, 2007) describes tenancies in common as "dead capital," that is, assets which are underutilized from a financial or economic perspective. Deaton (2005, p 84) maintains that heirs' property is a "likely factor" contributing to enduring poverty in Central Appalachia; Deaton et al.'s (2009) research in Central Kentucky also suggests that the lack of active management of heirs' parcels may result in environmentally degraded timber. Given the greater likelihood of compromised financial standing and possibly



Shanty typical of many in colonias.
Photo by Callie Richmond, The Texas Tribune

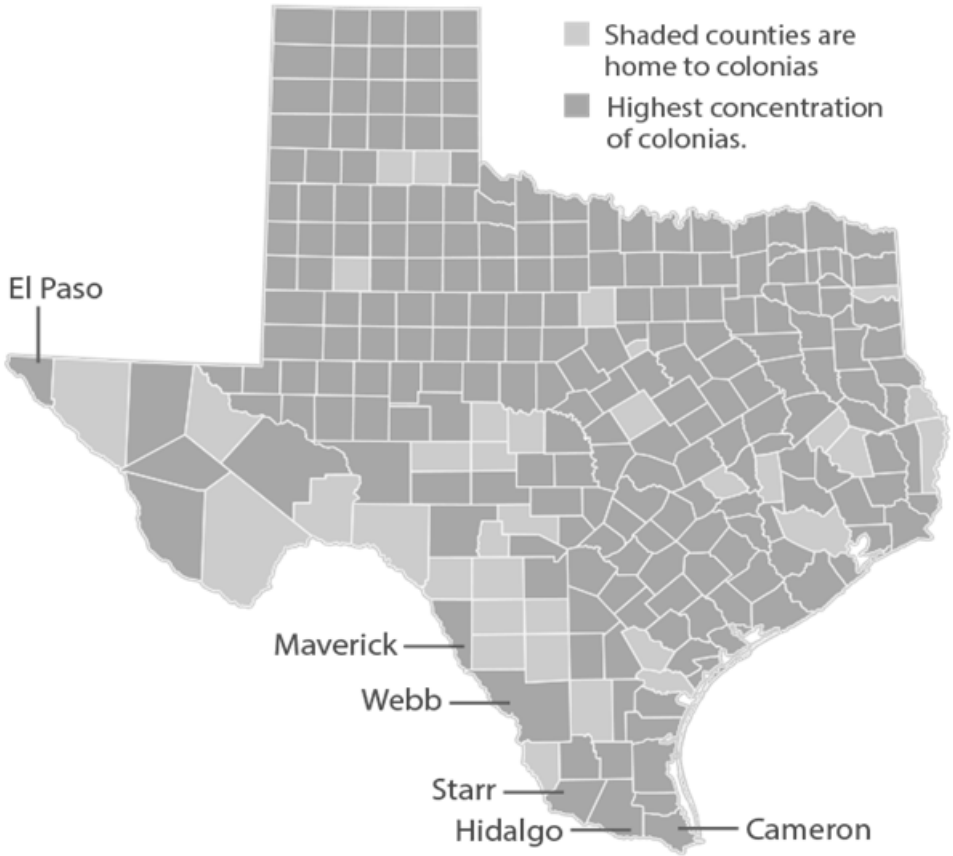
environmental quality associated with heirs' property, it follows that heirs' property and other indicators of social vulnerability would be positively related.

LITERATURE REVIEW

Enduring Poverty in Southwest Texas Colonias and Appalachia

Counties along the U.S.-Mexico border contain persistently poor communities dubbed *colonias,* which is Spanish for "community" (figure 3). The Texas Secretary of State's Office uses the descriptor to characterize the once impromptu, now permanent communities within 150 miles of the U.S.-Mexico border "that may lack some of the most basic living necessities, such as potable water and sewer systems, electricity, paved roads, and safe and sanitary housing" (Texas Secretary of State n.d.). Families that live in these communities are usually described as being either low or very low income, in terms of the federal poverty index. These settlements appeared in the Rio Grande valley region in the early 1950s as Mexican nationals migrated across the border to the fill the many agricultural jobs then in abundance. The Federal Reserve Bank of Dallas (2015) estimates that there are more than 500,000 people residing in 2,294 Texas *colonias*, with the highest concentration of such communities in Maverick, Webb, Hildago, Starr, and Cameron in southwest Texas and El Paso County in extreme west Texas. Virtually all of the *colonia* population living in these settlements are Hispanic (96 percent) (Federal Reserve Bank of Dallas 2015).

Larson's (2002) critique of *colonias* frames them as a logical extension of globalization at the intersection of national borders; they represent the consequences of international capital exchanges manifested as substandard housing and the informal exchange of the same, situated in a Third World-like, nether region (on U.S. soil) between the global north and Latin America. According to Larson (2002, p 140), Texas *colonias* are "extra-legal" rather than illegal expressions of globalization's downside. For older *colonias* in particular, lots were subdivided and sold according to local law, but the absence of regulations overseeing basic infrastructure and social services have come to epitomize these settlements. The informal housing markets that arose in these communities in response to residents' inability to operate in formal economies has aided community members in attaining something like the American dream of homeownership. Self-built dwellings, spotty availability of electrical hookups or potable water notwithstanding, Larson (2002, p 143) argues that because of the exceptional vulnerability that exists in these settlements, the application of regulating policies should be "regularized," or "scale[d] back." Strict standards of code enforcement or housing upkeep, for example, impose expectations



Texas Commission on Environmental Quality, 2013. In: Las Colonias in the 21st Century. Federal Reserve Bank of Texas. https://www.dallasfed.org/assets/documents/cd/pubs/lascolonias.pdf.

and burdens that undermine these particular residents' ability to obtain housing and build community, albeit informally.

Southwest Texas' flat, arid landscape contrasts sharply with eastern Kentucky's rolling hills and lush vegetation; however, in economic terms differences subside. According to data compiled by the Appalachian Regional Commission, the poverty rate for thirteen states included in the Appalachian region was 17.2%, compared to 15.6% for the entire U.S between 2010 and 2014 (Appalachian Regional Commission 2016). The poverty rate for the Appalachian portion of Kentucky (eastern) was highest at 25.4% (Appalachian Regional Commission 2016). While federal programming aimed at alleviating Appalachian poverty have been in place for decades, the pervasive deficiencies characterizing Texas *colonias* are not well-known outside of the state (Quinones et al., 2012). In 2010, the poverty

rate was 42% for a sample of Texas *colonias* residents in Cameron, El Paso, Hildago, Maverick, Starr, and Webb Counties, more than 1.5 times the rate for eastern Kentucky (Federal Reserve Bank of Dallas, 2015).

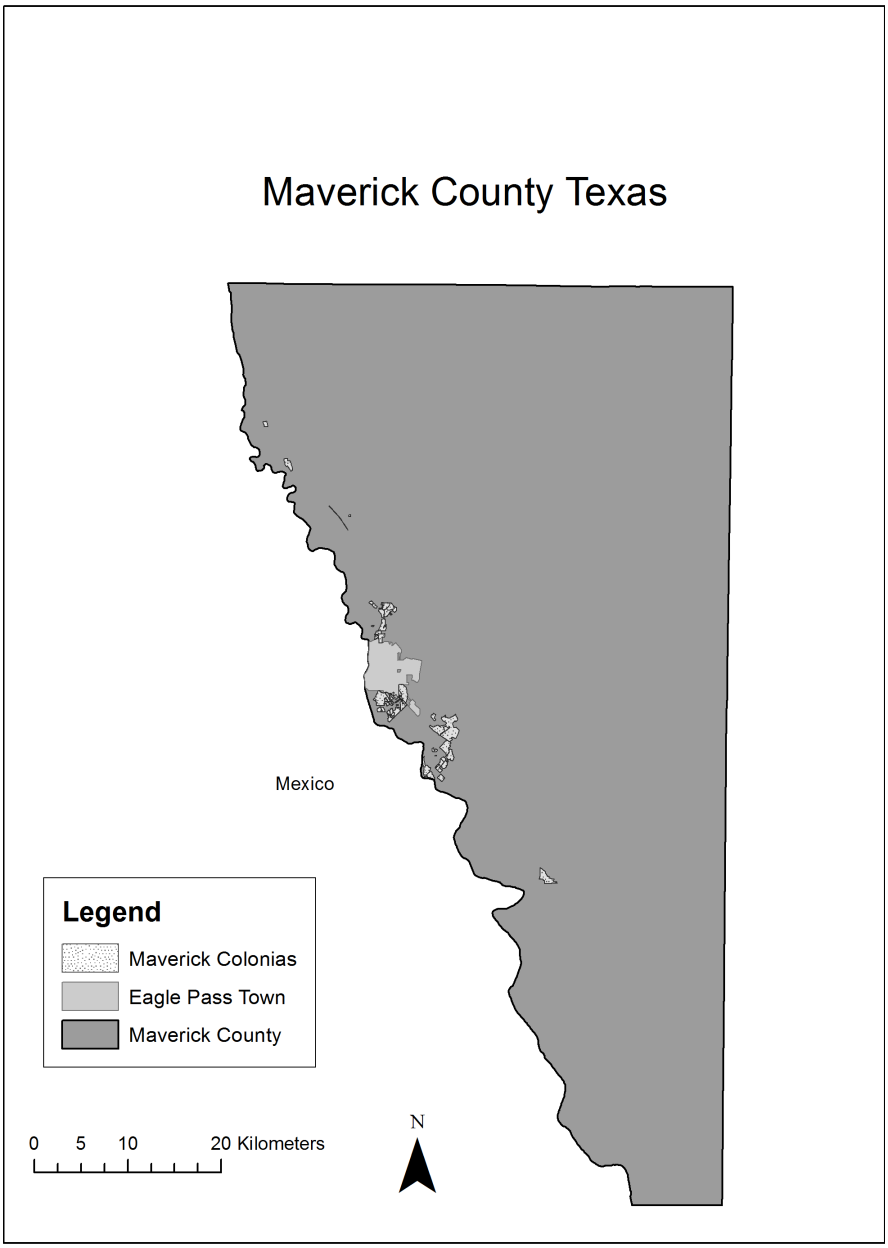
Also, like portions of southeastern Kentucky, poor *colonia* communities exist in the midst of mineral rich lands, which in Texas, contain the raw materials for petroleum-based products. Oil and gas reserves are contained in the Eagle Ford Shale, which covers 26 counties stretching from southwest to east Texas (Johnston et al. 2016), including virtually all of Maverick County.[1] While some landowners in the Eagle Ford Shale have become rich as a result of leasing their lands for drilling, many more have not. Similar to Appalachian residents in coal abundant areas, most *colonia* residents do not own leasing rights to the minerals underneath their lands, which prohibits them from reaping the financial benefits of extraction (Fernandez and Kraus 2014).

And like Deaton's (2005, 2007) observation regarding unclear land titles in Kentucky, concerns have been raised in Texas about the legal mechanisms used in the acquisition of real property in *colonias*. The issue was brought to the fore by the Texas Department of Housing and Community Affairs (TDHCA) in 2011 when that authority commissioned a study to estimate the number of both recorded and unrecorded "contract for deeds" (CFDs) in El Paso, Maverick, Starr, Webb, Hildago, and Cameron Counties (Ward et al. 2012). TDHCA sought to examine the extent to which property was being exchanged in *colonias* via informal means, using contracts, sometimes referred to as a "poor man's mortgage" (Ward et al., 2012, p 1) These agreements are rife with exploitative stipulations such as deed transference only after full payment is received (15 to 30 years), lack of title insurance, purchases with existing liens, and purchase of illegal lots (those which have not been legally subdivided) (Way 2009, p 136–137). In 1995, the Texas legislature enacted regulations to restrict the use of CFDs.

In response to the TDHCA's request, Ward et al. (2011) examined the number of recorded CFDs from 1989 through 2010 in ten Texas counties and found that since 1995, the number of recorded CFDs had declined; but they also discovered that 89 percent of the heads of households interviewed for the study had not created wills. Nearly 80 percent of those 61 or over had not created wills. If the inheritors of property are not designated in a will or other legally recognized means, state laws of intestacy determine property distribution after death. As discussed, this can lead to tenancies in common or heirs' property with all of the associated constraints. Further, the TDHCA study revealed that a considerable percentage of property owners (44 percent) either distributed or planned to convey property to family members via informal means, for example either by simply verbally informing family members of their intentions. This type of transference can present problems because such agreements are not recognized by courts, and disputes may arise among siblings after parents die. Given the lack of formal estate planning in *colonias,* there may also be a disproportionate clustering of heirs' properties in these communities.

STUDY AREA

The study areas for this investigation are Maverick County, TX and Maverick County *colonias* (Figure 4). Maverick



Maverick County Texas

Table 1. Sociodemographic characteristics for Leslie County, Kentucky and Maverick County, Texas Colonias

	Population	Percent colonia population/ county population	Percent Hispanic	Percent below poverty	Median household income	Percent over 25, no diploma	Median age	Percent U.S. citizen
Maverick County	56,584	–	95.2	20.4	$33,747	40.9	29.9	78.6
Maverick *colonias*	[+]23,295	41.2	[+]97.0	[+]37.7	[++]$22,041	[+]53.0	[++]27.7	[+]78.0

Source: U.S. Census Bureau American Community Survey 2011–2015.

[+] *Source*: Federal Reserve Bank of Dallas (2015) *Las Colonias in the 21st Century* website: http://dallasfed.org/microsites/cd/colonias/counties.html

[++] Estimates based on data from 13 Maverick County *colonias* in U.S. Census Bureau American Community Survey 2011–2014. These indicators are not in the Federal Reserve Bank of Dallas report.

County was selected as the study site because it contained *colonia* communities, and heirs' properties indicators were available in the county-level tax database. Table 1 shows key socio-demographic variables for the county and for *colonias*—population, percent Hispanic, percent below poverty, median household income, percent over 25 without a high school diploma, median age, and percent indicating U.S. citizenship (U.S. Census Bureau 2016). The Texas Secretary of State's office lists 74 colonias for Maverick County (Texas Secretary of State n.d.). With the exception of income and age, all of the demographic data for Maverick County *colonias* in Table 1 are from the website *Las Colonias in the 21st Century*; these data are derived from the study and report of the same name conducted by the Federal Reserve Bank of Dallas (2015). We report median household income and median age estimates for thirteen Maverick County *colonias*, also classed as Census Designated Places, from the 2011–2014 American Community Survey (U.S. Census Bureau 2015, 2016). Percent below poverty in the *colonias* is nearly twice the rate for the overall county; median household income in the county is 1.5 times that in colonias; and the percent over the age of 25 without a diploma is also higher in the *colonias*.

The Federal Reserve Bank of Dallas' report notes that persons earning moderate or even middle incomes live in some *colonias*; but the majority of residents in such communities are lower income, and their typically meager dwellings reflect this fact. According to the Federal Reserve Bank of Dallas (2015), there exists no formally recognized system for classifying *colonia* housing conditions. Researchers report conditions ranging from "substandard to well-built;" however, again by definition, *colonias* are typified by compromised housing conditions (Federal Reserve Bank of Dallas, 2015, p 5).

Table 2. Heirs' Property Characteristics: Maverick County Texas and Maverick County Texas Colonias

	Number of county parcels	Number of heirs' parcels	Percent of parcels classed as heirs'	Heirs' (km^2)	Mean heirs' parcel size (ha)	Heirs' market value	Heirs' market value per parcel	Non-heirs' market per value parcel
Maverick County	23,906	183	0.008	130.72	71.43	[+]$26,882,323	$146,897.94	[+]$132,374.05
Maverick County *colonias*	9,113	37	0.004	0.25	0.68	$1,420,545	$38,393.11	[++]$57,570.71

Market value for parcels with values ≥ $200.
[+] n = 22,873
[++] n = 9,009

METHODOLOGY

Heirs' property identification

Our working definition of heirs' property is any real property or attachments to real property wherein the owners have undivided, partial interests. To identify heirs' parcels, we purchased a database of taxed parcels from BIS Consulting in Farmer's Branch, TX, a web applications and GIS services provider. The data were compiled from county-level, tax Central Appraisal Districts (CAD). Database fields included: property identification number, number of acres, property description, land value, property improvement value, market value, property address, and deed date or last sale date.

We classified a property as heirs' if "MULTIPLE OWNERS" was listed in the owner's name column and in the property description column, any of the following appeared—"undivided interest," "undiv. int.," "U.I.," along with some indication of proportional interest, for example "50%," or "1/3." Conversations with CAD offices supported our assumption that these were likely heirs' properties. Shapefiles for Maverick County colonias were obtained from the United States Geological Survey, U.S.-Mexico Border Environmental Health Initiative

(BEHI) website (U.S. Department of Interior 2011). Sixty-nine of the 74 files were available. These communities comprise 20.89 km^2 of the county's 3,346.26 km^2. Heirs' properties for both the county as a whole and for those in *colonias* were analyzed. Importantly, the Maverick County's Chief Tax Appraiser relayed that while heirs' properties in the county are characterized by undivided interests and multiple owners, some are larger landholdings held by families with larger incomes (Personal Communication 2016). This case is more typical for heirs' parcels not located in or near *colonias*.

Maverick County and colonias heirs' parcels

Table 2 shows heirs' property characteristics for the county and *colonias*.

The 2016 property tax assessment database for Maverick County contained 24,948 parcels. Map numbers with identical information were combined, and parcels of less than .10 acre were omitted, resulting in a sample size of 23,906. We identified 183 heirs' property parcels. There are 130.72 km^2 associated with heirs' properties polygons for the entire county, with a mean hectare size of 71.43 (s.d. = 233.53) (Table 2). Total market value for the heirs' parcels in the entire county is roughly $27 million, with a mean parcel market value of $146,898 (s.d. = $40,8201). Market value is land value plus the value of improvements to the land. This figure compares to a mean of $132,374 (s.d. = $450,100) for the county's non-heirs' properties (non-commercial, government) and is consistent with the appraiser's comment that some heirs' properties are larger and of higher value. The inclusion of government-owned properties could also lower the mean parcel price for non-heirs' parcels.

There are 9,113 land parcels with acreage of .10 or greater in *colonias* (Table 2). Thirty-seven (20.21 percent) of the county's heirs' parcels are located in the 69 *colonias* for which we have data (20.89 km^2). These *colonias* represent less than one percent of the county land area (3,346.27 km^2). For the 37 heirs' parcels contained in colonias, the market value sums to $1,430,545, with a mean of $38,393 (s.d. = $96,476); and mean of $57,571 (s.d. = $223,100) for non-heirs' parcels in *colonias* (Table 2).

Hot spot analysis

To assess clustering of heirs' parcels, we conducted hot spot analysis with the Getis-Ord Gi* statistic in ArcMap 3.1.1 (Getis and Ord 1992). The Getis-Ord Gi* statistic is derived from the following equations:

$$G_i^* = \frac{\sum_{j=1}^{n} w_{ij}x_j - \overline{X}\sum_{j=1}^{n} w_{ij}}{S\sqrt{\frac{\left[n\sum_{j=1}^{n} w_{ij}^2 - \left(\sum_{j=1}^{n} w_{ij}\right)^2\right]}{n-1}}}$$

where x_j is the value for feature j and w_{ij} is the spatial weight defining features included in the "neighborhood" (described below) of j_i. n equals the total number of features and

$$\overline{X} = \frac{\sum_{j=1}^{n} x_j}{n}$$

is the mean of all x_i. The simplified version of the standard deviation is shown below:

$$S = \sqrt{\frac{\sum_{j=1}^{n} x_j^2}{n} - \left(\overline{X}\right)^2}$$

The Getis-Ord Gi* statistic is a z-score and indicates areas of autocorrelation for both high and low values of a phenomenon. The pertinent question for hot spot analysis is: what is the probability that the spatial pattern of a given dataset is significantly different from the pattern that would be detected if it were random? Our interest is in the extent of spatial clustering for land parcels classed as heirs'. For purposes of analysis, heirs' parcels were coded 9 and non-heirs' 0. The neighborhood of a given parcel includes contiguous parcels and those that share edges and corners with the referent parcel. In our case, if the Getis-Ord Gi* value for a neighborhood in which a given parcel is located is significantly different from the

value for the larger study area, that individual parcel is classed as a hot or cold spot, respectively, with varying degrees of significance.

Figure 5 shows hot spot clusters in the western part of the county, along the U.S.-Mexico border. Again, this is where most of the *colonias* are located and the county seat of Eagle Pass. The very dark color indicates that most of these associations are significant at $p = 0.001$. Twenty percent of the counties heirs' parcels are located in *colonias* (37/183).

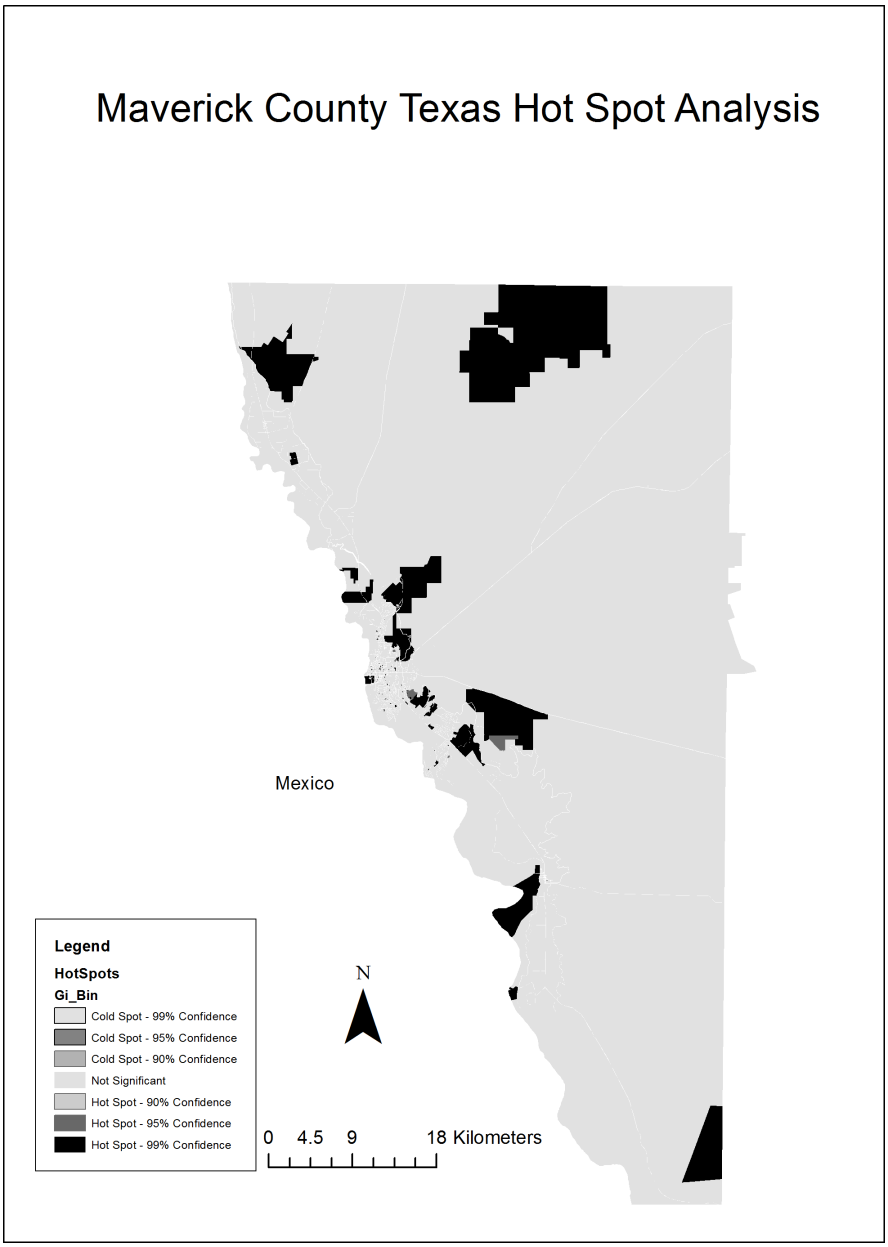
With respect to correlations between heirs' parcels and other vulnerability indicators, we also found that 101 (55.19 percent) heirs' parcels were within 2 km (1.24 miles) of *colonias*. Although just 20 percent of the county's heirs' parcels are within *colonias,* more than one-half of such properties are proximal to *colonias.* The average size of heirs' parcels within 2 km of *colonias* was 11.42 ha, which is considerably smaller than the average per parcel size of heirs' parcels in the larger county (71.43 ha).

In a telephone conversation between the first author and a Central Appraisal District official in neighboring Zavala County, the official commented that communities adjacent to colonias in west Texas often identify culturally and socioeconomically with colonia residents. This comment suggests the 55.19% of Maverick County heirs' property owners who live within 2km of colonias share lifestyle characteristics with colonias residents. To the extent that this is the case in Maverick County, it could be argued that both positive and negative aspects of colonia existence extend beyond colonia borders, in some cases perhaps amplifying deprivations of place.

To further look at such associations, we used the Pearson Product Moment correlation to examine associations between heirs' parcels/km^2 and proportion of population 18–64 in poverty, median household income, proportion over 25 without high school diploma, and proportion of manufactured housing, respectively. Results indicated a positive association between number of heirs' parcels and manufactured housing at the census block group (CBG) level ($r = 0.48$, $p = 0.009$, $n = 29$); this association was not found when heirs' parcels and manufactured homes were standardized by land area, (i.e., heirs' properties/km^2 and manufactured housing/km^2); however, the number of heirs' parcels/km^2 was negatively associated with median household income at the CBG level ($r = –0.37$, $p = 0.050$, $n = 29$).

DISCUSSION

This analysis advances heirs' property scholarship by focusing on counties and places with socially vulnerable populations outside of the Black Belt South. Also, by examining the spatiality of such properties, we provide an indication of how these properties aggregate in space, which is useful for understanding how poverty in its various forms tends to aggregate. The fact that over one-half of Maverick County's heirs' properties are within 2 km of *colonias* suggests that these properties are more likely to be co-located with other measures of social vulnerability, like poor housing conditions and poor infrastructure—all of which characterize most *colonias*. In terms of socio-demographics, distinctions between *colonias* and other Maverick County communities are difficult to make because of the general state of vulnerability that



Maverick County Hot Spots

exists in the county, regardless of where residents live. These vulnerabilities extend beyond measurable social factors and include political corruption which only exacerbate the extreme impoverishment faced by many (Buch 2012, 2015, 2016).

As indicated, one of the objectives of this research was to empirically examine Deaton's (2005, 2007) call to look at the relationship between heirs' property and measures of poverty, or more broadly, social vulnerability. Such investigations are necessary for advancing heirs' property scholarship from a place of mostly hypothesized or theoretical relationships to the empirical realm, where the actual mechanisms of how heirs' status may or may not impinge on human well-being can be better clarified.

For instance, these connections could improve vulnerability assessments. The broad notion of "vulnerability" is conceptualized as a coupled, human-natural phenomenon that is a function of the *exposure* of both humans and the places humans inhabit to perturbations or stressors; it also involves the inherent *sensitivity* of that coupled system, given exposure (with sensitivity indicated by socio-demographic markers like race/ethnicity, education, poverty, income), and *resilience* or the ability of that system to function despite exposure levels and sensitivities (Turner et al. 2003). If there are positive associations between aggregate-level sensitivity indicators like minority status, poverty, etc., and heirs' property, these connections would allow for a better understanding of the sensitivity component of vulnerability, or more precisely *what it is* about minority status or low education levels, for instance, that make certain places more susceptible to environmental or economic disturbances. Race or income, per se, only partly explain vulnerability. People's ability to first of all accumulate wealth via investments in real property and then their ability, or inability as the case may be, to exercise that wealth is more illuminating for understanding perpetual poverty or vulnerability.

Again, in the present case, examining associations between *colonia* communities and heirs' property helps to explain why poverty may be perpetuated in *colonias* and adjacent communities. If many of the properties in *colonias* and *colonia*-adjacent communities are classed as heirs', it is much less likely that these assets could be used as economic leverages to build wealth for individual families or for those sub-sections of Maverick County where these properties are clustered. Again, this is the economic inefficiency problem identified by Deaton (2005, 2007), Heller (1998), and others.

While the position taken in this paper is that heirs' property contribute to the perpetuation of poverty (or vulnerability), the assertion is not made that heirs' property ownership is the sole reason for vulnerability. As the Maverick County data show, larger heirs' properties in the county are sometimes less likely to be adjacent to socially vulnerable populations; whether this represents an exception unique to Maverick County or can also be found in other instances is a matter of empirical inquiry. No other research to date suggests this may be the case.

With respect to our estimates of heirs' property extent and research conducted in other regions of the South, a forthcoming report by Pippin et al. proposes a geospatially-based approach that identifies "potential" heirs' properties. This method

is based on land parcel characteristics such as length of time since the property was last sold, whether improvements have been made to the property, whether owner's address is different from land parcel address, appraised market value of property, presence of structures on land, among others, to identify heirs' parcels. The Pippin et al. method builds on a case study of Macon County, AL by Dyer et al. (2009) and adapted by Georgia Appleseed Center for Law and Justice (2013).

Between 12% and 25% of parcels in the social vulnerability counties targeted by Georgia Appleseed Center for Law and Justice (2013) were estimated to be heirs'; and between 11% and 19% of parcels in the non-social vulnerability counties included in their study were potential heirs' parcels. These estimates are much larger than what was found for Maverick County in the present study. But again, the method used to identify heir's parcels was more broadly defined than the tact taken in this paper and could certainly include actual heirs' parcels but also those that are incorrectly identified as being heirs'. The method of identifying heirs' parcels used in the present paper is similar to the approach taken by Dyer et al. (2009), which relied on annotations from the tax rolls. In Macon County, the tax assessor listed the terms "heirs of" or "both dec'd" to indicate heirs' status. Similarly, this paper uses the notation "MULTIPLE OWNERS" to indicate heirs' status. All such properties are assumed to be actual rather than potential heirs' parcels based on the definition of these properties by the Maverick County tax assessor. Still, Dyer et al. (2009) estimated 9.6% of county parcels to be heirs', which is roughly ten times the estimate for Maverick County (Table 2). The relatively low percentage identified in Maverick County could relate to the under-reporting of multiple owner status by local tax authorities.

Also, we expected to find more heirs' properties in *colonias*. A reason for the relatively small proportion found may be due to the history of CFDs and the fact that these kinds of deeds are less likely to be recorded. This analysis also highlighted the importance of distinguishing heirs' properties located both in *colonias* and those elsewhere in the county. Most of the heirs' parcels not located near *colonias* were of much higher value and size. Eleven heirs' parcels with market values exceeding $500,000 were identified. Only two of these were within 2km of *colonias*. The rest were either in unincorporated areas in the extreme northern or southern part of the county. Limitations of the data prevented a more in-depth analyses of these parcels. There is no indication whether these were commercial or residential holdings. The finding that these larger heirs' properties are less likely to be linked to social vulnerabilities in Maverick County aids greatly in our understanding of the various guises heirs' properties can assume and points to the need for consultations with local officials in any attempt to analyze heirs' property holdings at the local level.

An extension of this study would examine subsurface mineral deposits and their intersection with heirs' property, specifically how the historical acquisition and transfer of land titles may have excluded small landowners' rights to oil and gas in the *colonias*-- similar to the decades of disenfranchisement experienced by landowning families in Appalachia. As well, the environmental justice implications of intensive resource removal could be explored.

NOTES

1. A shale is a type of fine-grained sedimentary rock formed from compacted silt and mineral particles (i.e., mud). Black shales contain materials that when decomposed, produce natural gas and oil; these shales are the source rock for oil and natural gas deposits. Oil and gas are typically extracted with "fracking" techniques, horizontal drilling and hydrologic injections, that break apart underground shales to discharge raw materials.

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