Tennessee Economic Development Zone ESAs:

Implementation Considerations & Methods

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EXECUTIVE SUMMARY

THE PROBLEM

Most students are assigned to public school based on where they live. As a consequence, financially secure families tend to cluster in areas with good public schools. Poor families are concentrated in areas with weak schools. This geographic sorting actually reinforces differences in the quality of public schools across neighborhoods. Areas with bad schools also suffer from joblessness, low incomes, low economic activity, low housing values, high crime rates, a prevalence of food deserts and other negative neighborhood characteristics. In the long run, children who grow up in concentrated poverty suffer worse life outcomes than children who grow up in financially secure neighborhoods.

A HOUSING MODEL TO LEARN FROM

Policy makers have long recognized the link between school quality and neighborhood quality, and changes in housing policy have been enacted to reduce the negative impacts on children growing up in concentrated poverty. For example, in the Gautreaux Housing Program, the Chicago Housing Authority distributed Section 8 housing vouchers to African Americans in public housing. Families were randomly assigned to either move to suburban neighborhoods with better public schools or remain in urban neighborhoods. Ultimately, families assigned to the places with better schools experienced better life outcomes, and the program became a national model.

SCHOOL CHOICE IN POOR NEIGHBORHOODS, AN ANSWER

While housing policy can be used to move some poor families into wealthy neighborhoods, this policy is expensive. In contrast, enticing financially secure families to remain in low-income neighborhoods offers a fiscally positive path toward creating diverse and economically-integrated neighborhoods. Offering a private-school choice program in low income neighborhoods would reduce the incentives for financially secure families to leave the community, and it would attract families currently outside the neighborhood. Businesses seeking to sell goods and services to the revitalizing community would follow - bringing private investment dollars and creating jobs for local residents. Positive neighborhood-effects of school choice programs are now well-documented in academic studies, but until now, no school choice program has been designed specifically to promote economic development and reduce concentrated poverty.

It is also worth noting that academic studies conclude that private school choice will produce benefits beyond job creation and classroom improvement - including increased social cohesion, reduced neighborhood disorder, and reduction in crime. The core idea behind Economic Development Zone ESAs is a simple one; target distressed communities with the broadest and most flexible school choice tool available, and the result will be improved communities, as well as improved education outcomes.

STRUCTURING THE PROGRAM

When structuring an ESA program, it is critical to note that economically secure families will only be retained in low-income areas **if they are included in the program.** Many school choice programs have been designed to include only poor families. These programs help poor families

access better schools, but they do not support economic development efforts in poor neighborhoods because financially secure families, who are excluded, will not remain in those areas. ***School choice programs that direct benefits exclusively to the poor will continue to yield concentration of the poor.*** For this reason, we suggest a geographically-based policy rather than one determined by individual family income level.

Although there are several ways policymakers could identify neighborhoods as "economic development zones," this report recommends and analyzes the state of Tennessee based on ZIP codes. ZIP code designations are easily understood by families, and ZIP codes cover geographic areas that are large enough that they can support the development of new private schools, even where none exist currently. Once a school choice program has been created in a legal sense, de facto choice requires that there be schools to choose from.

Generally speaking, our recommendation is to include as Economic Development Zones all ZIP codes with median family income less than the statewide or MSA median (whichever is greater). "Distressed Counties", as designated by the Department of Economic and Community Development (See Appendix B in digital version at effective-ed.org/economic-development-zones/tn) should also be designated as Economic Development Zones.

We also recommend that implementation of the new Economic Development Zones be designed to take advantage of the economic development benefits offered in "Opportunity Zones," which were created as part of the Tax Cuts and Jobs Act of 2017. Specifically, when state funding is inadequate to fund all ESA applicants, students living in ZIP codes that contain a federal Opportunity Zone should be given priority. Doing so will help attract more investment dollars into the Opportunity Zones.

A ROLE FOR GOOD HOUSING POLICY

One concern that the proposed policy will spark can be summarized by the question: "Won't poor families be priced out of their own neighborhoods?" This question is valid, and it should actually be welcomed since it stems from the questioner's acknowledgement that the policy will have a strong economic impact on low-income neighborhoods. In fact, there is a straightforward response to this question.

We need to distinguish between good ***education policy*** and good ***housing policy.*** Good education policy cannot seek to keep high-quality quality schools out of poor neighborhoods just to keep rents low. ***Education policy*** should strive to give every neighborhood the best schools possible. Instead, cities will need to turn to ***housing policy solutions*** to ensure equity in transforming neighborhoods. Fortunately, HUD has designed multiple programs for just this purpose. Once Economic Development Zones have been identified, housing policy specialists will know where change is coming, and they can plan accordingly.

CONCLUSION

Economic Development Zone ESAs have the potential to transform communities in ways that previous school choice programs have only hinted at. Once voters understand all of the benefits that this program brings to a neighborhood, every community will demand them.

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INTRODUCTION

The purpose of this report is to explore how Tennessee can use geographically-targeted Education Savings Accounts (ESAs) to reduce concentrated poverty, create jobs, and promote revitalization in designated Economic Development Zones (ED Zones). Before we examine the details of how this program could be structured, this report will first present the nature of the problem at hand.

THE PROBLEM:

In Tennessee, students are typically assigned to a public school based on where they live. Over time, using residence as a primary factor in school assignment causes families to consider expected assignments when selecting a home. In short, school assignments based on where students live eventually change where they live, leading to geographic sorting (or "voting with your feet"). This phenomenon causes school quality, family income, economic activity, housing values, and local crime rates to be jointly determined.

Since economically secure families often leave areas with bad schools, these areas tend to suffer from low incomes, low economic activity, low housing values, high crime rates, and a prevalence of food deserts. Children who grow up in concentrated poverty are directly impacted by these problems, but they also experience long-term consequences - lower IQs, adult joblessness, lower earning potential in future careers, long-term health effects, and the list goes on and on.

Many people observe these problems and incorrectly attribute the plight of poor school districts to bad school district leadership. Bad current leadership is not the primary cause of the problems in very poor communities. If leadership was the issue, some poor districts would have already solved it. Further, it is not reasonable to believe all poor districts have poor leadership. Instead, the plight of school districts and the areas of deep poverty that they exist in is a natural equilibrium (a systemic condition) that results when school assignments are based on residence.

HOUSING POLICY MODELS

Recognizing the link between school quality and neighborhood quality, it is easy to find places where housing authorities' interest in education has influenced policy. A good example can be seen in the Gautreaux Housing Program. As part of a racial discrimination lawsuit settlement, the Chicago Housing Authority distributed Section 8 housing vouchers to African Americans in Chicago public housing. Some families were randomly assigned to suburban neighborhoods while others remained in poor urban neighborhoods. Ultimately, families assigned to the suburbs of Chicago experienced significantly better life outcomes. The program's success helped launch a national model referred to as the "Moving to Opportunity" (MTO) experimental program that used housing vouchers to relocate children out of poor areas and into wealthier ones. Research on MTO also confirms life-long positive effects on children and families in the program.[1]

Recently, the US Department of Housing and Urban Development (HUD) issued a new regulation designed in a similar way, moving low-income urban children and families into suburban areas with higher concentrations of wealthier neighbors. However, a full implementation of this new regulation seems both economically and socially challenging. There are 18 million children living in census tracts where the poverty rate is greater than 20%. Moving and housing these children and families in wealthier areas would take an enormous investment. Moreover, history suggests that wealthy neighborhoods will use strategies such as zoning to try to block such

[1] Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz. "The effects of exposure to better neighborhoods on children: New evidence from the Moving to Opportunity experiment." *The American Economic* Review 106.4 (2016): 855-902.

efforts.[2]

But both the Gautreaux Housing Program and the MTO program promoted and tested a key policy idea. Although it is costly to relocate poor families into high-income areas, poor families have better life outcomes when they live in economically integrated communities.

A BETTER ANSWER - Economic Development ESAs

While federal housing policy seeks to move poor families into wealthy neighborhoods, a properly structured private school choice program would retain wealthier families in poorer neighborhoods and accomplish the same goal, economically integrated communities. By addressing a core community need with private school choice, policymakers would be positively impacting the children who receive these ESAs while also promoting the revitalization of struggling communities. Not only could policymakers accomplish the same goal and benefit all community members, but also the cost of this program would be far lower than the cost of relocating poor people into high-income neighborhoods. Moving poor families into wealthy neighborhoods is costly, and the cost falls on taxpayers. ESAs funded at the cost of sending a child to public schools will be fiscally neutral, and ESAs funded at less than the cost of sending a child to public schools will actually save the state money. Since home values are lower in low-income areas, families who choose to remain in (or move to) a low-income neighborhood will save money also.

As for the rationale of targeting low-income communities, both theoretical and empirical evidence demonstrates that school choice programs increase economic activity, as measured by property values. The results are quite generalizable, having been found in studies that cover urban,[3] suburban[4] and rural areas.[5] Likewise, research shows that private school choice programs can have other community benefits beyond economic activity - including social cohesion, reduced perceived neighborhood disorder, and reduction in crime.[6] However, until now, no school choice programs in the US have been specifically designed to alleviate concentrated poverty and boost economic activity.

However, the idea that school choice can be used to create jobs and improve neighborhoods is gaining traction. In 2017, the American Enterprise Institute published a policy piece titled "CPR Scholarships, Using Private School Choice to Attack Concentrated Poverty, Crime and Unemployment." The author (Dr. Danielsen) proposed developing a private school choice program designed to improve low-income communities. The acronym "CPR" was shorthand for "Community Protection, and Revitalization," but the paper explicitly considers the use of Education Savings Accounts as an economic development driver.

In 2018, the American Legislative Exchange Council (ALEC) published model legislation titled "The Economic Development Zone ESA ACT"[7] to implement the economic development strategy. This model legislation replaced "CPR Scholarships" with "Economic Development ESAs" to emphasize the proposed program's positive impacts on targeted distressed areas.

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[2] Elahe Izadi, "George Lucas wants to build affordable housing on his land because 'we've got enough millionaires'," The Washington Post, April 17, 2015. https://www.washingtonpost.com/news/morning-mix/wp/2015/04/17/george-lucas-wants-to-build-affordable-housing-on-his-land-because-weve-got-enough-millionaires/?utm_term=.fda02b79985d

[3] Fack, G. and J. Grenet. When Do Better Schools Raise Housing Prices? Evidence from Paris Public and Private Schools. *Journal of Public Economics*, 2010, 94:1-2, 59-77.

[4] Merrifield, J.D., K. King-Adzima, T. Nesbit, and H. Gunasekara. The Property Value Effects of Universal Tuition Vouchers. *Journal of Housing Research*, 2011, 20:2, 225-38.

[5] Cannon, S.E., B.R. Danielsen, and D.M. Harrison. School Vouchers and Home Prices: Premiums in School Districts Lacking Public Schools. *Journal of Housing Research*, 2015, 24:1, 1-20.

[6] Margaret R. Brinig and Nicloe Stelle Garnett, *Lost Classroom, Lost Community*, (Chicago: The University of Chicago Press, 2014).pp. 57-89.

[7] https://www.alec.org/model-policy/the-economic-development-zone-esa-act/

The core idea behind the Economic Development Zone ESA Act is a simple one; target distressed communities with the broadest and most flexible school choice tool available (ESAs), so that economically secure families are willing to live near poor people, thereby reducing concentrated poverty.

KEY PROGRAM ELEMENTS

In the next section of this report, we will discuss various methods that can be used to define "Economic Development Zones." However, regardless of how these zones are designated, it is critical that the program be designed in a manner that will ensure its success.

Families should not be "means-tested" for eligibility.

An important shortcoming of many choice programs arises when the program is "means tested." Means testing targets a program only toward poor families. This might seem reasonable at first blush, but remember that the goal of this program is to create economically blended neighborhoods. No economically secure family will be retained in (or attracted to) a low-income neighborhood by a program that they are not allowed to participate in. Therefore, a program that only includes poor families will lack key economic development qualities while keeping poor families isolated in struggling neighborhoods.

Before restricting any group from participation in an ED Zone ESA, policymakers should first ask, "Who do we want to repel from these poor neighborhoods? Doctors? Executives? Business owners?" If the goal is economically blended communities, places of concentrated poverty need these economically-secure people. Therefore, policymakers need to allow these less obvious candidates to participate in school choice programs.

Milwaukee's Parental Choice (voucher) Program is a means-tested program that should serve as a cautionary tale. While this program has funded tens-of-thousands of private school students in the city, the middle class still leaves the city when their children reach school age because the program excludes them.[8]

Prior-attendance requirements

Many school choice programs have provisions that require applicants to be enrolled in a public school at the time they apply for the choice program. Prior-attendance requirements are designed to keep families out of the program if they are already attending a private school.

But consider the dilemma faced by a family considering a move to Shelby County. If the children in the family previously attended a private school, they would not be willing to move into Memphis because their choices would look like this: 1) live in a less desirable neighborhood while attending private school and forfeiting their right to an ESA for future years, or 2) enroll in Memphis public schools which will look very unattractive to a private school family, or 3) move to the suburbs instead. Notice that the prior-attendance policy undermines the policy objective to bring this family into a Memphis neighborhood.

When assigned public schools are driving families out of neighborhoods, choice programs with prior-attendance requirements won't be very useful in solving these neighborhoods' problems.

Lottery enrollments

Another shortcoming of some parental-choice programs arises when lotteries are used to determine program participation. Programs implement lottery systems when enrollment demand is anticipated to exceed the level of available funding. Again, consider a family that can afford outside options but who might be willing to remain in or move into a home in a poor neighborhood, under the right circumstances. The family will not want to move to a

[8] See Figure 3, page 6 of Danielsen, Bartley R. "CPR Scholarships: Using Private School Choice to Attack Concentrated Poverty, Crime, and Unemployment." *American Enterprise Institute* (2017). http://www.aei.org/wp-content/uploads/2017/03/CPR-Scholarships.pdf

neighborhood where they are promised only a chance to enroll in a lottery for an adequate school, but where losing the lottery consigns their child to a substandard school assignment. Why risk losing the lottery? The family will then be stuck with the outcome that they wished to avoid. With lotteries, a family can only avoid this risk by avoiding the unattractive assigned-school district entirely.

While these policies (means testing and lottery enrollments) are designed, well-intentionally, to target benefits to the poor while excluding wealthier families who can exercise other options, **school choice programs that direct benefits *exclusively* to the poor will continue to yield *concentration* of the poor** because they do not address the reality that economically secure families will continue to vote with their feet.

Unlike most current school choice programs, Economic Development ESAs would be intentionally designed to avoid family flight from poor areas because research clearly shows poor people are better off when they are not isolated by policies that exclude or drive out non-poor families. More affluent neighbors bring jobs and social stability that benefit entire neighborhoods. Inclusive school choice programs that allow access by wealthier families not only yield neighborhoods that are less poor and more diverse, but also poor families gain more from these programs as they are both directly and indirectly impacted by the outcomes.

Still, the reality is that transitioning into a program that allows students to attend private schools could have short-term transition costs that might strain the state's budget if there are too many applicants in the early years of the program. In this case, three alternatives to a lottery system should be considered.

1. Grant the ESAs on a first-come-first serve basis. In subsequent years, give priority to families who are already in the program, and then to families who apply for the program in the order of application. Train the real estate agent community, and they will probably bring plenty of applicants.
2. Prorate the ESAs so that all applicants get a reduced percentage of the budgeted amount.
3. Prioritize the ED Zones so that students in some zones are funded before other zones get funding. For example, perhaps after funding prior year recipients, students in the poorest neighborhoods receive funding before less-poor neighborhoods are funded. Ideally, all higher-priority neighborhoods would have ESAs fully funded before a lottery is required to allocate the remaining funds in the last neighborhood to receive funding.

The important thing to keep in mind is that just as Amazon has negotiated the terms of their HQ2 location before they decide where to invest, families are unlikely to remain in or move to an ED Zone unless the terms of the deal are known and in writing.

ALTERNATIVE METHODS FOR DESIGNATING ECONOMIC DEVELOPMENT ZONES

Having discussed the important elements to consider for an Economic Development ESA to be effective, this report will move to explaining potential methodologies for selecting the low-income communities eligible for ESAs. There are at least six methods that might be considered for defining distressed geographic areas eligible as ED Zones:

- Census tracts
- Opportunity Zones (special census tracts)
- Zip codes
- Cities and/or counties
- Zones designated by the Tennessee Department of Economic and Community Development (or a similar agency), providing statutory guidelines for implementing the selection process.
- Zones self-designated by local jurisdictions (city councils or county commissions)

Each of these methods has positive and negative attributes to consider. The following section describes and explains these attributes for each of the above potential methodologies:

CENSUS TRACTS

A census tract is a geographic region defined by the United States Census Bureau. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. In the state of Tennessee, there are 1,497 census tracts. Sometimes, census tract boundaries coincide with the limits of cities, towns or other administrative areas. But several tracts commonly exist within a city or county. In rural areas without clear political boundaries to guide the Bureau's tract-drawing process, census boundaries are often arbitrary. However, individual census tracts are always contained within a single county. In other words, each tract is in one county, but each county can contain many tracts.

One attractive feature of census tracts, for purposes of creating a new economic development program like this one, is the federal government already uses these tracts for designating low-income communities (called LICs) in various federal anti-poverty programs.

Both the New Markets Tax Credit (NMTC) and the Community Reinvestment Act (CRA) target program benefits to census tracts that qualify as LICs. For example, the NMTC, established to spur revitalization efforts of low-income and impoverished communities, provides tax credit incentives to investors for equity investments in census tracts where

- the poverty rate exceeds 20% in the most recent census, or
- the median family income in the district is less than 80% of the statewide or metro area median, whichever is greater

Unpacking this, there are three important elements interacting here:

1. Census tracts define the geographies considered for eligibility.
2. Individual tracts are eligible as LICs based on Census Bureau poverty metrics.
3. There are two alternative metrics that can serve to qualify a tract
    - A high poverty rate, or
    - Low-median family income

In addition to the fact that census tracts are already used for pre-existing economic development programs, a second attractive feature of tracts is each tract's containment in a single county. To the extent that county-level cooperation is needed in implementing or supervising ESAs, this containment may prove to be a helpful feature as inter-county coordination (if required) could be complicated.

Shelby County Census Tracts

However, there are two negative attributes of census tracts to consider before selecting this method for defining ED Zones. To begin with, average citizens do not typically know what tract they live in. They do not even typically understand what a census tract is. Educating parents, or even legislators, on this concept will take time and money. Second, because tracts are small geographies with small populations, using tracts for selecting eligible low-income communities can create eligibility areas that might make it hard to attract new private schools to the area. To demonstrate this, let's look at a map of census tracts in Shelby County that are eligible for the New Markets Tax Credit.

First, notice the very large number of tracts in Shelby County. Second, notice that tract 211.12, to the east of Memphis, is surrounded by tracts that are not eligible. Similarly, tract 220.24 is not eligible for the NMTC, but every tract around it is eligible. This concept is likely to confuse families in and around these tracts.

We should note that, in one regard, the Shelby County tract map is not representative of most other counties. Because poverty is so concentrated in Shelby County, the low-income tracts in Shelby are very tightly grouped. Large swaths of contiguous tracts in Memphis have high poverty levels. Many counties have more dispersed low-income tracts.

OPPORTUNITY ZONES (special census tracts)

Opportunity Zones are a community development program enacted by the Tax Cuts and Jobs Act of 2017. The program encourages long-term investments in certain low-income census tracts nationwide. The program provides tax incentives for investors to invest in census tracts that have been designated as Opportunity Zones by the governor of each state. Investment funds

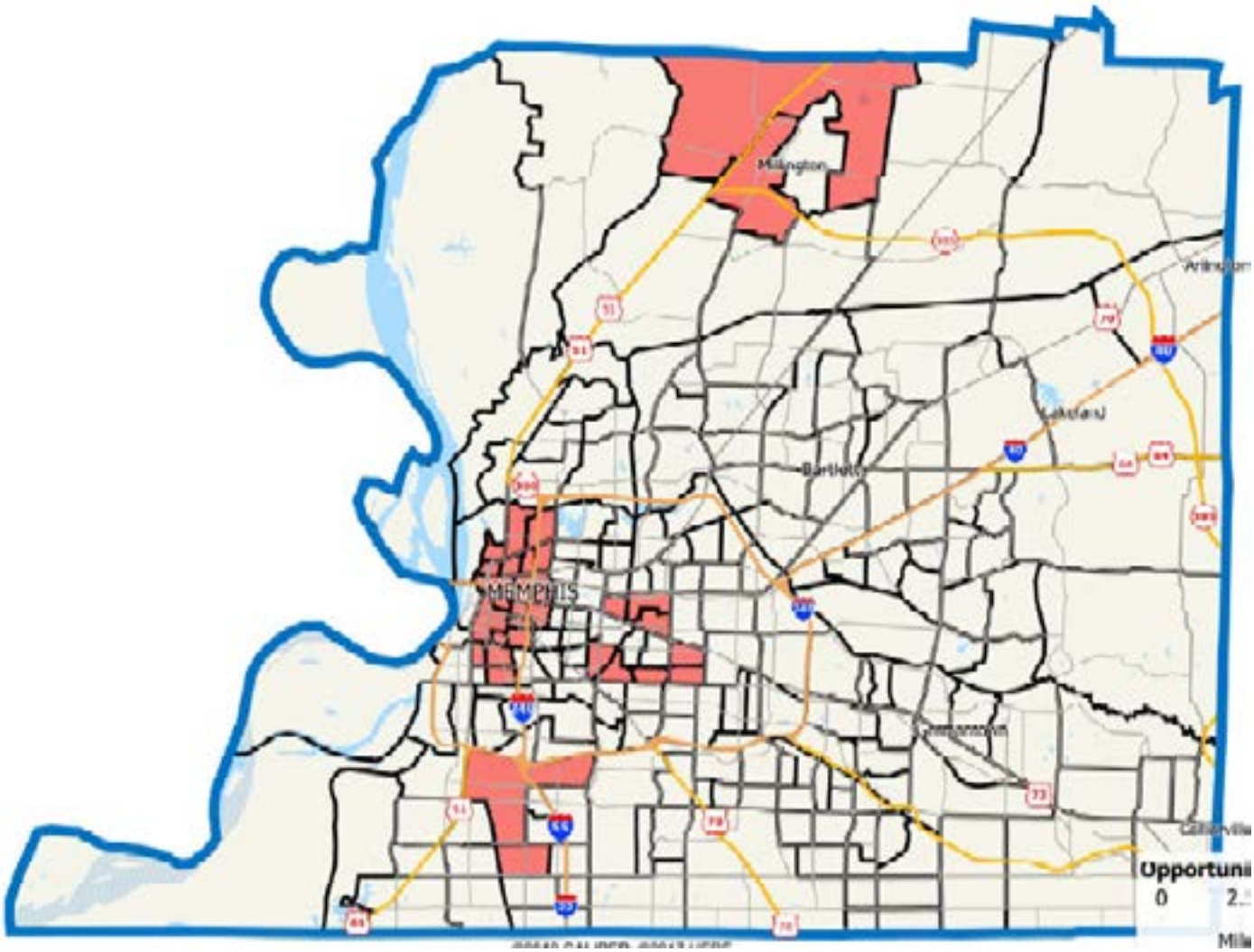
are raising billions of dollars to invest in these census tracts. Tennessee has designated 176 low-income census tracts across the state as Opportunity Zones. Shelby County contains 18 qualifying tracts. See the following map.

Obviously, the fact that Opportunity Zones have already been identified as areas in need of additional development makes them highly attractive as target areas for ED Zone ESAs. The ESAs would make these areas attractive places for families to live, and the Opportunity Zone designation will help to attract capital to the same areas.

On the negative side - because Opportunity Zones are census tracts, all the negative attributes of using census tracts as ED Zones are also applicable to Opportunity Zones. Moreover, for political expediency, governors have designated qualifying tracts that are scattered across their entire state. As a result, 75 of 95 counties in Tennessee have an Opportunity Zone, but 64 of these counties have only 1 or 2 qualifying tracts. Given that census tracts average about 4000 residents, very few students would qualify for ESAs in most counties if Opportunity Zones are used as the ESA qualification areas.

Nevertheless, the appeal of tying ED Zones to Opportunity Zones is compelling. Thus efforts should be made to find a way to incorporate Opportunity Zones into the designation of ED Zones.

Shelby County Opportunity Zones



FIVE-DIGIT ZIP CODES

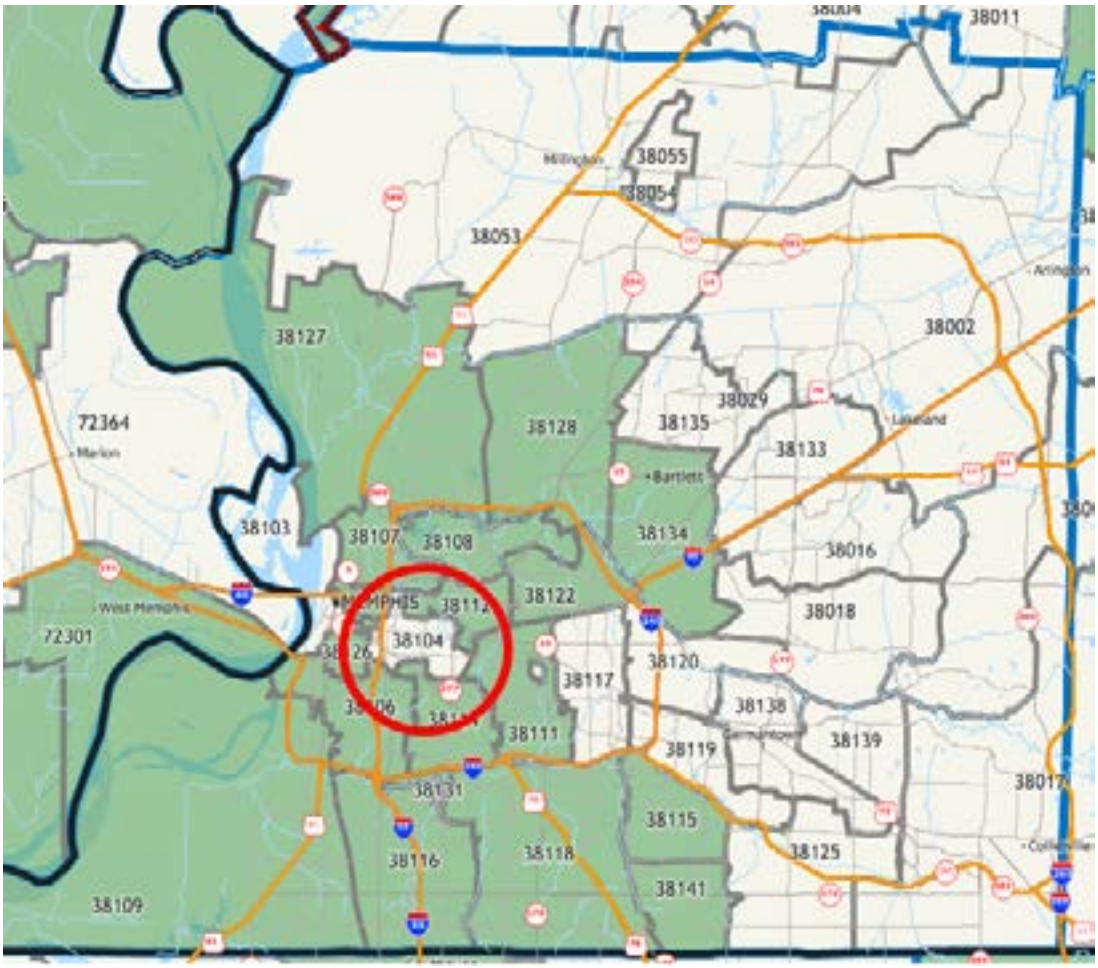
A ZIP Code is a postal code used by the United States Postal Service. On average, ZIP codes have about twice as many residents as census tracts. However, some ZIP codes have very large populations. ZIP code 37013 in Antioch, TN has almost 80,000 residents.[9]

ZIP codes have several features that would be attractive for using them to define ED Zones. Perhaps most importantly, people generally know which zip code they live in. If parents are told that children who live in ZIP code 38115 are entitled to an ESA, they will know whether the program includes their children.

A second attractive feature of ZIP codes, relative to census tracts, is that zip codes are usually larger geographically. See, for example, the following **Shelby County ZIP Codes** map and compare it to the census tract map that preceded this one. This map shows ZIP codes with median family incomes that are less than the median family income of the Memphis metro area as a whole.

The ZIP code areas, which are larger than tracts, produce fewer "islands" of eligibility or ineligibility, although some still exists. Notice that ZIP code 38104 (circled) has a Median Family Income that is greater than the Memphis metro areas overall median, but it is surrounded by ZIP codes that have median values that are significantly lower than the metro median. Nevertheless, the larger eligibility areas will make it easier for new private schools to find enough students to open in the low-income Zip codes.

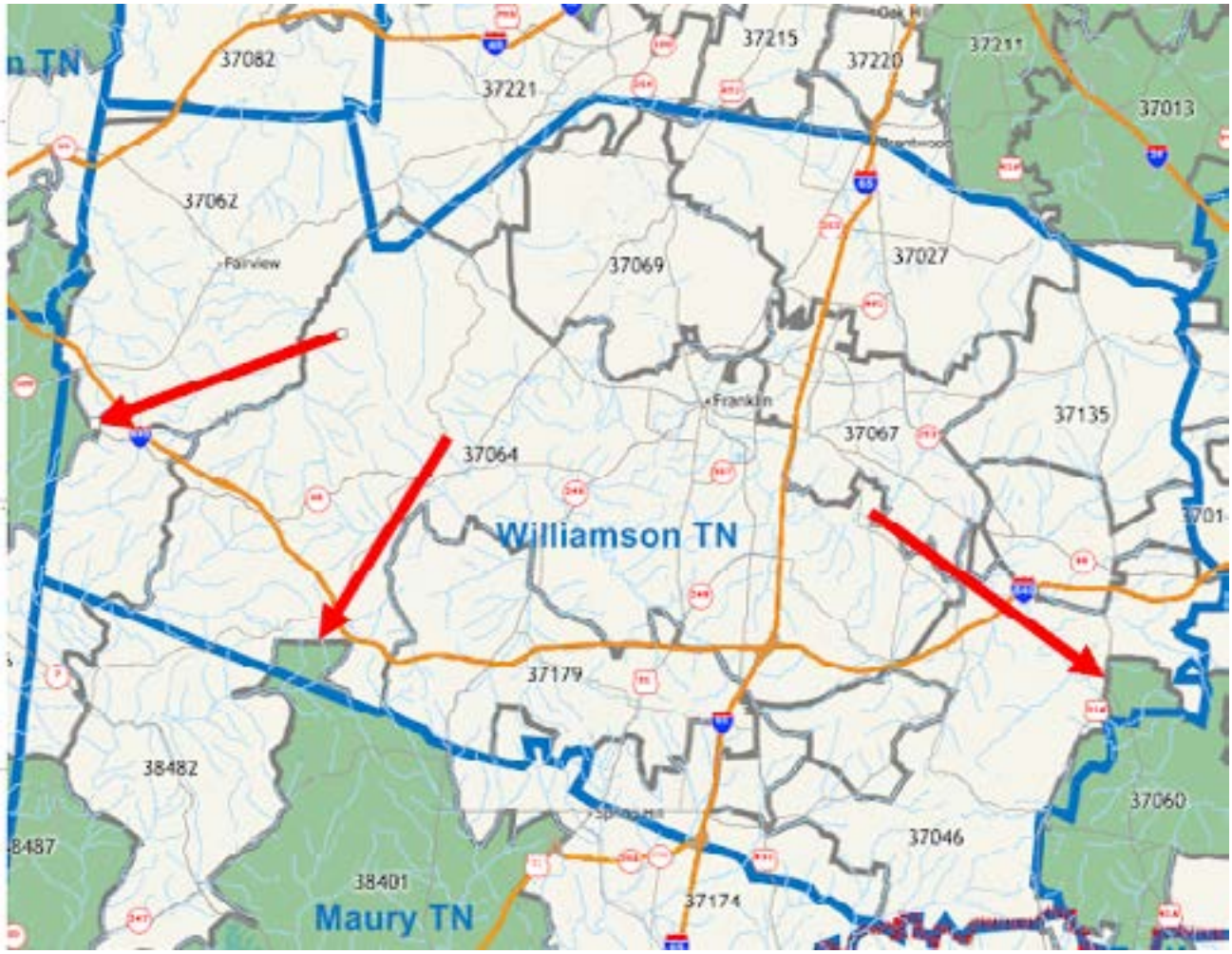
Shelby County ZIP Codes



[9] http://localistica.com/usa/zipcodes/most-populated-zipcodes/

There are at least two characteristics of ZIP codes that might make them unattractive in defining ED Zones. First, ZIP codes are not generally used for other geographically targeted anti-poverty programs. Second, ZIP codes can often overlap city and county lines. Notice that ZIP code 38017 in the lower right corner of the ZIP-code map is partially in Shelby County, and partially in Fayette County. This might lead to some unusual outcomes within counties. See, for example, the following **Williamson County ZIP Codes** map. Williamson is a relatively wealthy county, and most of the ZIP codes have high median family income, but three ZIP codes from other counties extend slightly into Williamson. Using ZIP codes to define ED Zones could allow Williamson residents in these small areas to access ESAs, while most of the county could not.[10]

Williamson County ZIP Codes

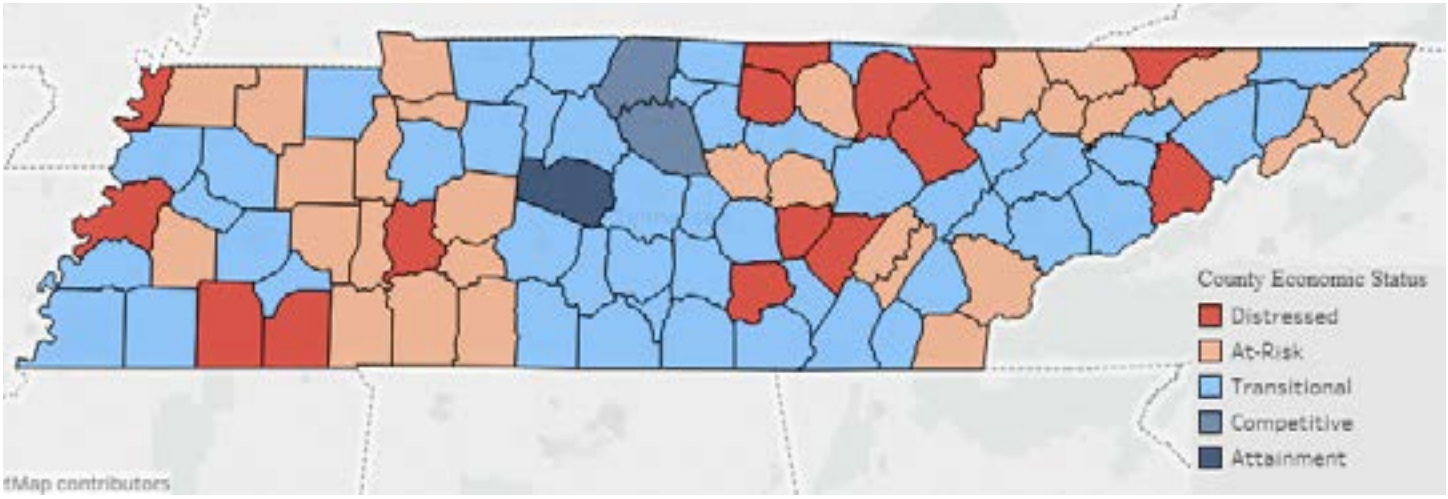


[10] In our county-by-county sensitivity analysis, we assign ZIP codes like these entirely to the county that contains most of the zip code.

CITIES AND/OR COUNTIES PREDESIGNATED AS DISTRESSED

A third method that could be used for identifying ED Zones would be to reference some list of distressed counties or cities, or to create such a list. For example, each year, the Appalachian Regional Commission (ARC) prepares an index of county economic status for every county in the United States. Economic status designations are identified through a composite measure of each county's three-year average unemployment rate, per capita income, and poverty rate. Based on these indicators, each county is then categorized as distressed, at-risk, transitional, competitive or attainment. Distressed counties rank among the 10 percent most economically distressed counties in the nation.[11] A map of the 2019 ARC-designated economic status for each Tennessee county is shown below.

County Economic Status Map (Fiscal Year 2019)



An attractive aspect of using these status designations is that, like the federal Low-Income-Community designations for census tracts, the status of each tract is provided by a universally recognized impartial outside party. Each county is assigned to a category purely on the basis of income/poverty/unemployment data.

Another attractive feature of ARC County Economic Status is that it uses counties, which are whole political units (unlike tracts or ZIP codes.)

There is one big negative aspect to using ARC designations. The designations for counties' economic status are very broad with all but three counties classified as "Distressed," "At-risk," or "Transitional." Only Williamson County is classified as "Attainment," while two other suburban Nashville-area counties (Sumner and Wilson) are classified as "Competitive." Shelby, Davidson, Knox and Hamilton counties are all classified as "Transitional," the third highest tier of economic status. They are not considered "Distressed," or even "At-Risk." But we know that there are very distressed areas in these urban counties.

Thus, we are faced with a dilemma. If only "Distressed" and "At-Risk" counties are treated as ED Zones, then Memphis, Nashville, Knoxville and Chattanooga would be excluded. But if the ED Zone designation is expanded to include "Transitional" counties like Shelby, Davidson, Knox and Hamilton, then almost every county is included (92 of 95). This method would then beg the question, "Why exclude anyone?" In other words, using this criterion, if we "stretch" to include Memphis, we are left

[11] https://www.tn.gov/transparenttn/jobs-economic-development/openecd/tnecd-performance-metrics/openecd-long-term-objectives-quick-stats/distressed-counties.html

excluding almost no counties at all.

While it seems obvious that Distressed Counties are good candidates for ED Zone designation, a method needs to be designed to include distressed neighborhoods in otherwise more prosperous counties.

ZONES DESIGNATED BY THE TENNESSEE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

The Tennessee Department of Economic and Community Development is charged with promoting economic development via a range of activities. Designating to the Department (or perhaps the Department of Commerce and Insurance) the task of defining ED Zones might be viable. The Department could use ED Zone status as an additional corporate relocation/ expansion recruitment tool. ALEC's model legislation offered this method as one alternative.[12]

An advantage of this method is that it allows for the program to be passed through the legislative process without specifying exactly where it will be used. If the governor's office is aggressive in promoting the program, it can be implemented in areas where it is more likely to be well-received and effective. A large corporation might find moving its headquarters to Tennessee more attractive if the headquarters location were to be surrounded by the Department with an ESA-eligible ED Zone for its employees, and for nearby residents.

ZONES "SELF-DESIGNATED" BY LOCAL JURISDICTION

A fifth method for designating ED Zones might involve allowing each county commission to "opt in" to the program. This method could be attractive because while it does not *force* any county to participate, it *allows all* counties to participate and shifts the debate out of Nashville and into 95 separate municipalities. Counties might be given the option of designating the entire county, or just parts of the county for ED Zone ESAs, at each county's discretion.

If the program is made available, but optional, in 95 counties, some are likely to choose to implement it. For example, Vermont has seen individual school districts switch from assigned schools to the "tuitioning" voucher model. Each of these transformations was locally initiated, because the state allowed localities to choose. Experience in Vermont has shown that townships have observed the benefits of tuitioning from nearby tuitioning townships. Over time, a similar pattern might arise in Tennessee.

Even if one of the five previous zone-designation alternatives is chosen, the legislature should consider allowing county commissions to add areas to the program if they wish to use the program to spark economic development in their county. Having a local hospital or college petition the county commission to create an ED Zone around their institution might be compelling to some commissioners.

[12] https://www.alec.org/model-policy/the-economic-development-zone-esa-act

MEASURING LOW-INCOME STATUS IN AREAS NOT PREDESIGNATED AS DISTRESSED

If policy makers conclude that census tracts or ZIP codes are the preferred geographic unit for designating ED Zones, a second required step would be to determine the method by which to measure the distress level in individual tracts or ZIP codes. As mentioned above, the federal NMTC offers two alternative measures for classifying tracts as low-income communities; a high poverty rate, or a low Median Family Income.

Under the NMTC, census tracts qualify if either of two criteria are met:

- the poverty rate exceeds 20% in the most recent census,
- or the median family income in the district is less than 80% of the statewide or metro area median, whichever is greater.

One drawback in using this methodology is that using two alternative criteria for qualification creates some complexity that could be avoided if only one criteria was used. For example, ED Zones could be designated based only on having a high poverty rate. Alternatively, the zones could be designated only on the basis of low Median Family Income levels.

Of the two alternatives, we believe that using the Median Family Income would be a better method. Because poverty rates only capture the number of very-low-income people in an area, a poverty rate of 20% tells us that 20% of the population is below the poverty level but tells us nothing about the other 80% of the population. A tract or ZIP code could have many residents with incomes only slightly above the poverty line, and the area would still have a poverty rate of only 20%.

In contrast, the median family income describes at least half of the population. In fact, when explaining the statistical term "median," Wikipedia uses household income (a similar measure to family income) to describe the advantage of using a median measure. Here is an excerpt:

> **For example, in understanding statistics like household income or assets which vary greatly, a mean may be skewed by a small number of extremely high or low values. Median income, for example, may be a better way to suggest what a "typical" income is.**

We should note that while Wikipedia contrasts the median value against the mean value, the poverty rate is even more prone to skewing than the mean value because it is only based on low values.

RECOMMENDED ED ZONE METHODOLOGY

After weighing the merits of using census tracts versus ZIP codes for designating ED Zones, we find ZIP codes to be preferred. The reasons, as set forth earlier: ZIP codes are more easily understood, they generally have larger populations, and they cover larger geographic areas. However, the merit in using federal Opportunity Zones for designating Economic Development Zones is compelling. Therefore, we recommend the following methodology for defining Economic Development Zones.

Economic Development Zones shall be defined as follows:

1. All ZIP codes with median family income less than the statewide or MSA median, whichever is greater. This qualification should be based on median income levels prior to January 1, 2019.
2. "Distressed Counties", as designated by the Department of Economic and Community Development as of January 1, 2019. (See Appendix B for list.)
3. ZIP codes that meet the above criteria at a later date, and additional counties that meet the "Distressed Counties" criteria at a later date.

Notice that once an area is designated as an Economic Development Zone, it will retain that designation, regardless of later improvements in economic conditions.

Because it is important to avoid lottery allocations, to the extent possible, when applications for Economic Development ESAs exceeds the number than can be funded in any year, preference should be granted in the following priority:

1. Students who have a sibling already participating in the ESA program,
2. Students who reside in a qualifying ZIP code which contains, in whole or in part, a designated Opportunity Zone as established by the federal "Tax Cuts and Jobs Act" of 2017,
3. Students who reside in a Distressed County,
4. Students who reside in a qualifying ZIP code that does not contain an Opportunity Zone and that is not located in a Distressed County.

AVOIDING THE PROBLEMS OF GENTRIFICATION

Once policymakers understand how Economic Development Zone ESAs could operate, they are often quickly convinced that the program will have a strong impact on the targeted development zones. Thinking through this impact, policymakers are likely to voice concern about what should be done if the program works too well! In other words, as soon as a policymakers understand the power of Economic Development ESAs, they have questions about whether the program could lead to gentrification.

The Oxford Dictionary defines "gentrification" as "the process of renovating and improving a house or district so that it conforms to middle-class taste." For those who live "middle-class" lives, gentrification sounds promising, but gentrification can come with negative consequences. The most worrisome consequence being an increase in rents, ultimately pricing poor families out of their neighborhoods.

We need to acknowledge up front that an Economic Development Zone ESA program will make high-poverty areas more attractive to the middle class. So, questions about gentrification are not unreasonable, and the issue must be analyzed carefully.

Often, gentrification is a concern of "first impression." When one first reads about a policy that will retain middle class families in poorer neighborhoods, it is a common reaction to ask, "What happens to all the poor people?" which is another way of asking, "What happens if the program is too successful?"

But like many first impressions, there is more here than meets the eye. It is true that gentrification can have negative effects. Improving neighborhoods can create winners and losers. Property owners like rising home values, but renters would rather pay less. Unfortunately, rising rents can lead to displacement of poor people.

Now, let's move past first impressions and dive into a deeper understanding of this issue. Consider the following proposal that the U.S. Department of Housing and Urban Development (HUD) could promote in an effort to prevent gentrification:

"Good schools make neighborhoods more desirable, raising home prices and rents. Since we want to keep rents affordable for low-income families, we need to keep good schools out of low-income neighborhoods."

If this policy seems misguided, rest assured that HUD has never promoted it. No one thinks we should give poor neighborhoods bad schools just to keep rent cheap. It is illogical to oppose policies that improve education in poor neighborhoods just because the policies will make the neighborhoods more attractive, and rents will rise. Fortunately, where economic development lifts up a neighborhood, HUD has explored ways to soften potential impacts on existing residents. Housing problems in low-income areas are best addressed through good ***housing policies***. Education problems in low-income areas should be addressed with good ***education policies***.

ANSWERS IN HOUSING POLICY

The US Department of Housing and Urban Development (HUD) has given a lot of thought to solving gentrification issues. See, for example, "Ensuring Equitable Neighborhood Change," which describes numerous programs aimed at assisting low-income families living in neighborhoods that are progressing.

Here are a few current HUD programs addressing these issues:

- Rental Assistance
- Affordable Housing Development Incentives
- Mixed-Income Development
- Incentives
- Housing Choice Voucher Programs

These programs are not perfect, and they are not always implemented optimally. But still, it is better to rely on housing experts, who are focused on making neighborhoods affordable, rather than relying on struggling schools to depress housing costs.

Fortunately, there are *very few* areas of deep poverty at risk of having too many rich people move into the neighborhood. Instead, many poor areas are depopulating. A journalist for *The Atlantic*, discussing this same topic, points out a problem considered much worse than gentrification:

"The reality is that the displaced are getting pushed out of working-class neighborhoods that are [already] 'good enough' to attract people and investment, while the poorest and most vulnerable neighborhoods remain mired in persistent poverty and concentrated disadvantage."

By analogy, we don't withhold food during famines because we worry that that people will eat, live longer, and require more healthcare. We have programs to address healthcare issues once we have erased food insecurity. Likewise we should not withhold school choice (or any other anti-poverty program), from poor neighborhoods due to fear of too much success (gentrification).

ON A POSITIVE NOTE

Gentrification is not viewed as a bad thing by existing residents when they are able to remain in revitalizing neighborhoods, which they often can.[13] Life gets better for them in many ways:

- better jobs,
- higher incomes,
- lower violent crime rates,
- better options in supermarkets, banks and drug stores,
- assignment to better public schools
- and, in fact, better public services in general.

Urban planners recognize these benefits of improving poor neighborhoods while working to keep poor people from being priced out of those same neighborhoods. See, for example, the Nashville Metropolitan Development and Housing Agency's *Envision Cayce* program that is designed to create a mixed-income community that ensures one-for-one replacement of public housing units in Cayce Place.

We want Envision-Cayce-type improvements in poor neighborhoods. Thus, policymakers should endeavor to provide the best education possible to all students, regardless of where they live.

Once people recognize gentrification as a problem of housing policy, rather than a justification for leaving poor neighborhoods with bad schools, they are generally convinced that Economic Development ESAs are, on net, an excellent jobs-creation and neighborhood improvement tool to revitalize poor areas.

Of course, some people will not allow themselves to be convinced. Opposing "gentrification" can be a tactic used to distract people both from thinking about the many negative effects produced by struggling schools, and from considering how Economic Development ESAs can correct those effects. Therefore, it is important that we address gentrification up front so that policymakers possess a clear understanding of the benefits of the program and the housing policy solutions that can be brought to bear when the program seems to have "too much success."

THE TAKEAWAY

In summary, policy makers need to understand two important points:

1. ***The problems of gentrification are isolated to only a small number of places near rapidly developing urban areas, and***
2. ***Where applicable, potential gentrification problems should be addressed through housing policy - not by withholding good school options from families in these areas.***

[13] See the digital version of this document for links.

ANALYSIS OF MAJOR METROPLITAN AREAS (and the rest of the state)

Now that we have selected ZIP codes as the means for designating Economic Development (ED) Zones, we must determine which ZIP codes are eligible based on the measure we chose to use in our base cases, median family incomes. The following introduction to the maps and sensitivity analyses will explain:

- How to calculate the Relative Median Family Income % for each ZIP code
- The distinction between the treatment of rural and urban (MSA) ZIP codes
- How we use sensitivity analysis to estimate the number of new private school students who will use ESAs

PARAMETERS FOR INCLUDING A ZIP CODE IN AN ECONOMIC DEVELOPMENT ZONE:

ZIP codes meet the requirements for inclusion in an Economic Development Zone if the ZIP code's median family income is below a given threshold, which we will also refer to as a "benchmark." The benchmark against which each ZIP code's income is measured depends on whether the ZIP code is in a rural area, or in an "MSA".

Important Definition: An MSA is a "metropolitan statistical area." MSAs are used by the census bureau, and they can be thought of simply as metropolitan areas. Here is an image of the Memphis MSA (2017 population of 1,369,548.)

The city of Memphis (2017 population approximately 652,236) is shown in green.
The full MSA includes several counties in Tennessee, Mississippi and Arkansas.

MSA median family incomes are almost always larger than the overall state median family income. As a result, many metro ZIP codes are considered to be "low income" because they are low *relative to the local MSA median.* These ZIP codes are not always low-income relative to the state-wide median.

Federal anti-poverty programs (Community Reinvestment Act and the New Markets Tax Credit) use the following benchmark:

is an area's[14] median family income either,

1. less than 80% of the state median family income OR
2. less than 80% of the median family income for the MSA that it is located within, whichever of these two values is greater.

CALCULATING THE "RELATIVE MEDIAN FAMILY INCOME (MFI)" FOR EACH ZIP CODE:

The method for benchmarking a ZIP code's median family income depends upon whether the ZIP code is in a rural county or in an MSA.

If the ZIP code is in a rural county, the calculation is straightforward. The ZIP code's MFI is divided by the state MFI.

$$\textit{Relative MFI \%} = \frac{\textit{ZIP code MFI}}{\textit{State MFI}}$$

If the ZIP code is located in an MSA, the calculation is slightly more complex. The MSA ZIP code is benchmarked by dividing the ZIP code's median family income by *the greater of*

1. The state median family income level OR
2. the MSA median family income level.

$$\textit{Relative MFI \%} = \frac{\textit{ZIP code MFI}}{\textit{Max(State MFI, MSA MFI)}}$$

Here are examples of these Relative MFI % calculations for two adjacent ZIP codes. ZIP code 37034 is in Marshall County, which is rural. However the ZIP code is adjacent to ZIP code 37060, which is in Rutherford County, which is a county in the Nashville MSA.

Rural ZIP code calculation: Chapel Hill, TN - ZIP Code 37034

To benchmark the ZIP code's median family income, the following data is used:

- ZIP code 37034 median family income: $67,476
- Tennessee state median family income: $57,747
- MSA median family income: (N/A - ZIP code is in a rural county)

Because the ZIP code is located in a rural area, the state median family income of $57,747 is used for benchmarking the relative family income level of the area. Therefore, the Benchmarked Median Family Income for this ZIP code is:

$$\textit{Relative MFI \%} = \frac{\textit{\$67,476}}{\textit{\$57,747}} = 117\%$$

Since this Relative MFI % is greater than 100%, the ZIP code **would not** qualify as an ED Zone if the ZIP code threshold is set at 100%.

MSA ZIP code calculation: Eagleville, TN - ZIP code 37060

Next, let's consider an adjacent ZIP code that is located in an MSA (Nashville Metro area). Eagleville, TN - ZIP code 37060 - is in Rutherford County, along the Marshall County line. Rutherford County is in the Nashville MSA.[15] To benchmark the ZIP code's median family income, the following data is used:

- ZIP code 37060 median family income: $68,777

[14] These programs use census tracts, rather than ZIP codes, to define low-income neighborhoods.

[15] Technically, the MSA is named the "Nashville-Davidson-Murfreesboro-Franklin TN MSA". Fourteen counties comprise the MSA, including Rutherford.

- Tennessee state median family income: $57,747
- Nashville MSA median family income: $69,038

Because ZIP code 37060 is located in an MSA, the calculation requires using the greater of the State MFI or the Nashville MSA MFI. As is normally the case, the MSA MFI is larger than the state value.

$$\textit{Relative MFI \%} = \frac{\$68,777}{\textit{Max}(\$57,038 \text{ or } \$69,039)}$$

$$= \frac{\$68,777}{\$69,039}$$

$$= 99.6\%$$

Since this Relative MFI is **less than 100%**, the ZIP code would qualify as an ED Zone when a 100% threshold is used, but it would not qualify if an 80% threshold is used. Also, notice that this ZIP code qualifies because it is located in an MSA with an MFI greater than the overall state's MFI. If this ZIP code had been located in a rural area, it would not qualify under the 100% threshold because

$$\frac{\$68,777}{\$57,038} > 100\%$$

SENSITIVITY ANALYSES:

Since this will be a new program, it may be helpful to consider the impact that various ZIP code threshold values will have on the **number of school-age children (S.A.POP)** who would be eligible for an ESA.

Likewise, regardless of how many children are eligible under the program, the propensity for families to enroll in the program will be higher when the dollar value of the ESA is higher. In other words, more families will jump to access a $7,000 ESA than a $1,000 ESA.

Therefore, we estimate **the increase in demand for private schooling (ΔPRIV)** based on two different variables.

- Alternative ZIP code for ED Zone qualification
- Alternative dollar values for each ESA

In the MSA reports that follow, the reader will find maps showing the ZIP codes that would qualify as ED Zones given a Relative MFI % threshold of 100% (greater of state or MSA value used in each calculation).[16] The reader will also find, by county, the estimated **S.A POP** and **ΔPRIV** for various ZIP code MFI thresholds.

We have also estimated the Expected Change in MSA Private School Demand **(ΔPRIV)** at various ESA amounts from $4,000 per child to $7,000 per child. These calculations are done at the MSA level. And finally, we provide lists of "near-miss" ZIP codes for various ZIP code eligibility cut-offs.

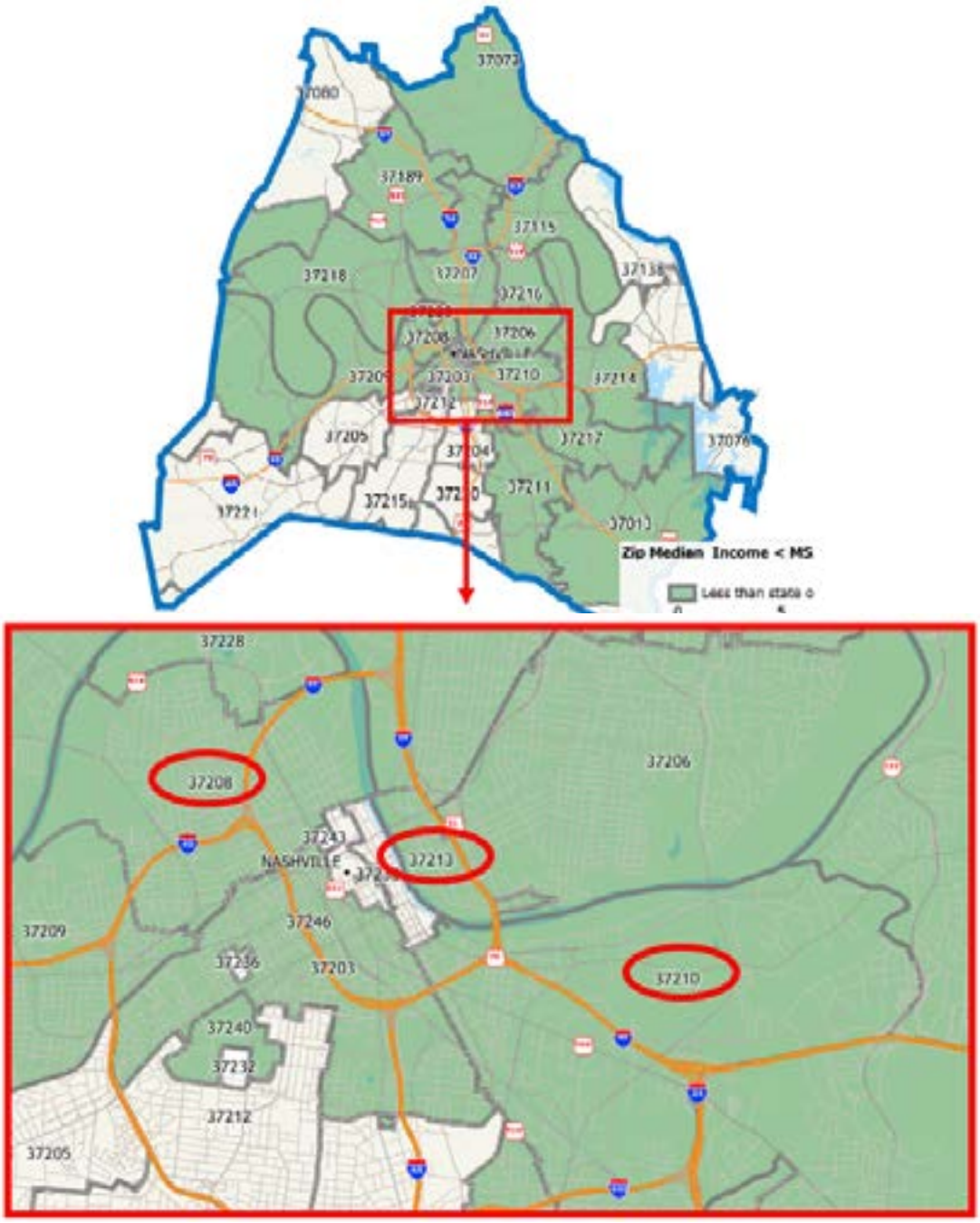
We suggest that the reader refer back to this introduction as a guide to the analysis in the following descriptions of the different MSAs and rural areas of Tennessee.

[16]Maps with alternative thresholds are low-income-community designation methods are available in a separate digital appendix found at effective-ed.org/economic-development-zones/tn.

Nashville MSA Report

The Nashville MSA has 13 counties: Cannon, Cheatham, Davidson, Dickson, Hickman, Macon, Maury, Robertson, Rutherford, Smith, Trousdale, Williamson, and Wilson.

Using ZIP codes to define eligibility for ED Zones, Davidson County's share (containing Nashville) of the ESA-eligible school-age population ranges from 71% of the MSA total (given an 80% Relative MFI % cutoff) to 51% (given a 100% Relative MFI % cutoff). Only six of the MSA's 13 poorest ZIP codes are outside Davidson County. The three poorest counties are in Davidson County. Those three (37208 – 48% Relative MFI %, 37210 – 49%, and 37213 – 35%) form a strip from NW Nashville to ESE Nashville. The six poorest ZIP Codes outside Davidson County are in Hickman (37033, 37140, 37137, and 37098) and Macon County (37150 and 37083).



Sensitivity Analysis

In the Nashville MSA, the size of the eligible school age population (S.A POP), and therefore the change in private school demand (ΔPRIV), is much more sensitive to the threshold chosen for ZIP code inclusion as an ED Zone. There is quite a bit of sensitivity in the range of the 80% Relative MFI ZIP code cut-off. Raising the cutoff from 80% to 90% increases the number eligible students in Davidson County by 26,285; over a 50% increase in eligible students. The total eligible MSA population rises even more: from an S.A. POP of 72,833 to 156,588.

Table 1 reports the School Age Population (S.A. POP) and the expected increase in demand for private schooling (ΔPRIV) in each MSA county, given various cutoffs for ZIP code eligibility. Table 2 indicates the increase in MSA private school use at four different ESA values. Following that, in Table 3, is a list of ZIP codes within ten percentage points of the cut-off level at the top of the column.

Table 1: Qualification Outcomes (ΔPRIV based on $7,000 ESA)

Cut-Off level for ZIP code eligibility calculated as:
(ZIP code Median Family Income as a percent of MSA Median Family Income)

	80%		90%		100%		110%	
Counties	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV
Cannon	1,375	110	1,480	119	1,980	159	1,980	159
Cheatham	4,429	355	4,429	355	4,429	355	5,647	452
Davidson	51,900	4,158	78,185	6,264	89,149	7,142	96,161	7,704
Dickson	965	77	8,798	705	8,798	705	10,015	802
Hickman	4,175	334	4,497	360	4,497	360	4,497	360
Macon	3,818	306	3,818	306	3,818	306	3,818	306
Robertson	4	0	6,691	536	9,876	791	12,237	980
Rutherford	1,735	139	20,968	1,680	21,947	1,758	46,456	3,722
Smith	1,957	157	3,152	253	3,152	253	3,190	256
Trousdale	118	9	1,492	120	1,492	120	1,492	120
Williamson	0	0	0	0	0	0	2,535	203
Wilson	0	0	9,655	774	12,570	1,007	12,570	1,007
Maury	2,357	189	13,423	1,075	13,423	1,075	13,655	1,094
TOTAL	72,833	5,835	156,588	12,545	175,131	14,031	214,253	17,165

Table 2: Expected Change in MSA Private School Demand (ΔPRIV) at various ESA amounts

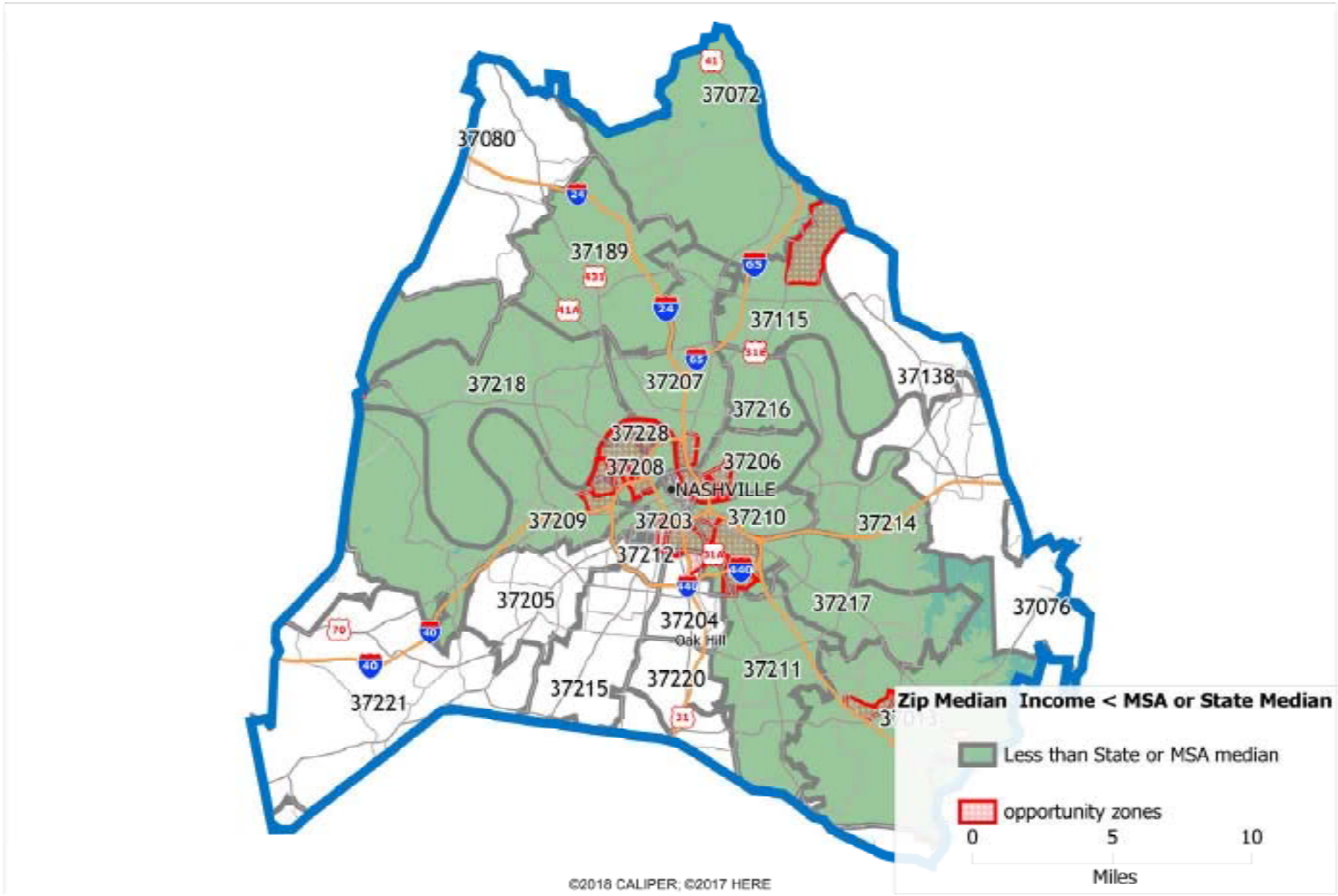
Cut-off level for ZIP code eligibility
(Calculated as in Table 1)

ESA Amount	80%	90%	100%
$4,000	3,334	7,169	8,017
$5,000	4,168	8,961	10,022
$6,000	5,001	10,753	12,026
$7,000	5,835	12,545	14,031

Table 3: Near-miss ZIP codes when qualification level is set at 80%, 90% and 100% cut-offs

alternative zip code cut-off levels		
80%	90%	100%
near miss zip codes		
zip codes with MFI ratio between 80% and 90%	zip codes with MFI ratio between 90% and 100%	zip codes with MFI ratio between 100% and 110%
38487	37022	38482
38401	37026	37029
37013	37060	37037
37016	37073	37049
37032	37090	37062
37051	37141	37076
37055	37149	37080
37074	37189	37082
37086	37214	37085
37087		37128
37118		37146
37130		37151
37165		37167
37172		
37181		
37184		
37187		
37209		
37216		
38454		
38547		
38563		
38567		

Davidson TN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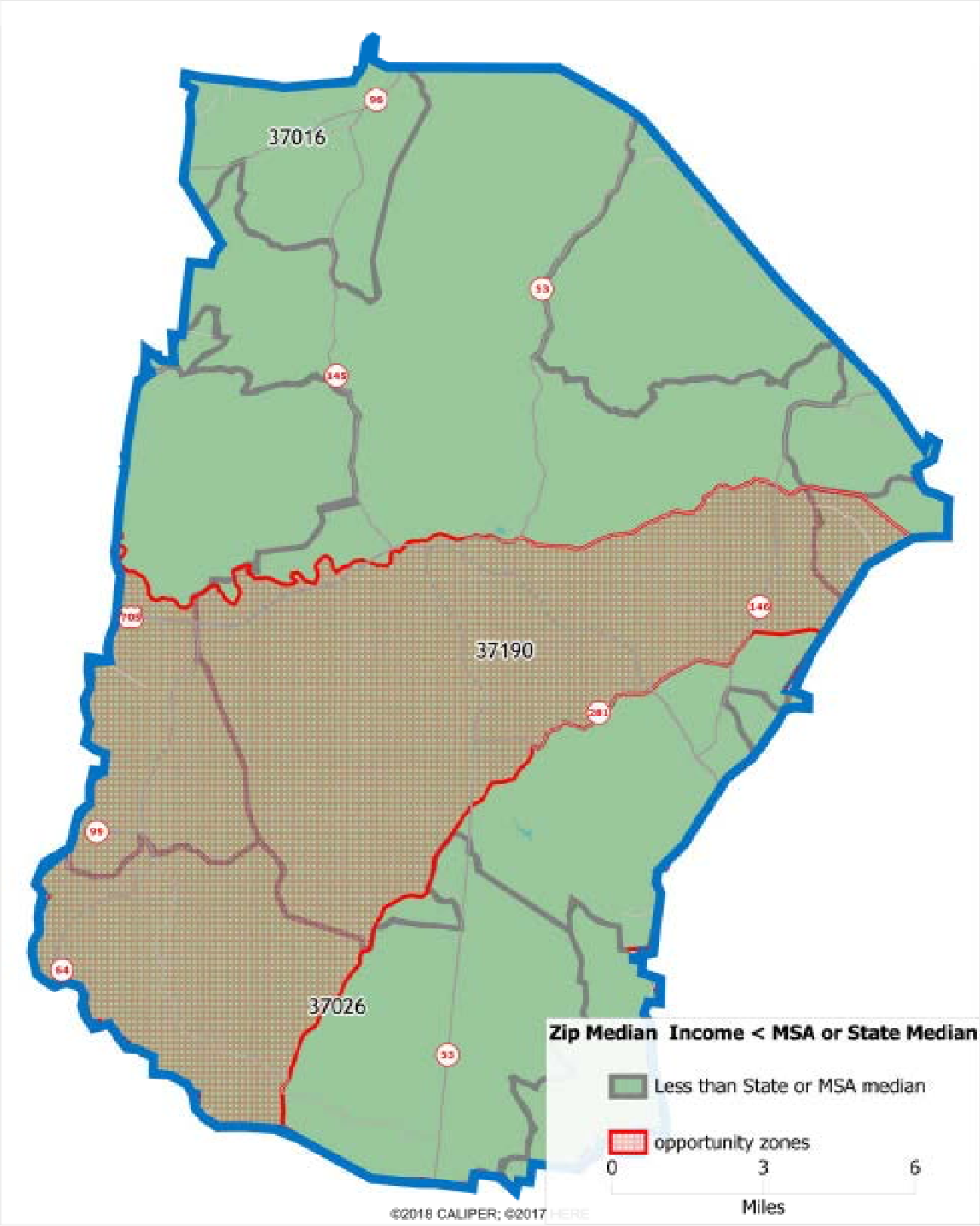
37080
37189
37115
37218
37207
37138
37216
37228
37208
37206
NASHVILLE
37209
37203
37210
37214
37212
37205
37204
Oak Hill
37217
37076
37211
37215
37220
37221
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
©2018 CALIPER; ©2017 HERE

Cannon TN


37016
37190
37026
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
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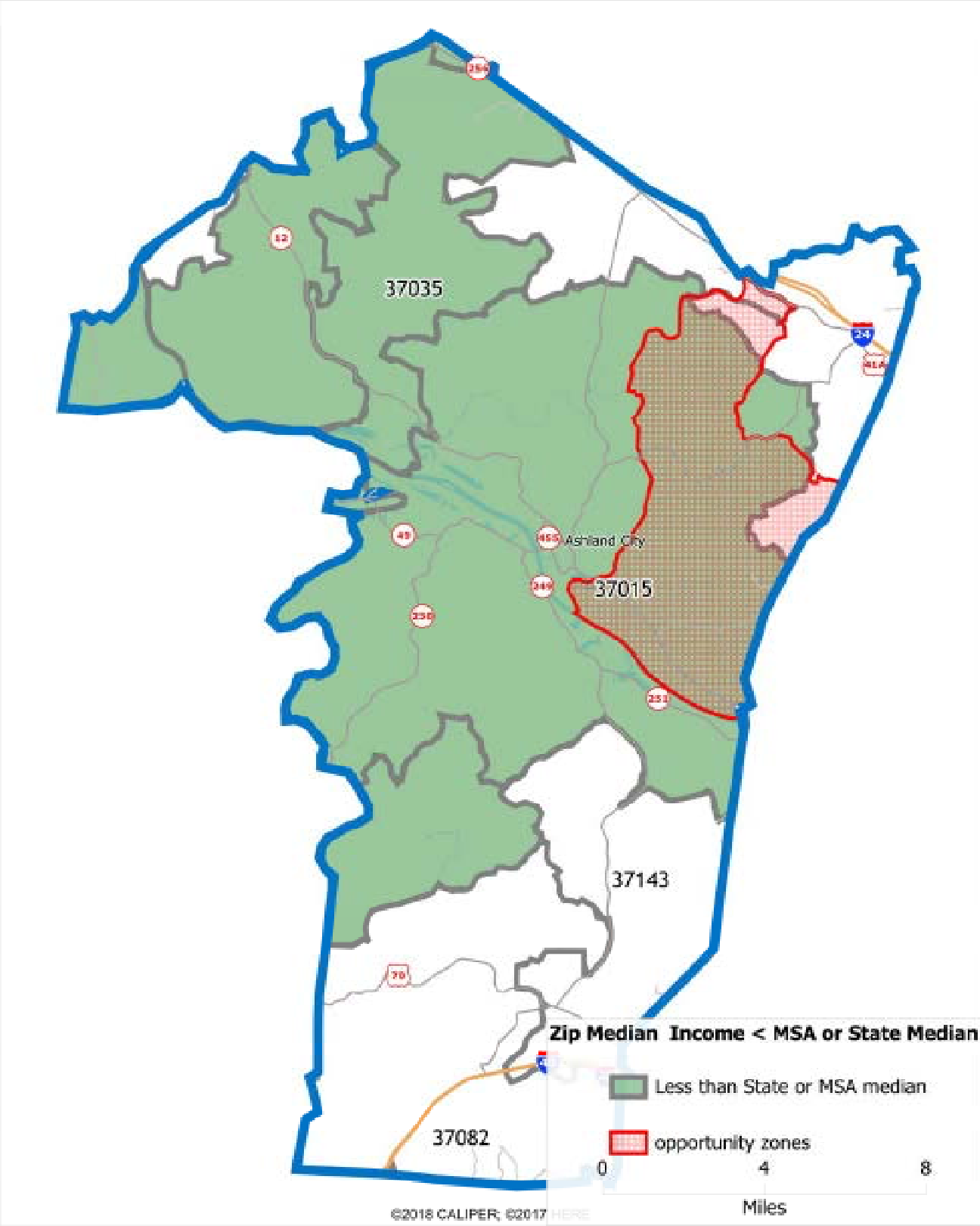
3
6
Miles
©2018 CALIPER; ©2017

Cheatham TN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Ashland City
37015
37143
37082
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
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8
Miles
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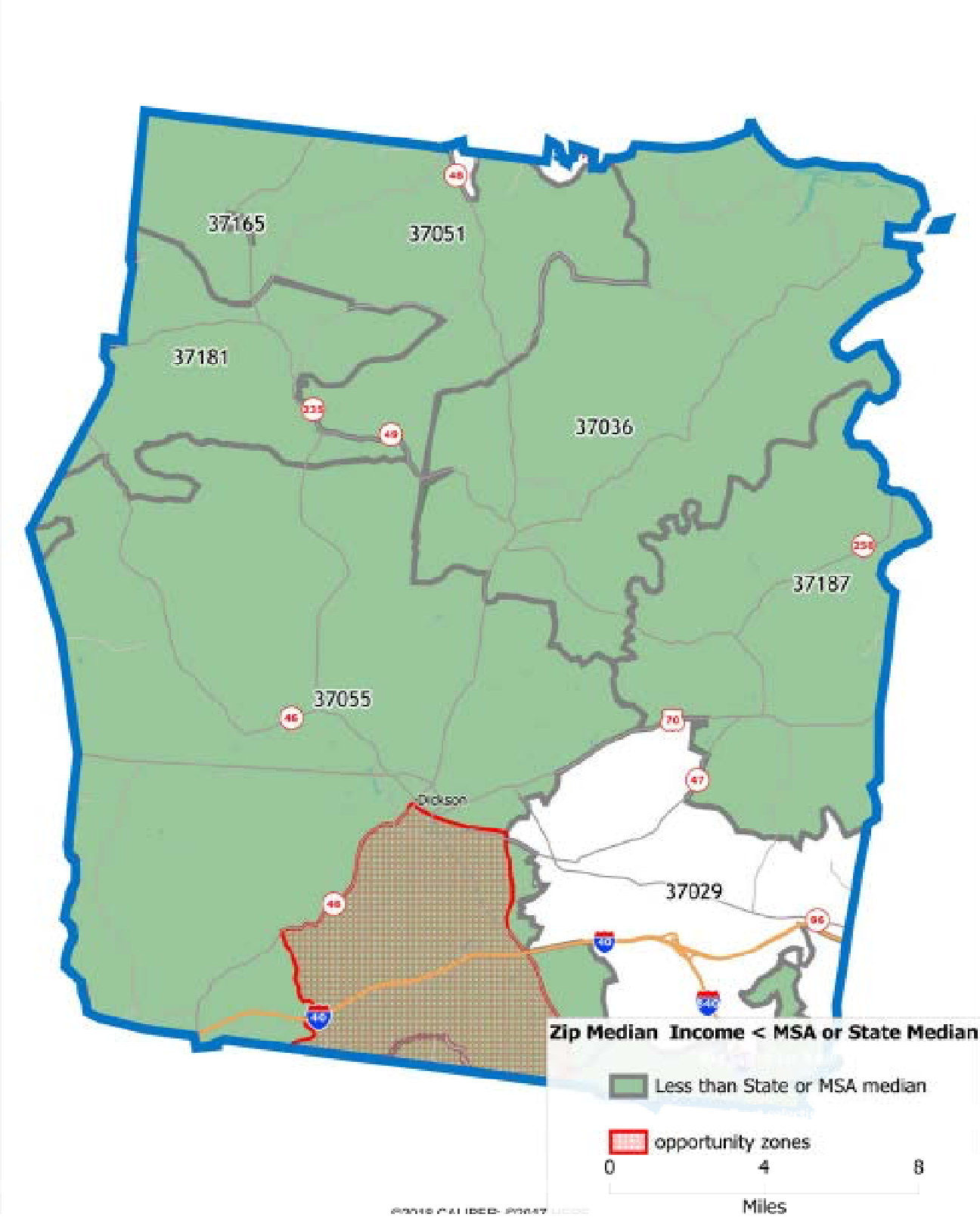
Dickson TN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37051
37181
37036
37187
37055
Dickson
37029
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
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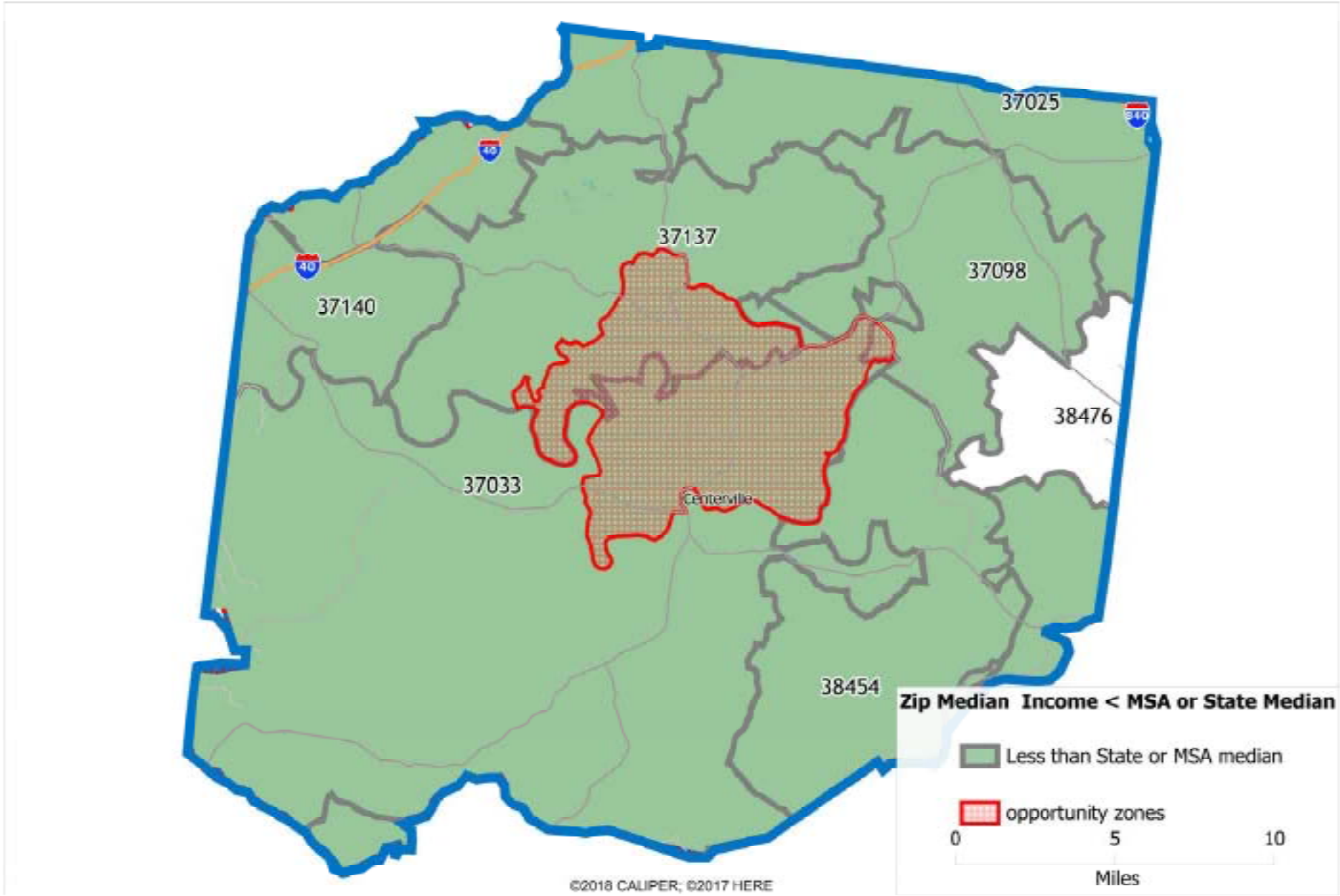
4
8
Miles

Hickman TN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38476
37033
Centerville
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Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
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10
Miles
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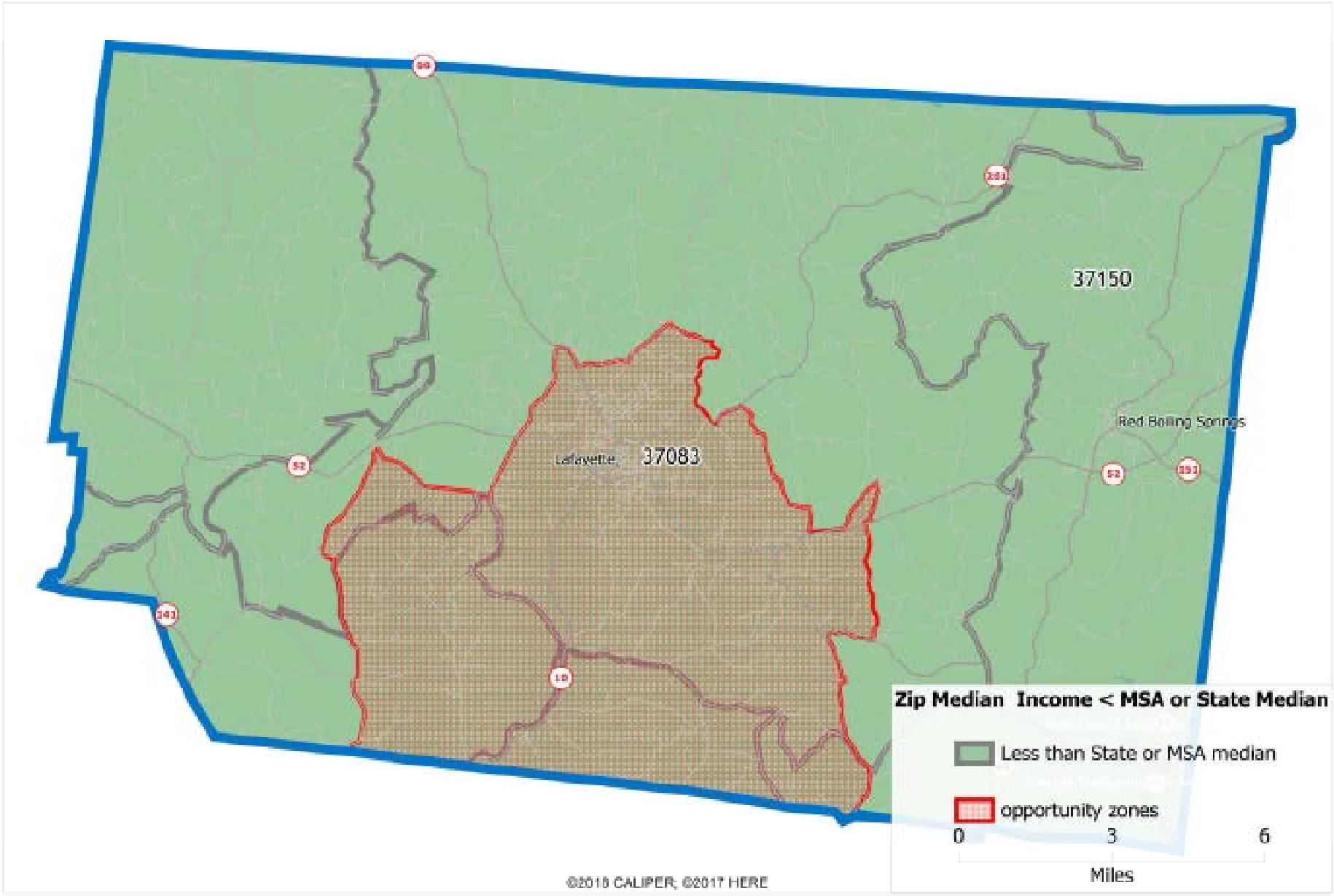
Macon TN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Red Boiling Springs
Lafayette
37083
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
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6
Miles
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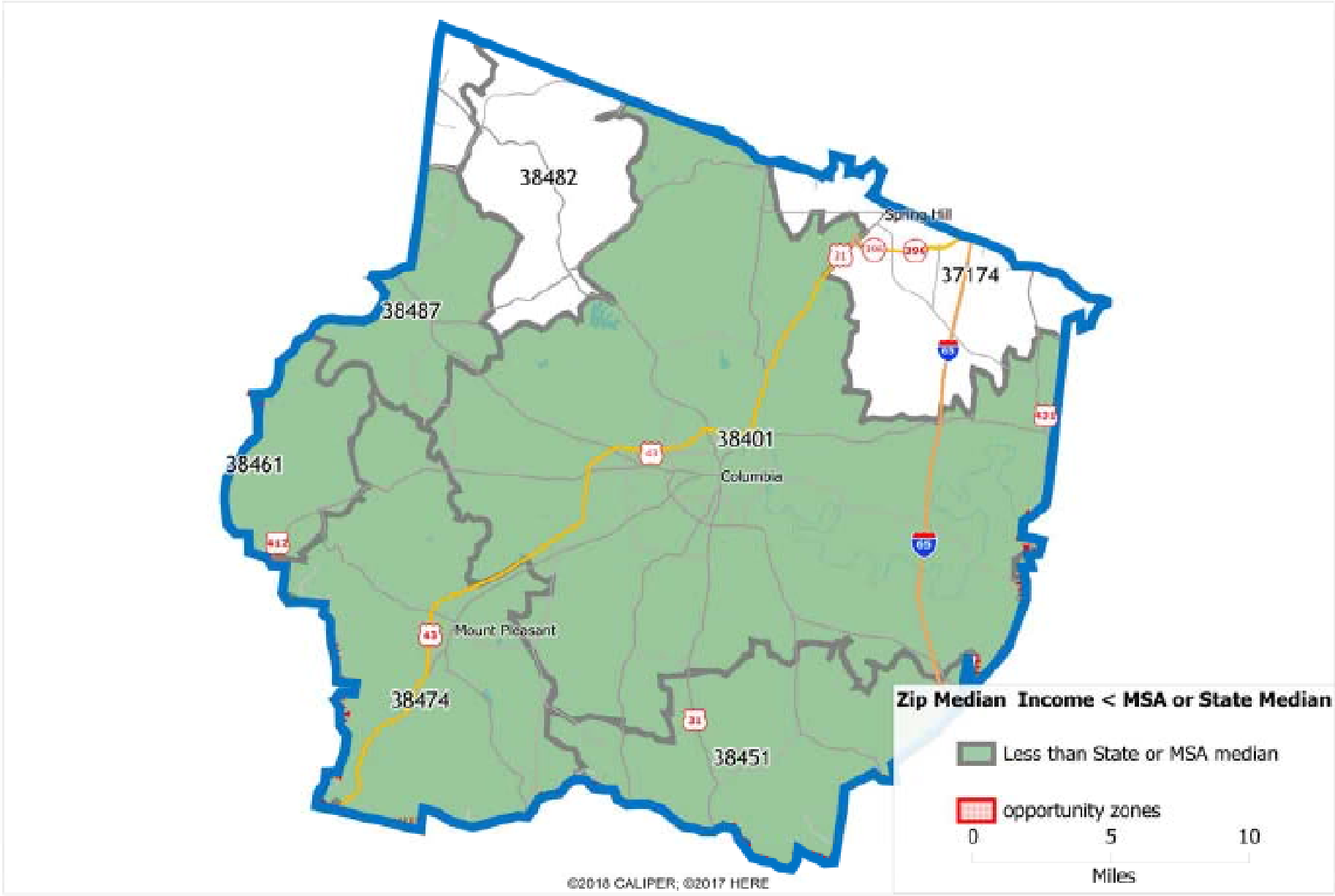
Maury TN


38482
Spring Hill
37174
38487
38401
38461
Columbia
Mount Pleasant
38474
38451
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
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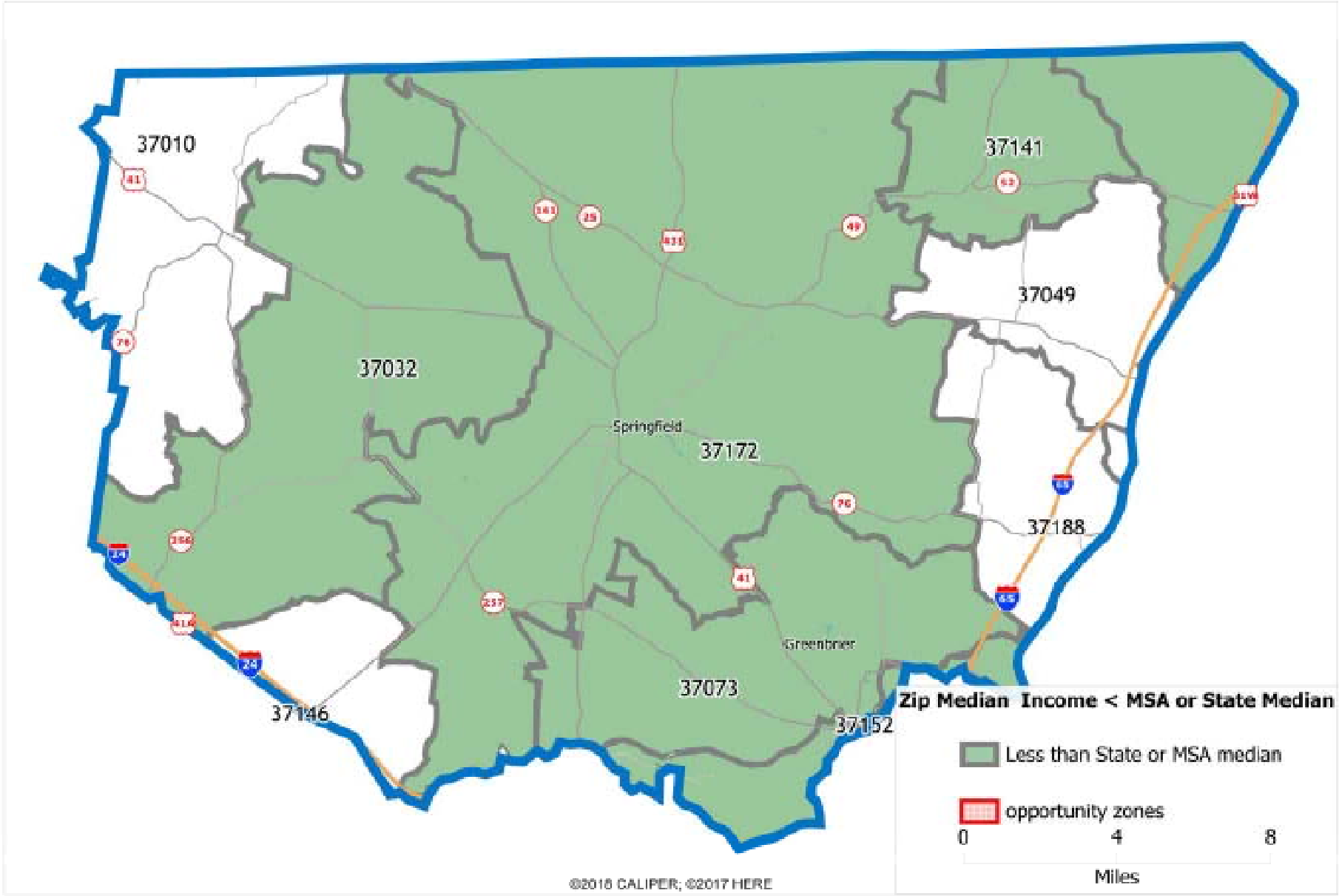
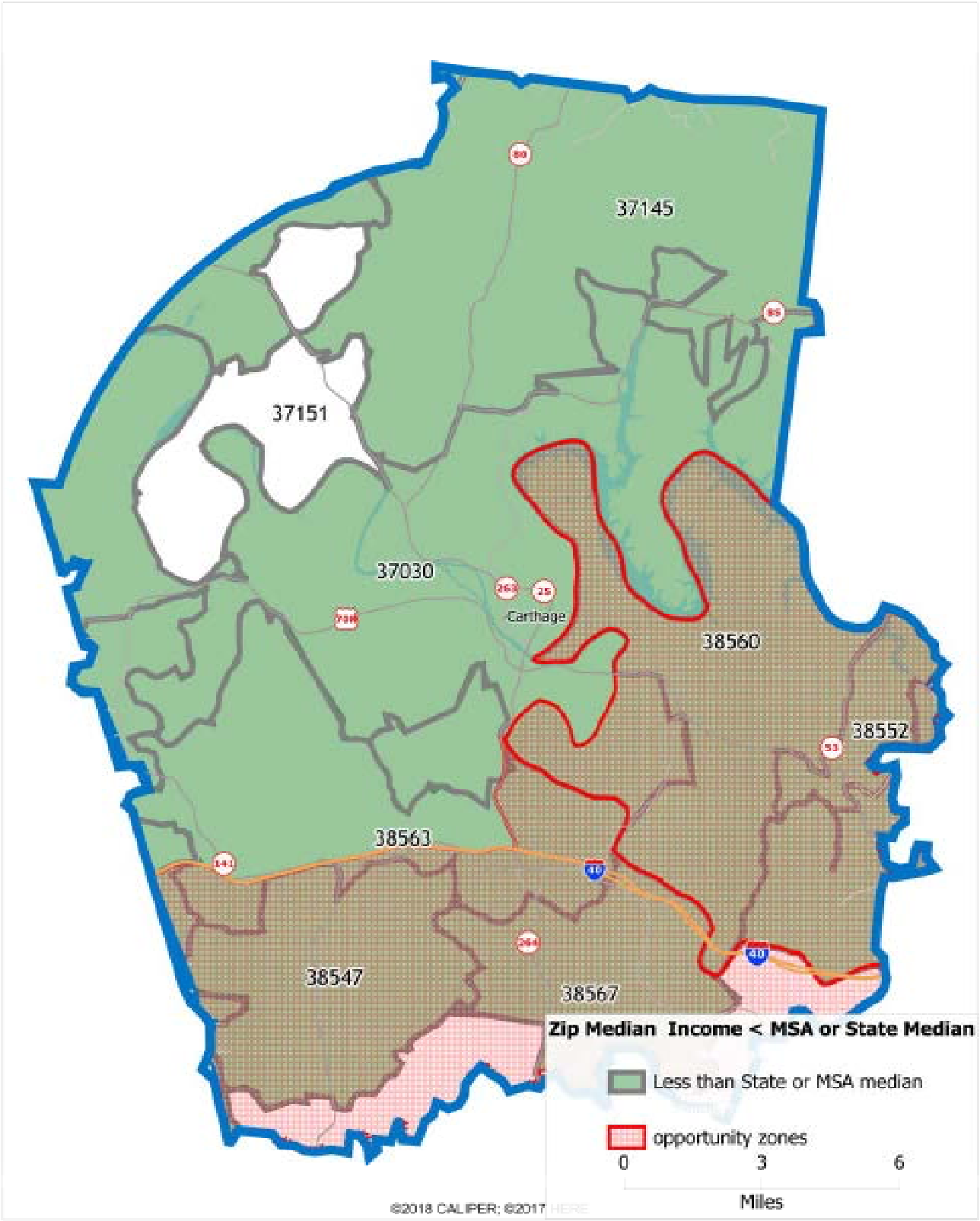
Robertson TN



Smith TN


37145
37151
37030
Carthage
38560
38552
38563
38547
38567
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
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3
6
Miles
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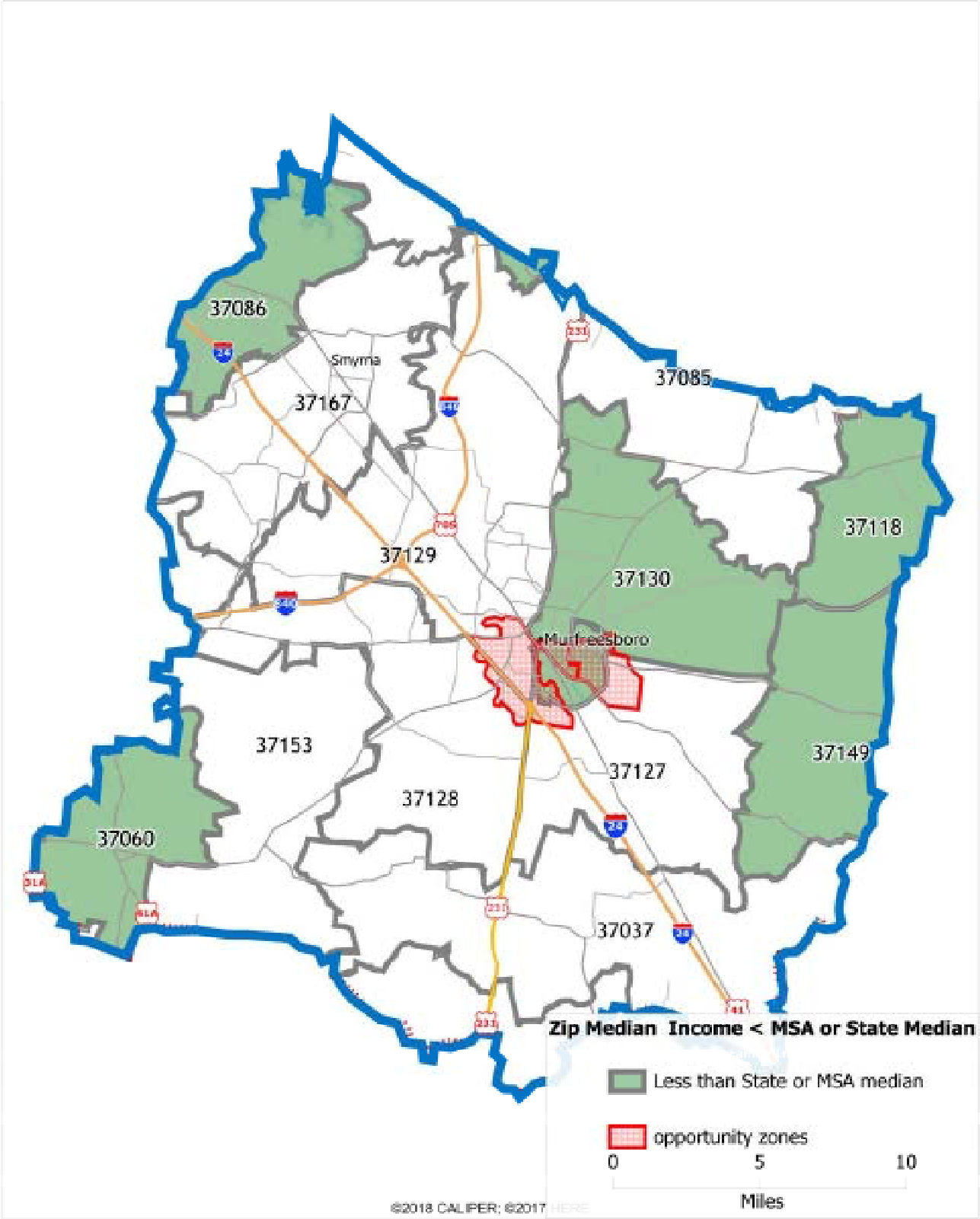
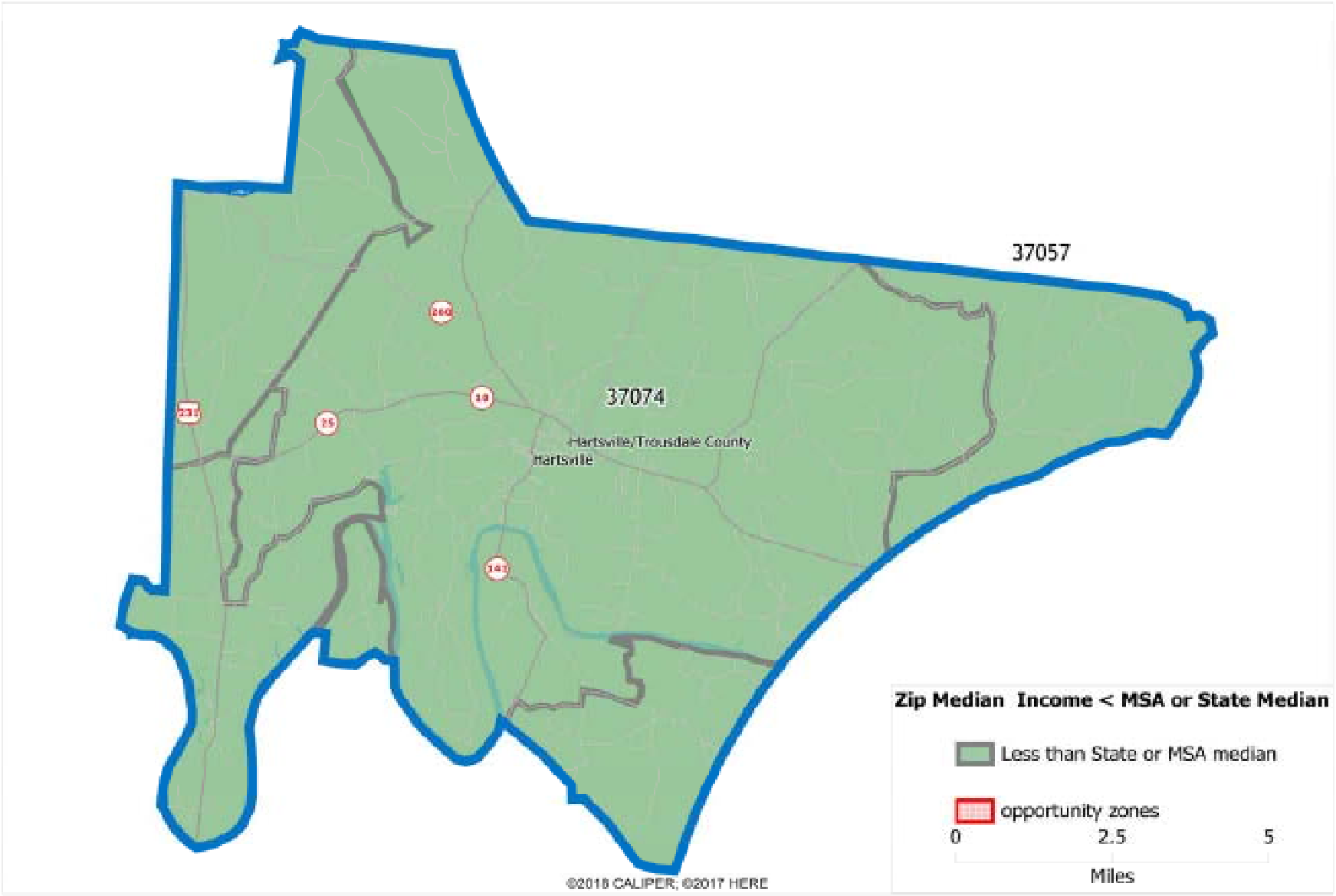
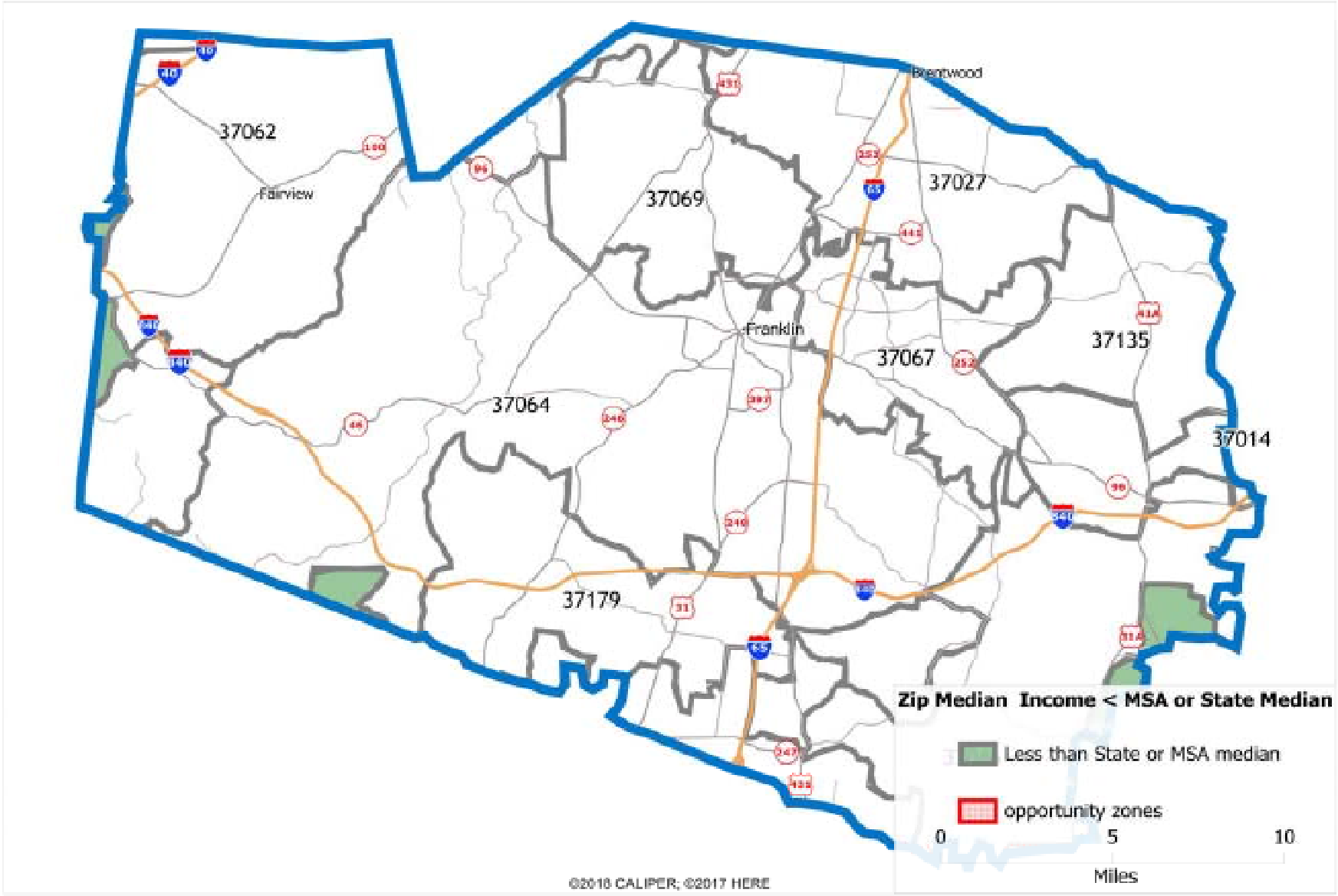
Rutherford TN



Trousdale TN



Williamson TN



Wilson TN

37087
Green Hill
Lebanon
37122
37090
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
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Memphis MSA Report

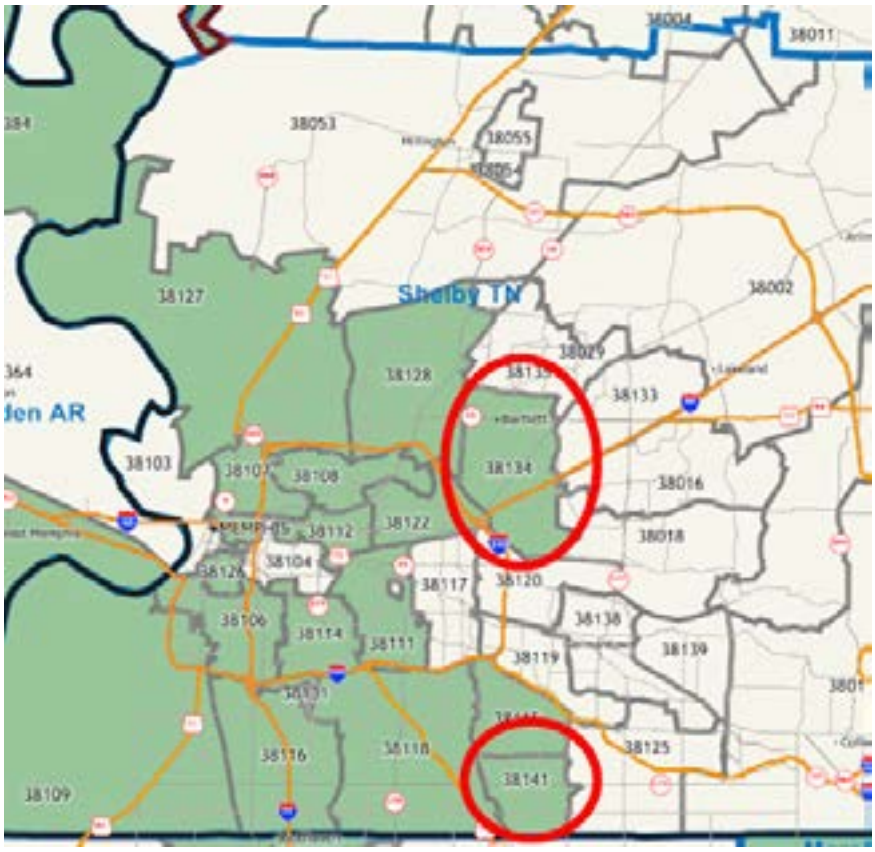
Shelby, Tipton, and Fayette are the three Tennessee counties in the Memphis MSA. Nearly all of the lowest income ZIP codes in the MSA are in the city of Memphis (in Shelby County). In Shelby County, almost all of the ZIP codes are either very poor or the ZIP codes have income levels that are well above the metro median. In contrast to Shelby County, median family incomes for ZIP codes in Fayette County and Tipton County have much lower variation.

Memphis MSA Counties in Tennessee

For the three Tennessee counties in the Memphis MSA, the "100%-of-Median ZIP Codes" maps, which follow this general discussion, show which ZIP codes would be eligible for ED Zone ESAs, assuming that a ZIP code qualifies if its median family income is less than the median family income for the Memphis MSA.

As mentioned above, the qualifying ZIP codes in Memphis tend to have very low-income levels. Six of Memphis' eligible zips (38105, 38106, 38108, 38114, 38126, and 38127) have Median Family Incomes below 45.2% of the Memphis MSA median! Of the 25 Memphis MSA ZIP codes that would qualify under the "below 100% median family income" rule, only seven ZIP codes have incomes that are even 80% of the MSA Median (38015, 38019, 38049, 38057, 38068, 38134, and 38141). Only ZIP codes 38134 and 38141 are in Shelby County (outer Memphis – see the circled ZIP codes below).

Shelby County 100% of MSA median ZIP codes



Sensitivity Analysis

The "100%-of-MSA-median" criterion is a reasonable one because it targets the benefits to areas with over half of their families in the less wealthy range. But state policymakers might choose to adopt other cut-offs for Economic Development ESA zip-code eligibility. With this in mind, we present a sensitivity analysis in Table 1 below. It reports the School Age Population (S.A. POP) and the expected increase in demand for private schooling (ΔPRIV) given various cutoffs for ZIP code eligibility. For this base case, we will denote the dollar value for an ESA as $7000 in our calculation of the change in private school demand. Notice that this table allows the reader to gauge how sensitive ESA utilization is to the ZIP code income cut-off chosen, hence the term "sensitivity analysis."

Looking at Table 1, assume that the only ZIP codes that are allowed to participate in the Economic Development ESA program are those with a median family income less than 80% of the MSA median. In this case, there would be 96,961 school age students (S.A.POP) who live in qualifying Shelby County ZIP codes, and we estimate an increase of 7768 students (ΔPRIV) attending private schools from the qualifying Shelby ZIP codes.[1] Since only one small ZIP code in in Fayette County has a median family income that is less than 80% of the metro-area median, we project that only one new student would attend private school in Fayette County given an 80% cut-off for ZIP codes. There is no ZIP code in Tipton County that has a median family income that is less than 80% of the metro-area median. Therefore, there would be no additional private school students, there, as a result of the program with an 80% cutoff.

[1] This is an "equilibrium" increase in private school demand. In the first year many parents will be unaware of the program, and even after they are aware of the program they may not know how to access the program. It may take two or three years for this equilibrium level of ΔPRIV to be reached. Also, we are assuming that all k-12 students will be eligible for the program. If some grades are initially excluded, then the length of time until an equilibrium level is reached will be much longer.

Table 1: Qualification Outcomes (ΔPRIV based on $7,000 ESA)

Cut-Off level for ZIP code eligibility calculated as:
(ZIP code Median Family Income as a percent of MSA Median Family Income)

	80%		90%		100%		110%	
Counties	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV
Shelby	96,961	7,768	111,257	8,913	111,257	8,913	116,082	9,300
Fayette	16	1	774	62	3,289	263	3,432	275
Tipton	0	0	3,551	284	3,551	284	5,764	462
TOTAL	96,977	7,769	115,582	9,260	118,097	9,461	125,278	10,037

Moving to the second column with the cut-off at 90% of the MSA median, there would be 111,257 school age students who live in qualifying Shelby County ZIP codes; 14,296 more than with the 80% cut-off. We estimate a within-2nd-year-increase of 8913 students attending private schools from the qualifying Shelby ZIP codes. With the 90% cutoff, some Tipton and Fayette County ZIP code areas would qualify for the program.

Using the 100% cut-off median family income level for ZIP code eligibility, there are 118,097 eligible students in the MSA, and we project an increase of 9,461 students attending private schools in the MSA.

The 110% of median numbers allow us to estimate how many children are just barely left out by setting the cutoff at 100% of the Memphis MSA's Median Family Income. This information probably has some special importance when 'near-miss' ZIP code areas are in close proximity to qualifying areas. Movement of families from non-qualifying "near-miss" areas to contiguous qualifying areas is especially likely, which could push median family incomes downward in the near-miss areas.

At some later date, the near-miss ZIP code may have a lower median family income than the nearby ZIP codes in the ED Zone which is now attracting families who are concerned about school quality. If this happens, subsequent legislation may be needed to designate the original near-miss ZIP codes as new ED Zones.

Table 2 considers the effects of setting the ESA dollar amount at various alternative values. Table 1 estimates assumed that the dollar value of the ESA amount would be $7000. In Table 2, we show the expected number of new private school students for lesser ESA values (of $4000, $5000 and $6000.) Note that if we set the ZIP code eligibility requirement to include all ZIP codes with Median Family Incomes below 100% of the MSA Median Family Income (last column of Table 2), we will only attract 5406 new private school students with the ESA value set at $4000 as compared to 9461 new students when the ESA value is $7000.

Table 2: Expected Change in MSA Private School Demand (ΔPRIV) at various ESA amounts

Cut-off level for ZIP code eligibility
(Calculated as in Table 1)

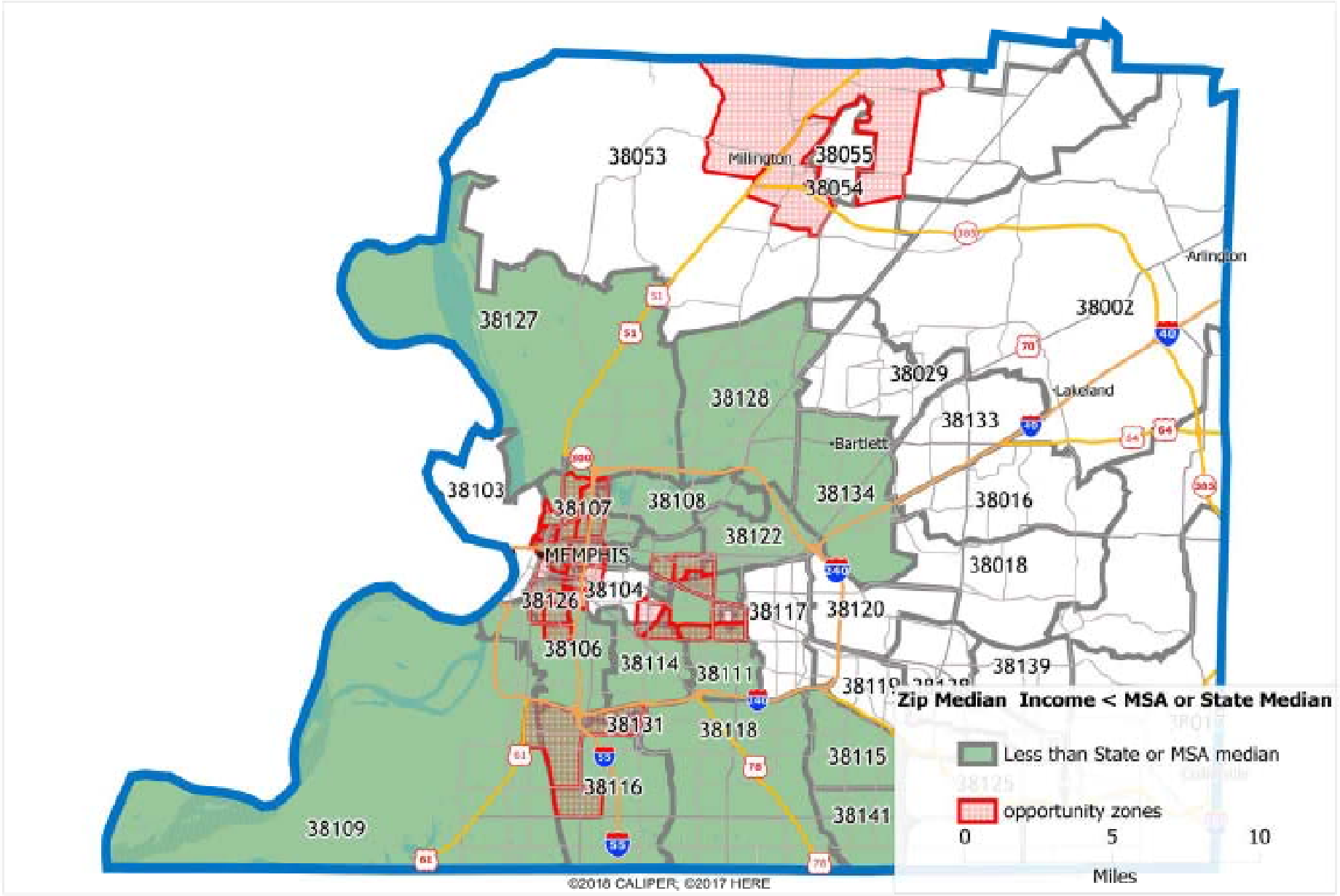
ESA Amount	80%	90%	100%
$4,000	4,440	5,291	5,406
$5,000	5,550	6,614	6,758
$6,000	6,659	7,937	8,110
$7,000	7,769	9,260	9,461

Table 3, shows the ZIP codes that are "near misses" at various zip-code eligibility cut-off levels. For example, when the cut-off is 80% of the MSA median family income, we see that there are 5 ZIP codes that are "near misses" because they have median family incomes higher than 80%, but lower than 90% of the MSA median.

Table 3: Near-miss ZIP codes when qualification level is set at 80%, 90% and 100% cut-offs

alternative zip code cut-off levels		
80%	90%	100%
near miss zip codes		
zip codes with MFI ratio between 80% and 90%	**zip codes with MFI ratio between 90% and 100%**	**zip codes with MFI ratio between 100% and 110%**
38015	38057	38053
38019	38068	38055
38049		38058
38134		38076
38141		

Shelby TN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38055
38054
Arlington
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38127
38029
38128
Lakeland
38133
Bartlett
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38134
38016
38122
MEMPHIS
38018
38104
38126
38117
38120
38106
38114
38111
38139
38131
38118
38115
38116
38141
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Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
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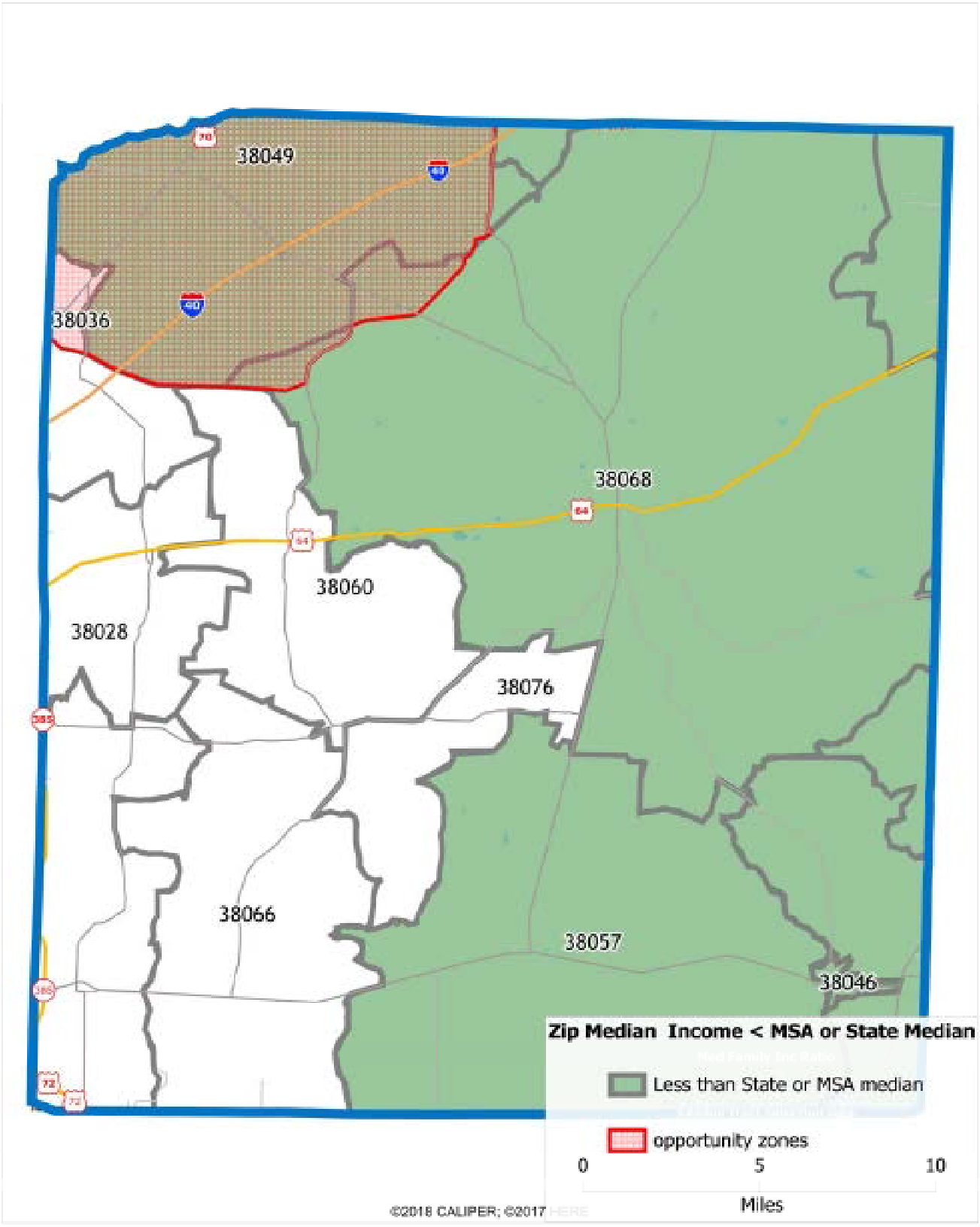
Fayette TN


38049
38036
38068
38060
38028
38076
38066
38057
38046
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
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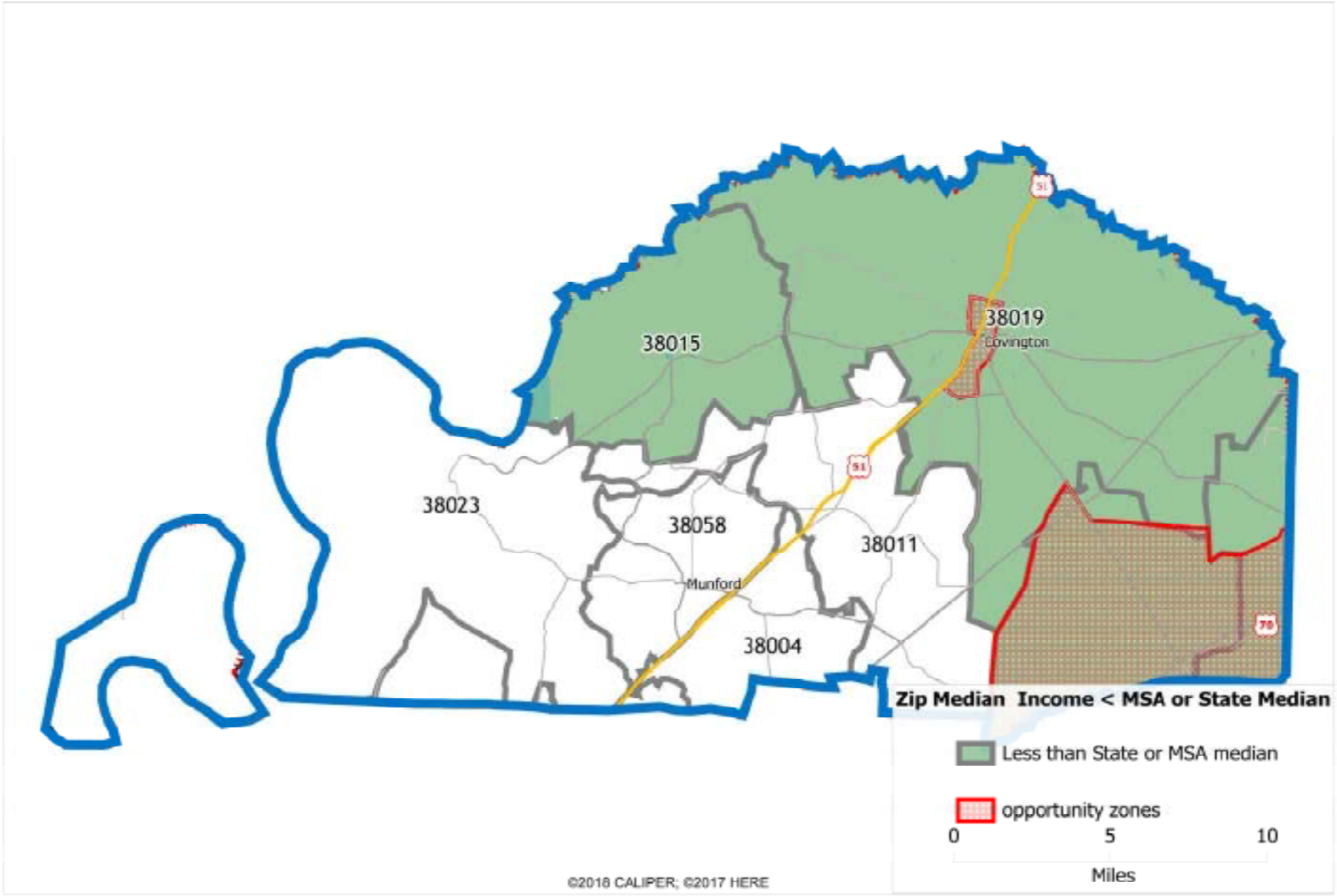
Tipton TN


38015
38019
Covington
38023
38058
38011
Munford
38004
51
51
70
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
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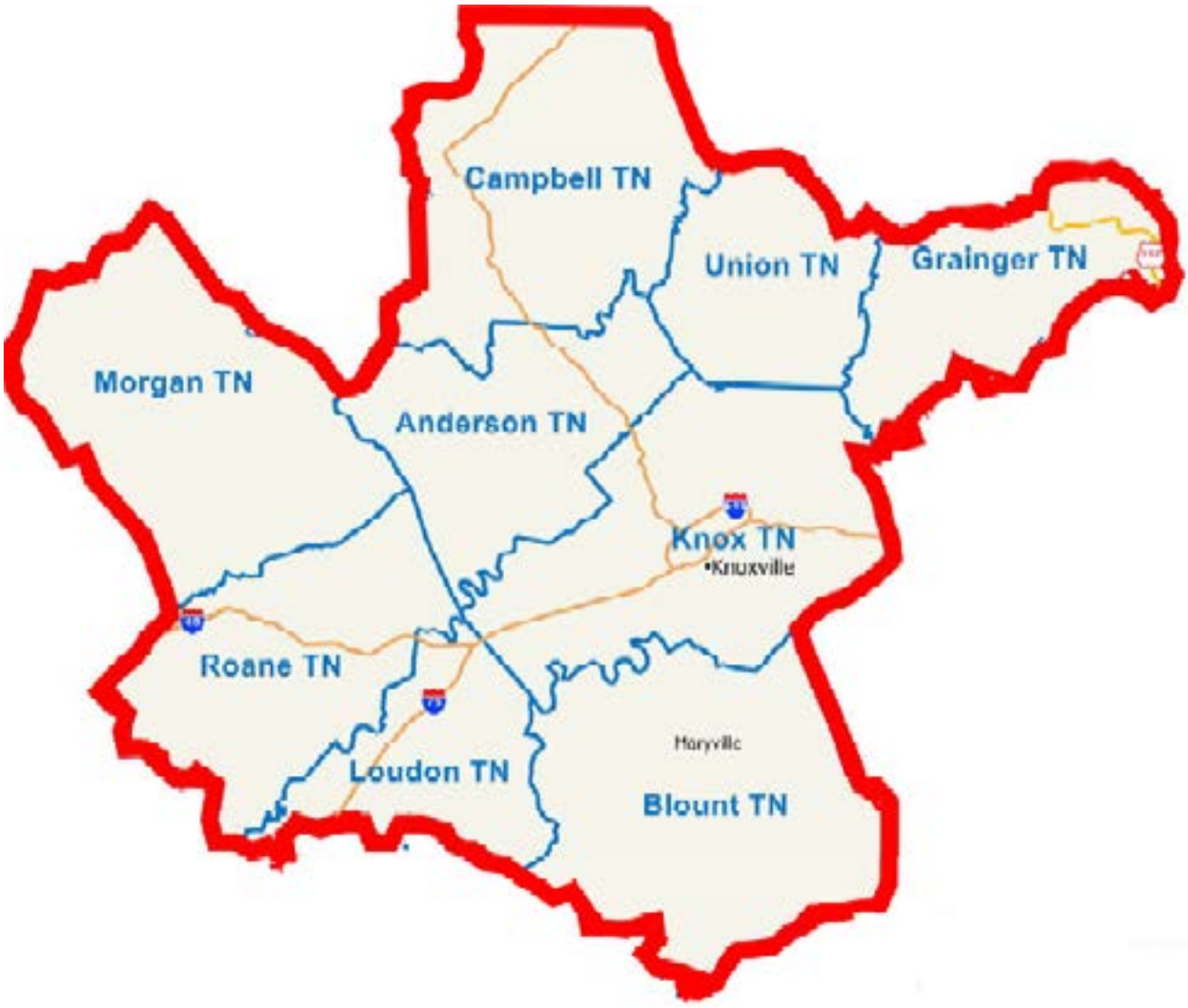
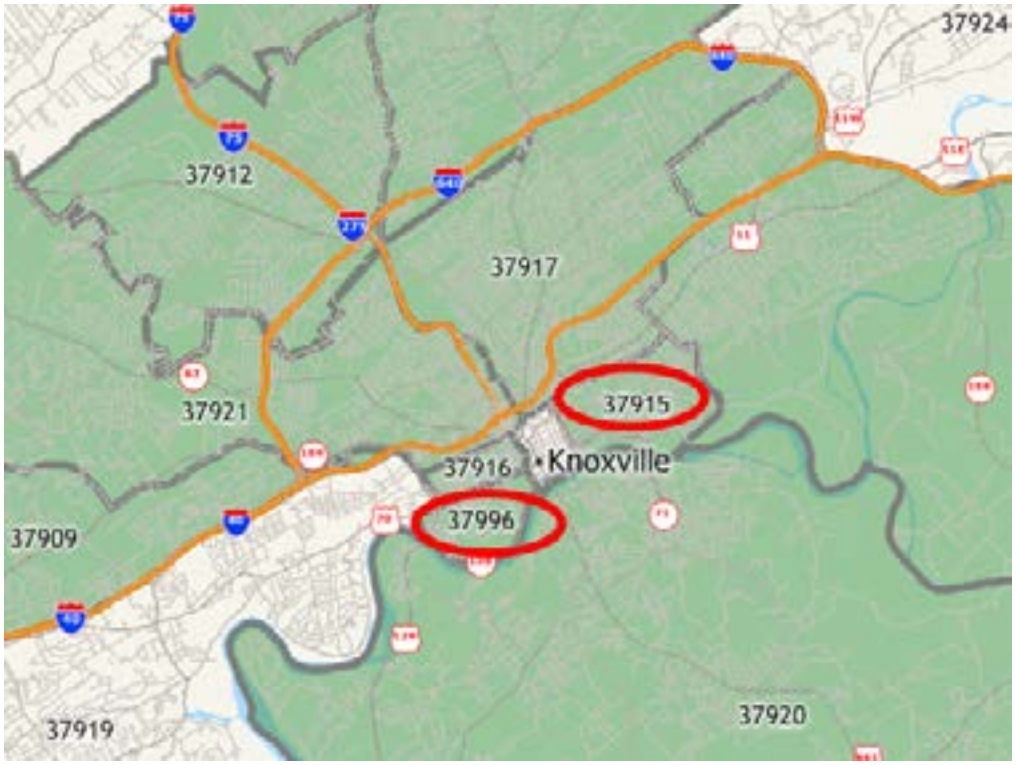
Knoxville MSA Report

The Knoxville MSA has 9 counties: Anderson, Blount, Campbell, Grainger, Knox, Loudon, Morgan, Roane, and Union.



Unlike Shelby County in the Memphis MSA and Hamilton County in the Chattanooga MSA, Knox County (Knoxville) does not dominate its MSA's ESA-qualifying school-age population. Depending upon the income level cutoff, the Knox County ESA-qualifying ZIP code areas account for about 40% of the total MSA's qualifying population.

Moreover, our analysis probably overstates the number of children who would qualify for an ESA in Knoxville because the data does not adequately distinguish high-school seniors from young students at the University of Tennessee. The University's 37996 ZIP code has a very low median income, but probably very few (probably zero) actual ESA candidates. Ten of the Knoxville MSA's poorest ZIP code area's are outside Knox County, with six of those ten in Blount and Campbell County. However, by far, the poorest Knoxville MSA ZIP code area is 37915 in NE Knoxville, with a Median Family Income of 36% of the Knoxville MSA Median Family Income.



Sensitivity Analysis

Because there are relatively few really poor ZIP code areas, but many clustered around the MSA Median Family Income, the number of students eligible depends quite a bit on the cut-off MFI % chosen. Changing the cutoff from 80% to 90% increases the ESA-eligible number for the MSA by 23,554. Moving the cutoff from 90% to 100% adds another 41,240.

Table 1: Qualification Outcomes (ΔPRIV based on $7,000 ESA)

Cut-Off level for ZIP code eligibility calculated as:
(ZIP code Median Family Income as a percent of MSA Median Family Income)

	80%		90%		100%		110%	
Counties	**S.A.POP**	**ΔPRIV**	**S.A.POP**	**ΔPRIV**	**S.A.POP**	**ΔPRIV**	**S.A.POP**	**ΔPRIV**
Anderson	1,265	101	2,236	179	7,679	615	7,679	615
Blount	1,450	116	2,390	191	7,858	630	20,756	1,663
Campbell	5,315	426	5,315	426	7,095	568	7,095	568
Grainger	3,663	293	3,663	293	4,434	355	4,434	355
Knox	16,885	1,353	22,669	1,816	40,795	3,268	45,150	3,617
Loudon	979	78	4,262	341	4,262	341	7,098	569
Morgan	2,083	167	4,604	369	4,611	369	4,645	372
Roane	0	0	3,102	249	3,102	249	3,102	249
Sumner	1,754	141	8,052	645	17,697	1,418	17,697	1,418
Union	2,712	217	2,967	238	2,967	238	2,967	238
TOTAL	36,106	2,893	59,260	4,748	100,500	8,052	120,623	9,664

Table 2: Expected Change in MSA Private School Demand (ΔPRIV) at various ESA amounts

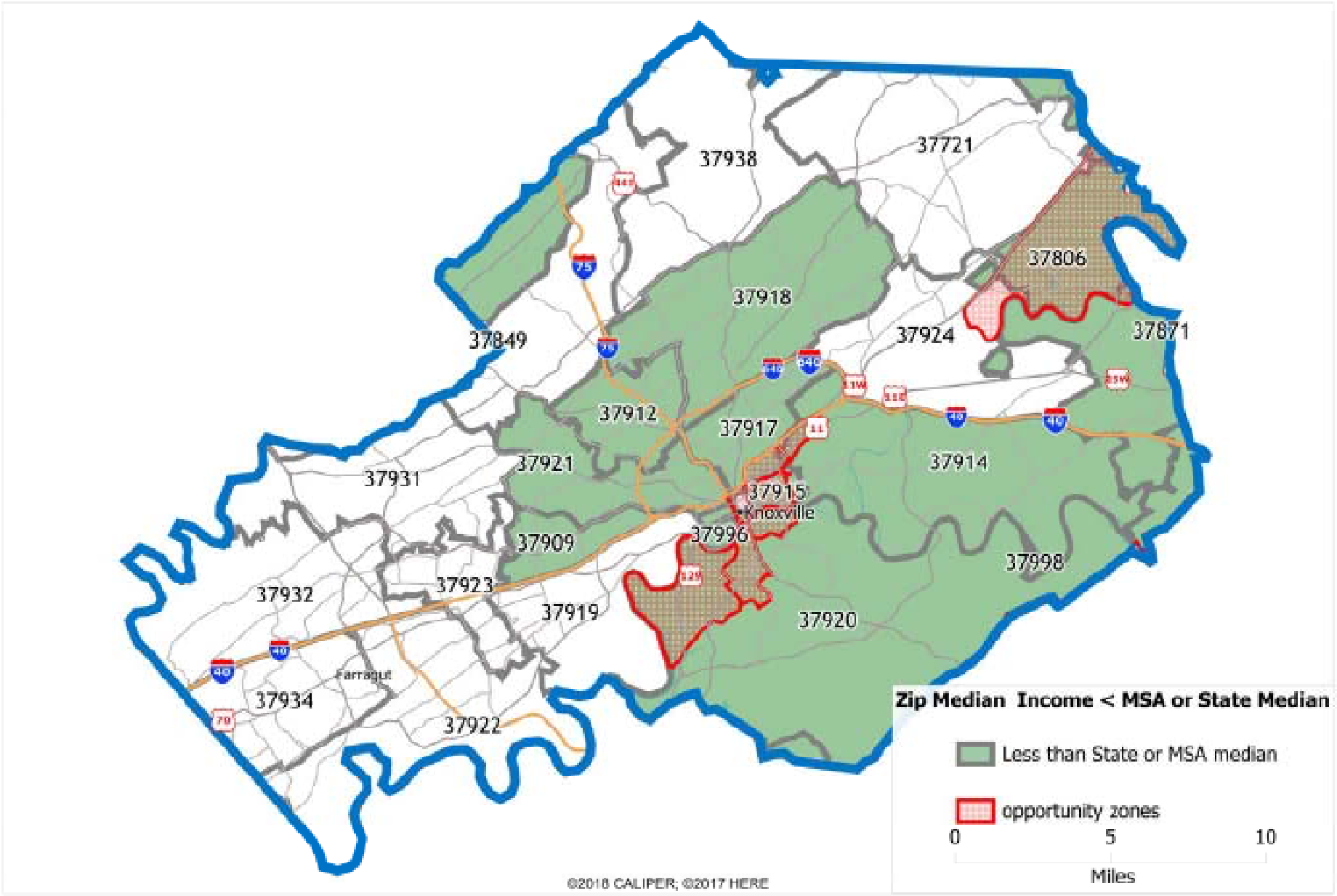
Cut-off level for ZIP code eligibility
(Calculated as in Table 1)

ESA Amount	80%	90%	100%
$4,000	1,653	2,713	4,601
$5,000	2,066	3,391	5,751
$6,000	2,479	4,069	6,901
$7,000	2,893	4,748	8,052

Table 3: Near-miss ZIP codes when qualification level is set at 80%, 90% and 100% cut-offs

alternative zip code cut-off levels		
80%	90%	100%
near miss zip codes		
zip codes with MFI ratio between 80% and 90%	zip codes with MFI ratio between 90% and 100%	zip codes with MFI ratio between 100% and 110%
37022	37031	37719
37148	37066	37721
37748	37705	37774
37754	37709	37777
37770	37716	37803
37771	37733	37804
37840	37757	37878
37866	37801	37924
37882	37821	38482
37886	37853	
37890	37909	
37921	37918	
37998	37920	
38401		
38487		

Knox TN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37806
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37849
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37912
37917
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37931
37915
Knoxville
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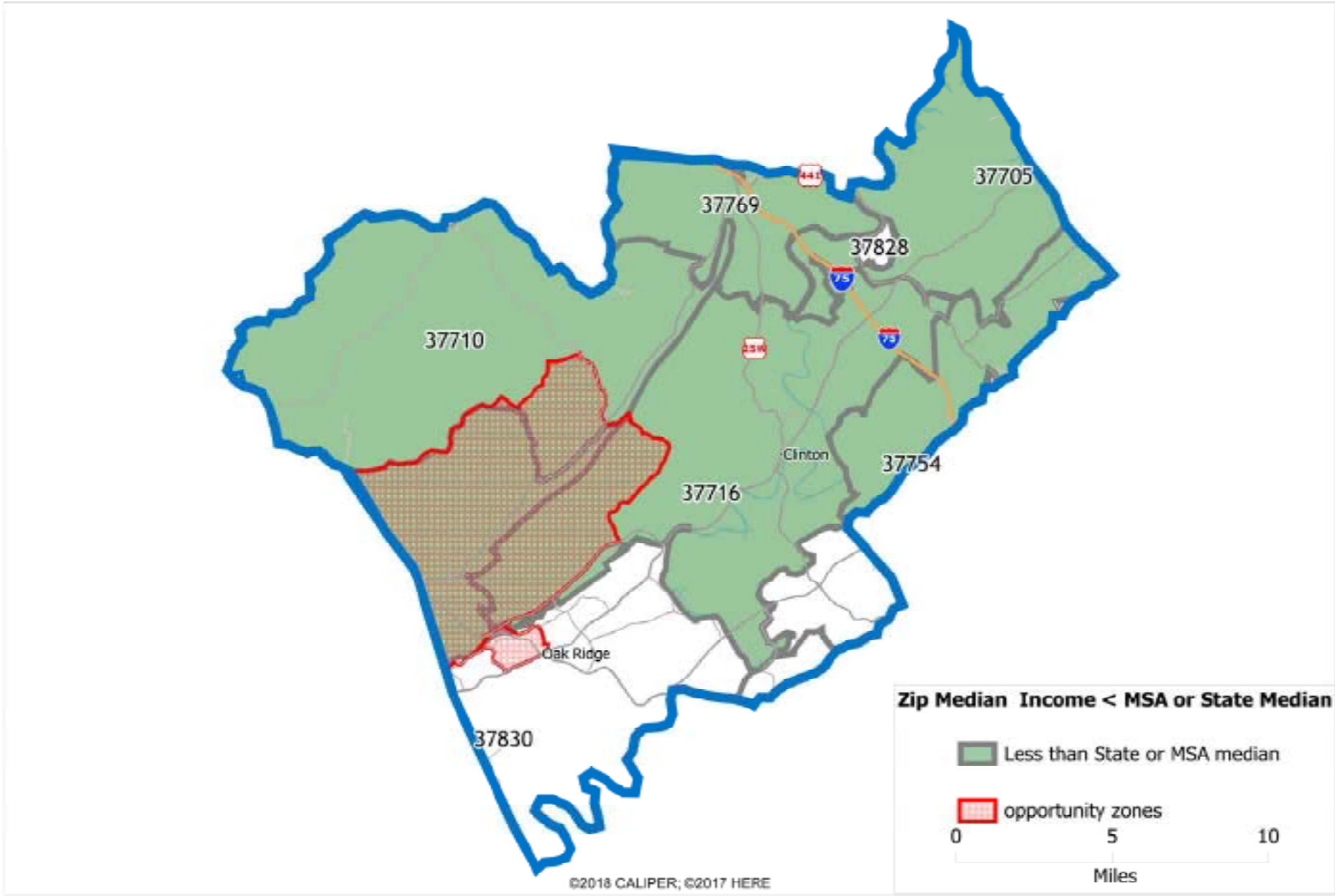
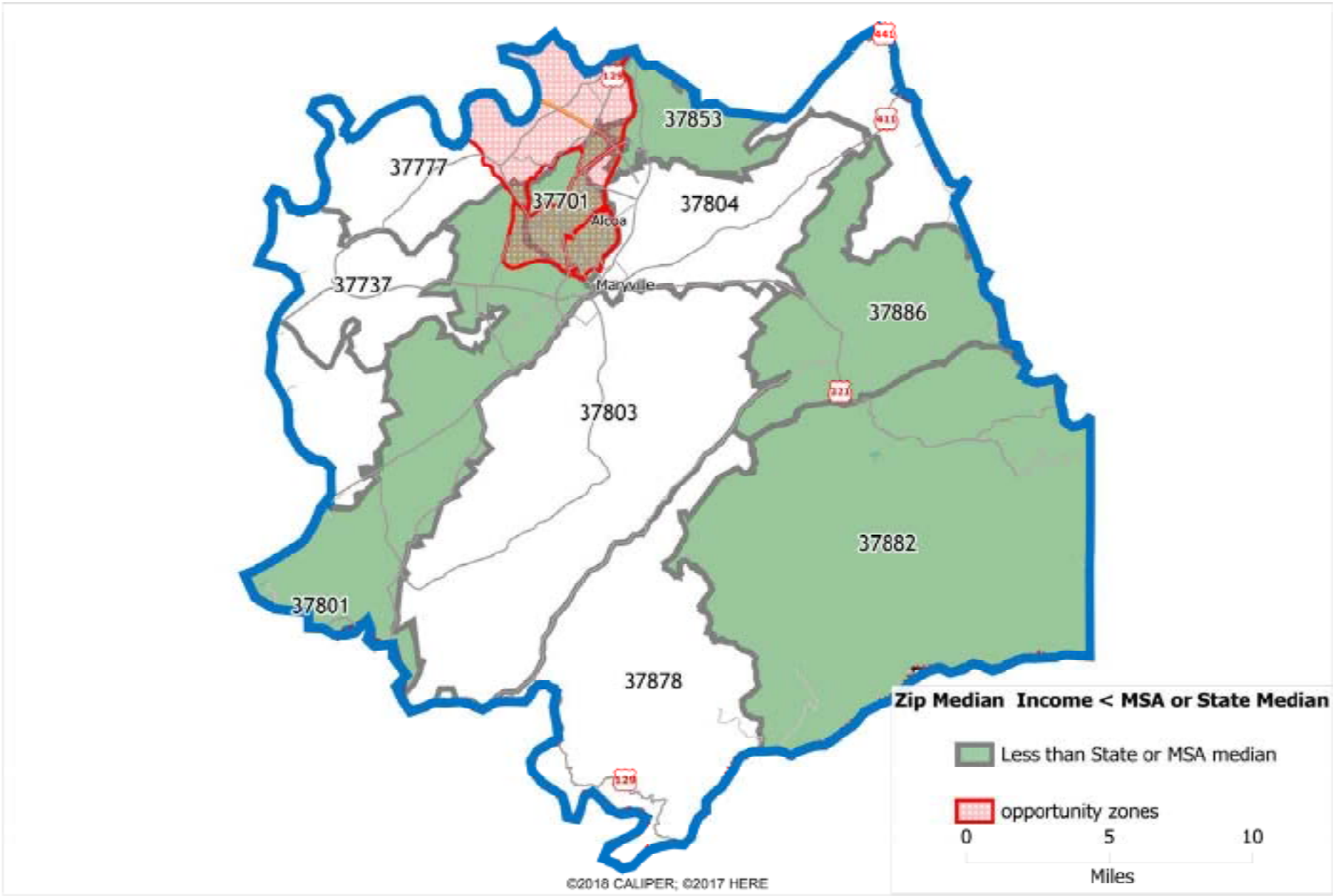
37996
37998
37923
37932
37919
37920
Farragut
37934
37922
©2018 CALIPER; ©2017 HERE
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles

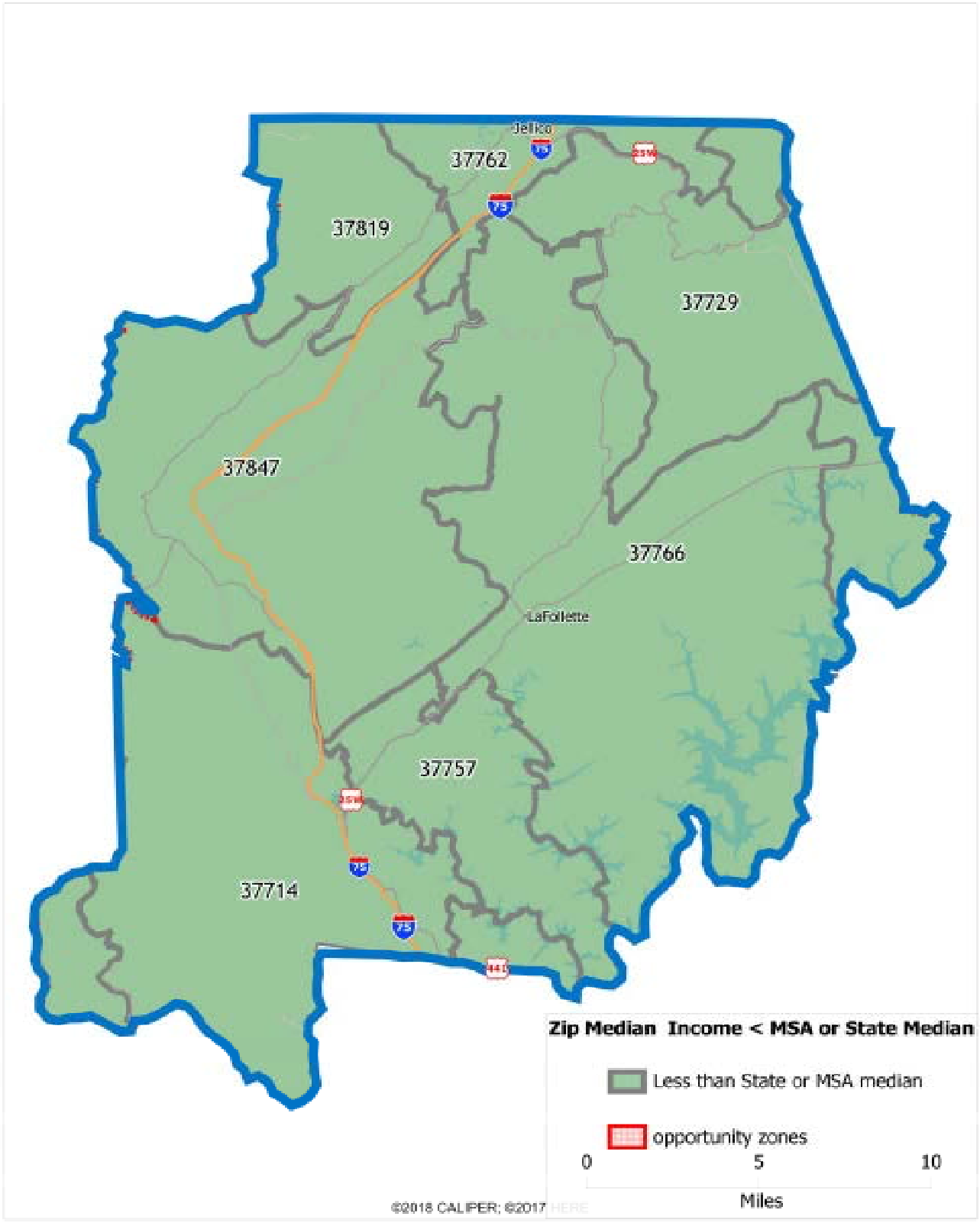
Anderson TN


37705
37769
37828
37710
Clinton
37754
37716
Oak Ridge
37830
©2018 CALIPER; ©2017 HERE
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles

Blount TN


37853
37777
37701
37804
Alcoa
37737
Maryville
37886
37803
37882
37801
37878
©2018 CALIPER; ©2017 HERE
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles

Campbell TN


Jellico
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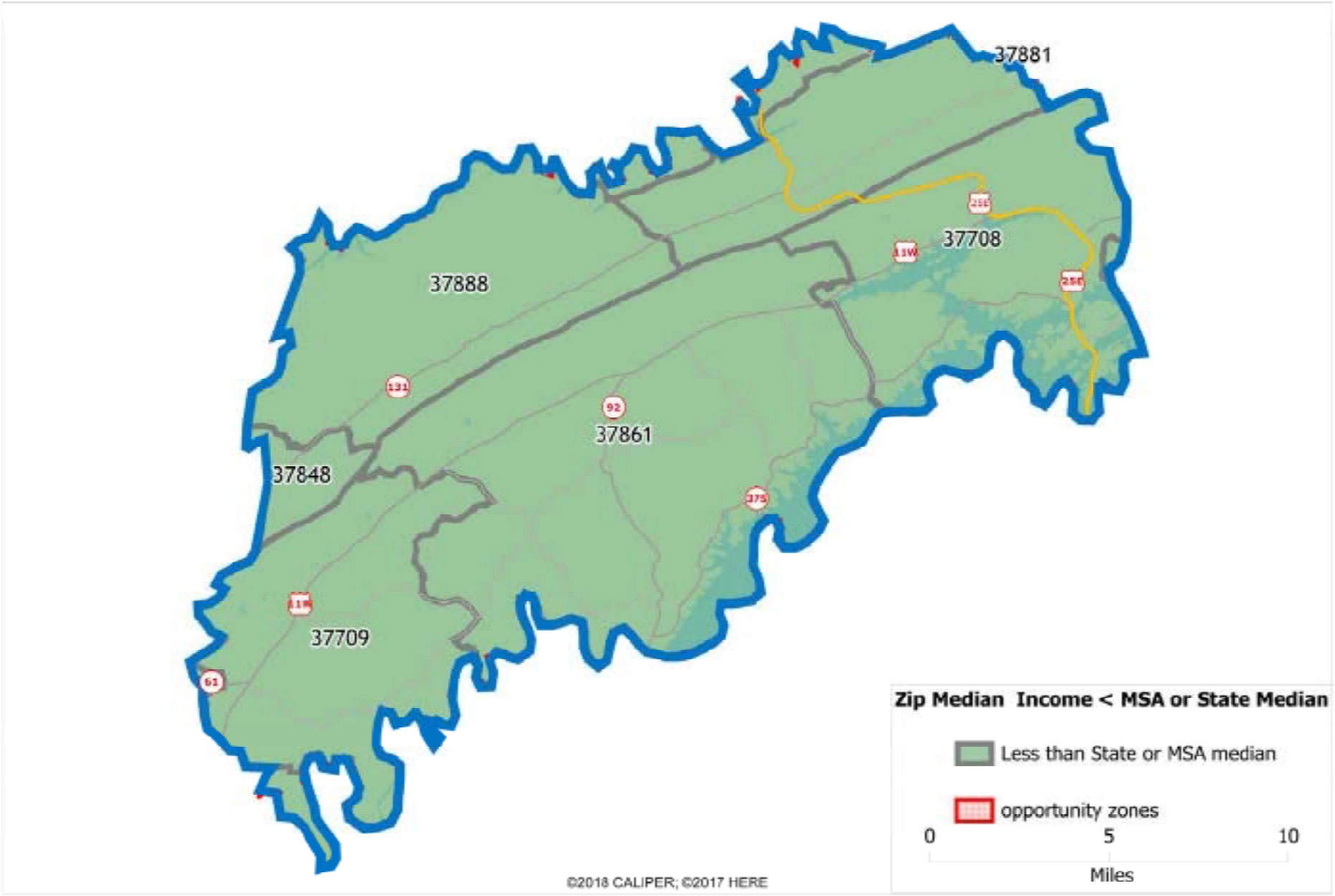
37819
37729
37847
37766
LaFollette
37757
37714
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
©2018 CALIPER; ©2017 HERE

Grainger TN


37881
37708
37888
37861
37848
37709
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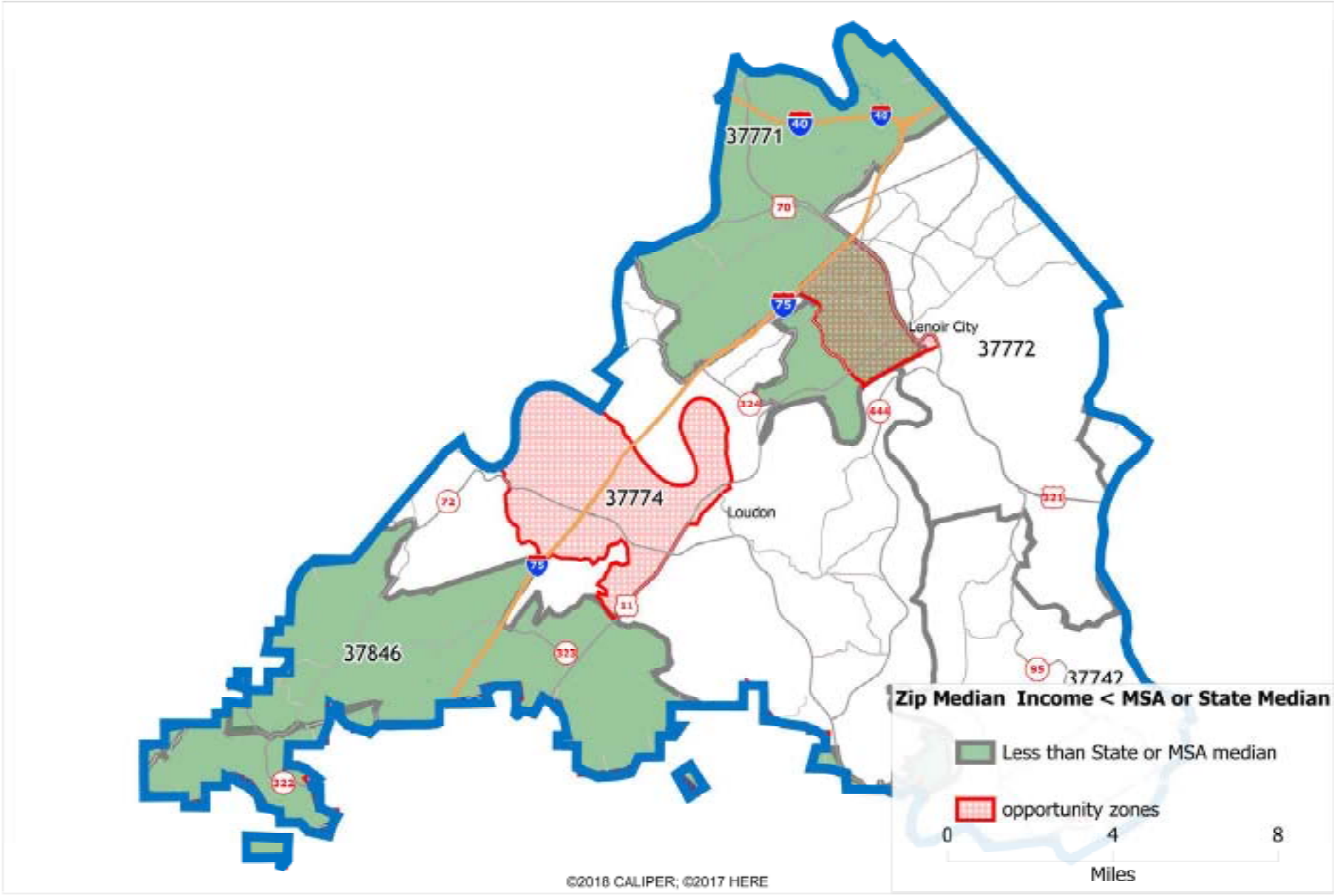
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles

Loudon TN


37771
Lenoir City
37772
37774
Loudon
37846
37742
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
4
8
Miles
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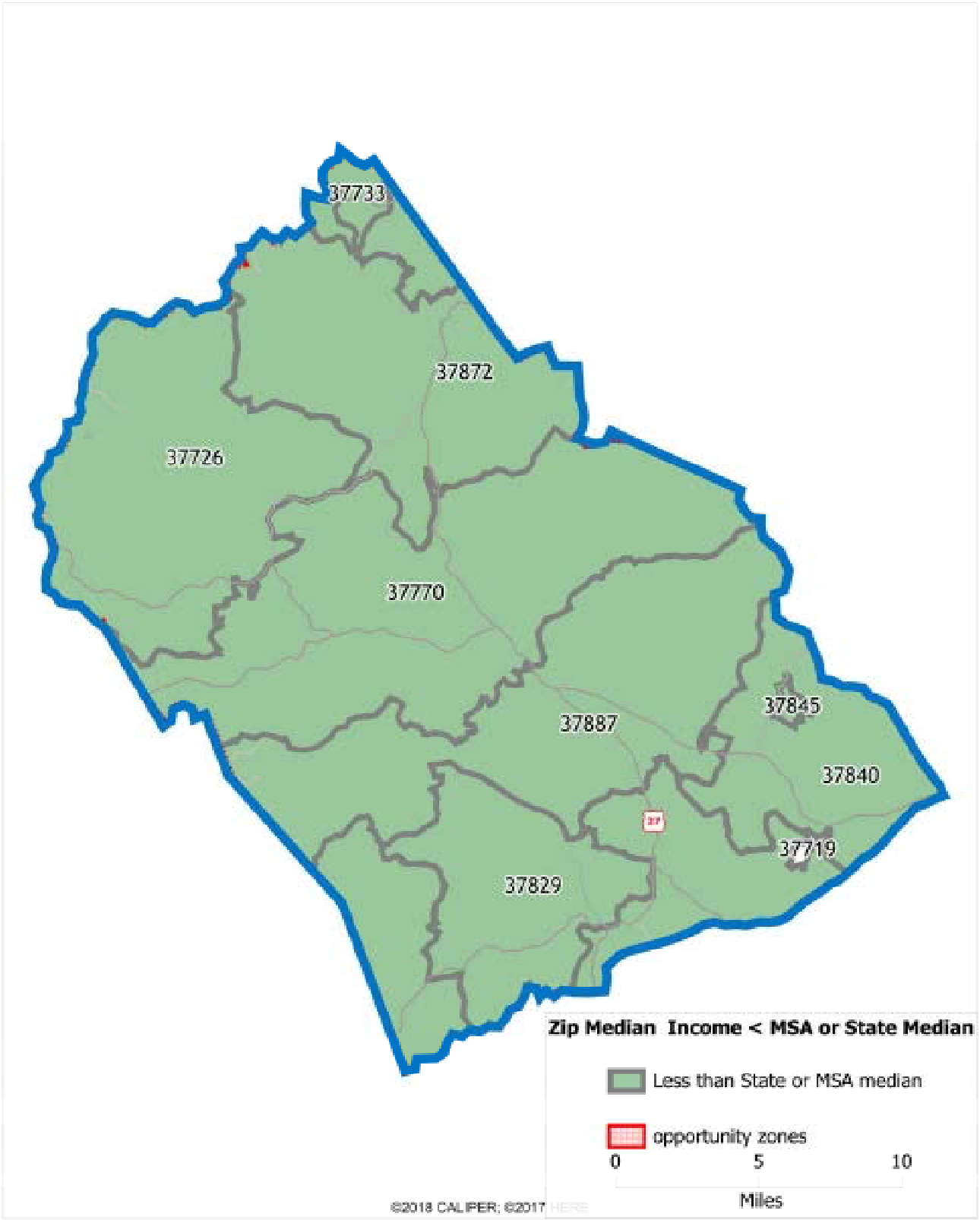
Morgan TN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37872
37726
37770
37887
37845
37840
37719
37829
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
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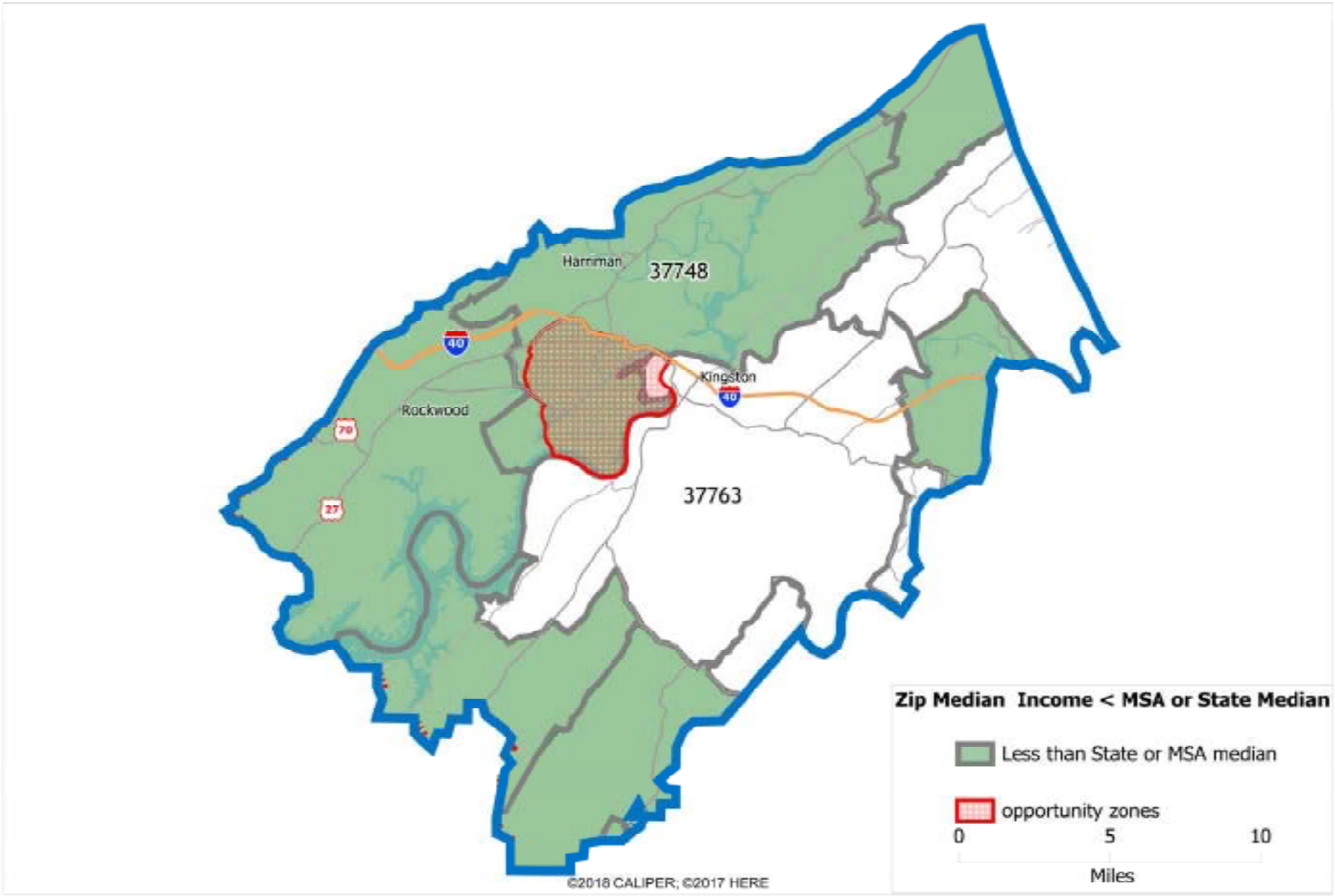
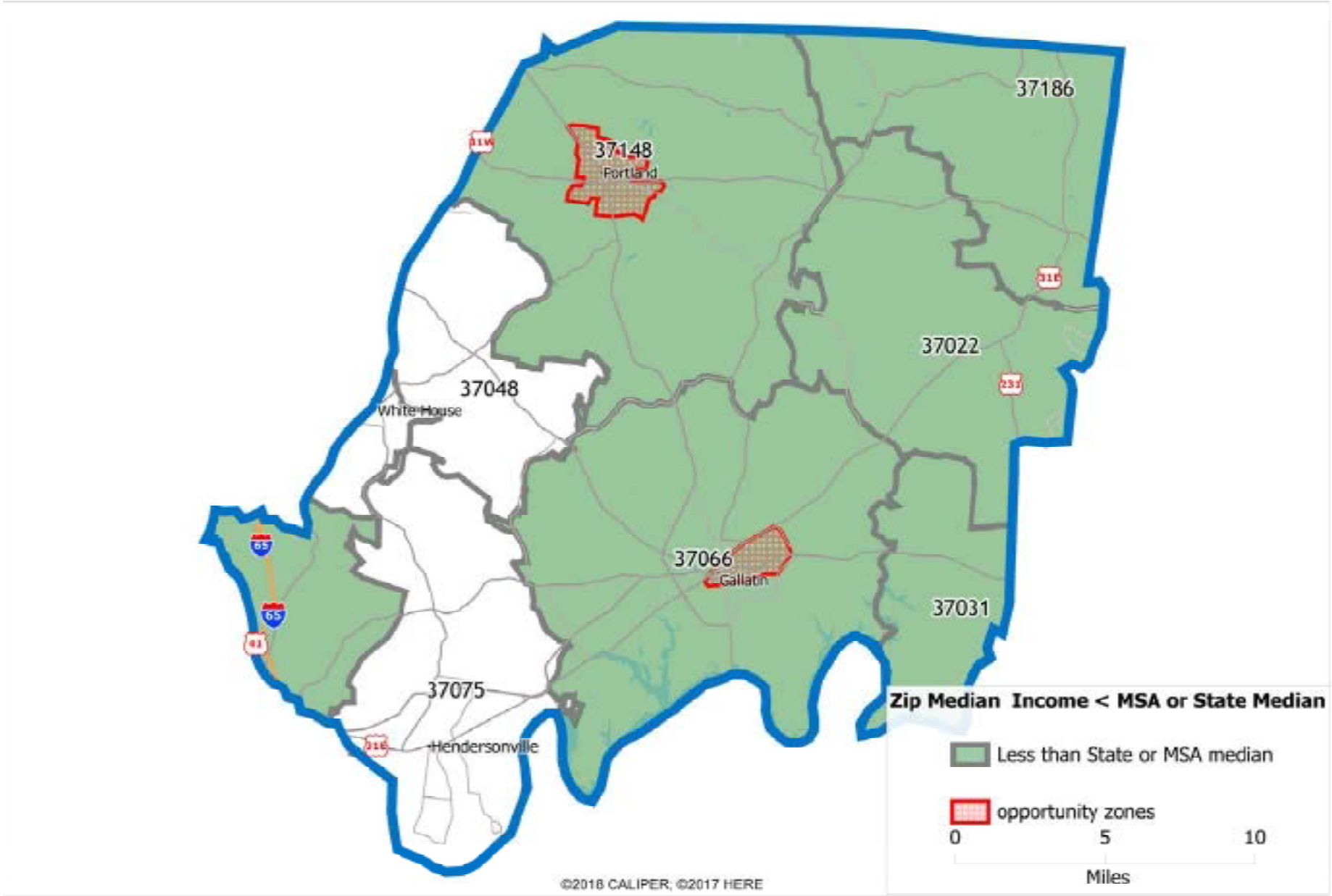
Roane TN


Harriman
37748
Kingston
Rockwood
37763
40
70
27
©2018 CALIPER; ©2017 HERE
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles

Sumner TN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37148
Portland
37022
37048
White House
37066
Gallatin
37031
37075
Hendersonville
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
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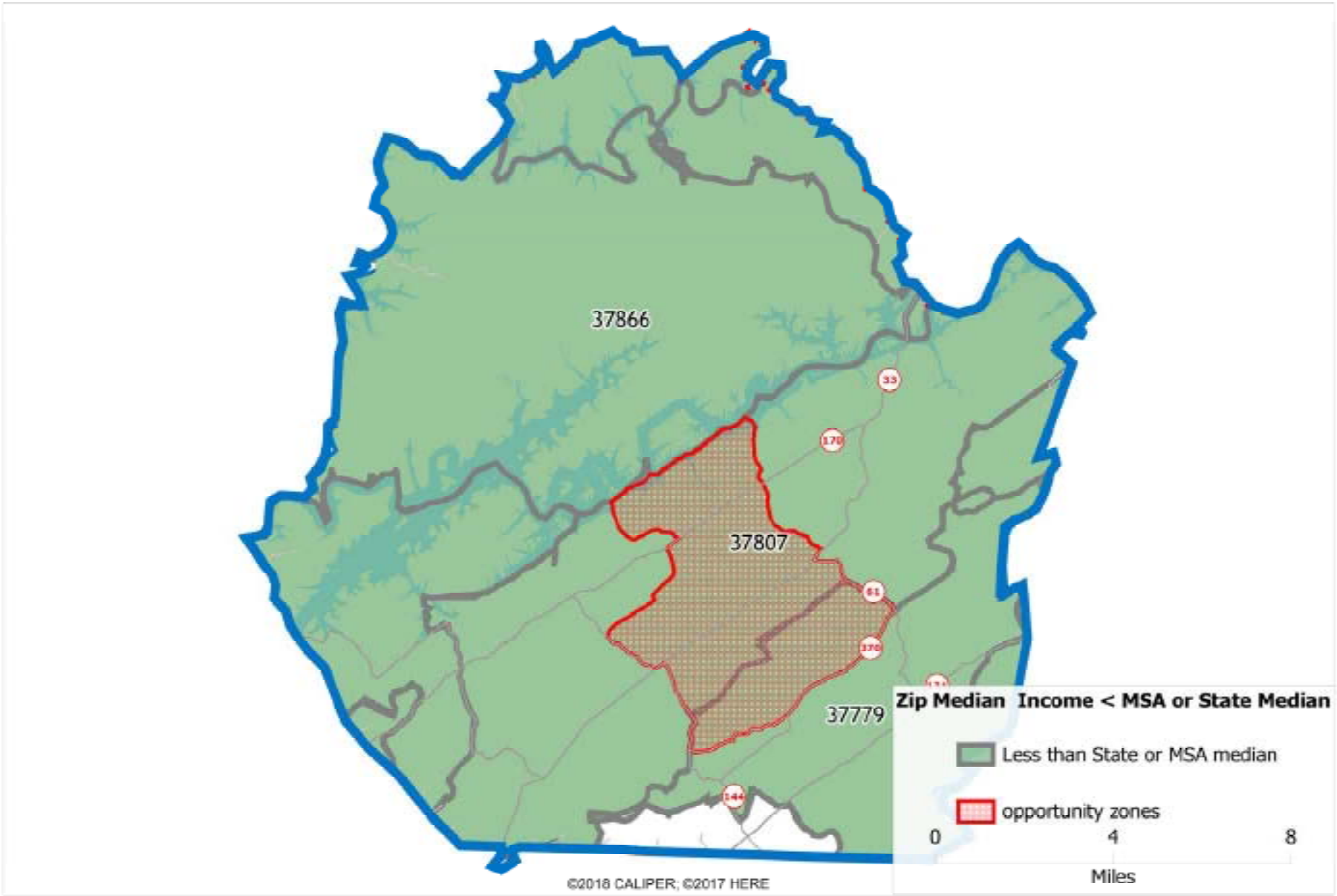
5
10
Miles
©2018 CALIPER; ©2017 HERE

Union TN


37866
37807
37779
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
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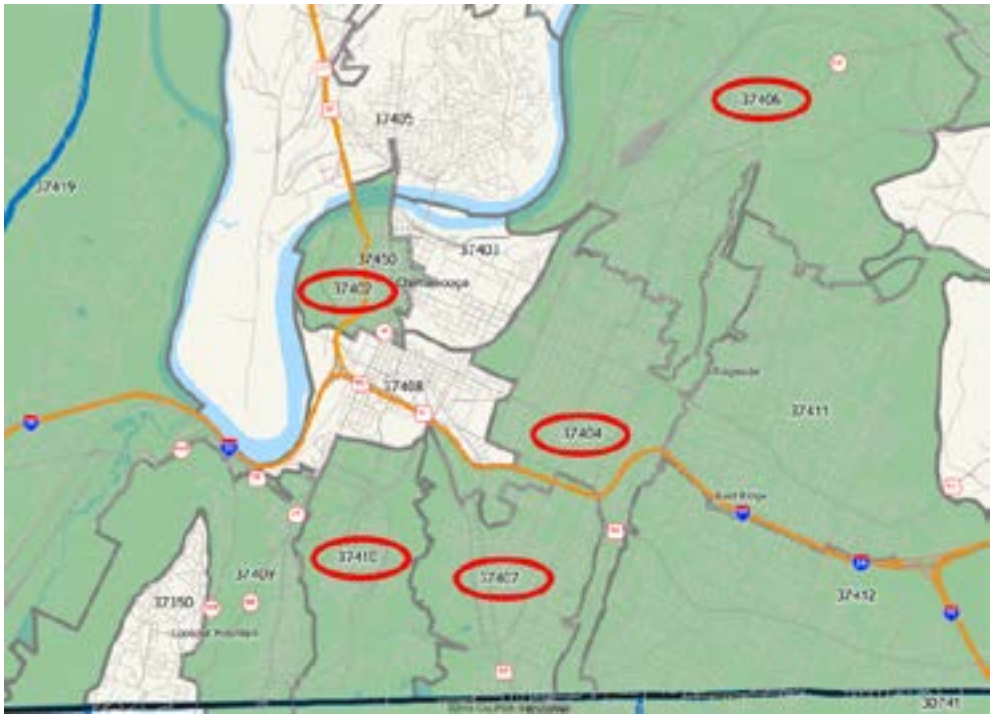
8
Miles
©2018 CALIPER; ©2017 HERE

Chattanooga MSA Report

Hamilton, Marion, and Sequatchie are the three Tennessee counties in the Chattanooga MSA.

All of the lowest-income ZIP codes in the MSA are in the city of Chattanooga (in Hamilton County). Five ZIP code areas (37402, 37404, 37406, 37407, and 37410) are below 58% of the MSA Median Family Income.



Two of those are really, really poor areas; 37402 (western ~2/3 of downtown Chattanooga) at 23% of the MSA's Median Family Income and 37410 at 34% of the MSA's Family Median Income. Several others are eligible at the 80%, 90%, and 100% cut-offs.

The Median Family Incomes of the ten Marion and Sequatchie ZIP code areas range from 78% to 172% of the MSA's Median Family, with six of the ten between 78% and 81%, and another at 88%.

Sensitivity Analysis

Clearly, there is quite a bit of sensitivity to the Relative MFI % cut-off level near the 80% value. This sensitivity could be seen as a key reason for setting the cut-off no lower than 90%. We compare those cut-offs in the first table, below.

Table 1 reports the School Age Population (S.A. POP) and the expected increase in demand for private schooling (ΔPRIV) in each MSA county, given various cutoffs for ZIP code eligibility. Table 2 indicates the increase in MSA private school use at four different ESA values. Following that, in Table 3, is a list of ZIP codes within ten percentage points of the cut-off level at the top of the column.

Table 1: Qualification Outcomes (ΔPRIV based on $7,000 ESA)

Cut-Off level for ZIP code eligibility calculated as:
(ZIP code Median Family Income as a percent of MSA Median Family Income)

	80%		90%		100%		110%	
Counties	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV
Hamilton	12,784	1,024	16,724	1,340	21,003	1,683	29,386	2,354
Marion	3,246	260	3,836	307	5,223	418	5,223	418
Sequatchie	0	0	2,351	188	2,351	188	2,351	188
TOTAL	16,030	1,284	22,911	1,836	28,577	2,289	36,960	2,961

Table 2: Expected Change in MSA Private School Demand (ΔPRIV) at various ESA amounts

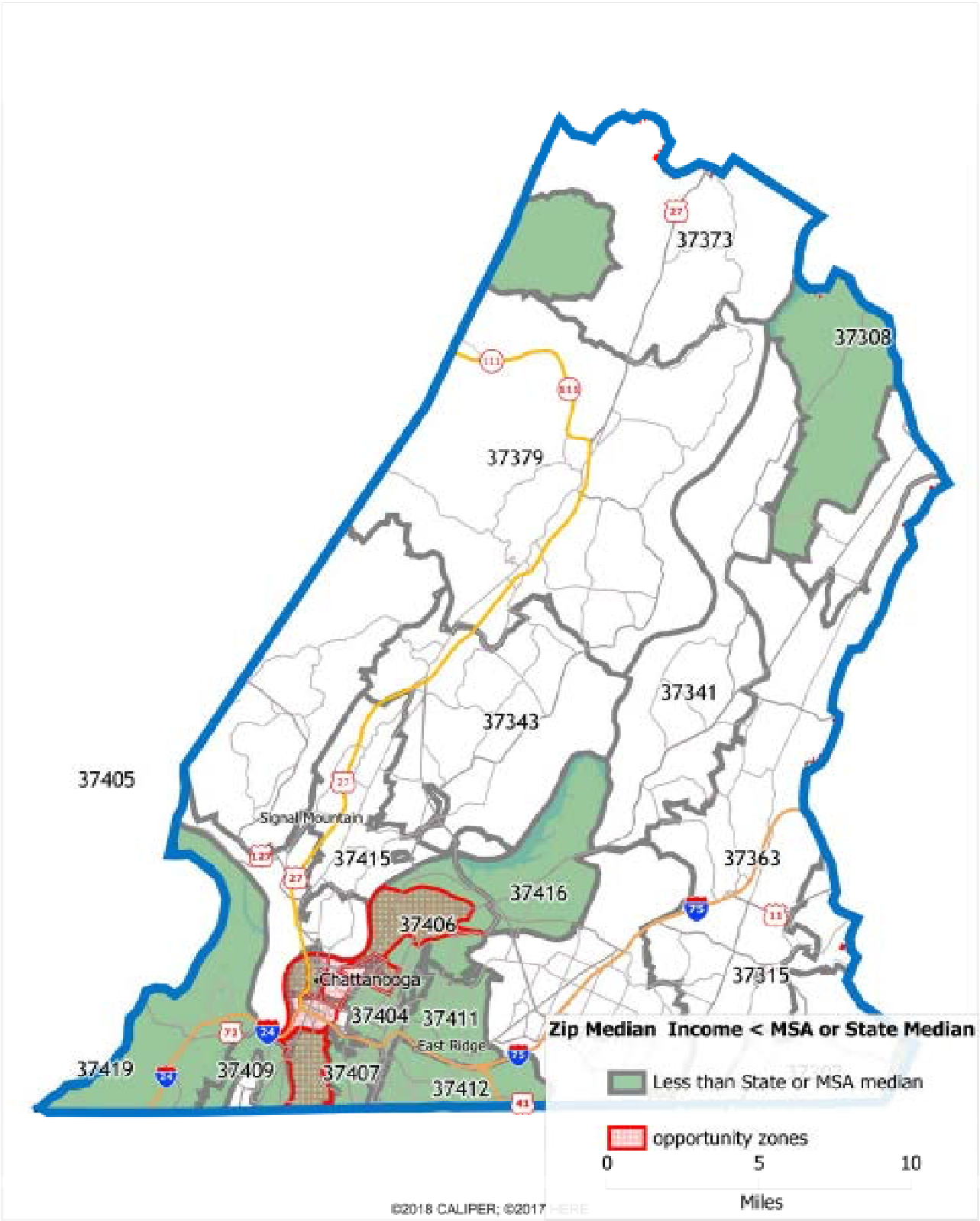
Cut-off level for ZIP code eligibility
(Calculated as in Table 1)

ESA Amount	80%	90%	100%
$4,000	734	1,049	1,308
$5,000	917	1,311	1,635
$6,000	1,101	1,573	1,962
$7,000	1,284	1,836	2,289

Table 3: Near-miss ZIP codes when qualification level is set at 80%, 90% and 100% cut-offs

alternative zip code cut-off levels		
80%	90%	100%
near miss zip codes		
zip codes with MFI ratio between 80% and 90%	zip codes with MFI ratio between 90% and 100%	zip codes with MFI ratio between 100% and 110%
37327	37308	37373
37356	37347	37379
37374	37409	37408
37412	37416	37415
	37419	38048

Hamilton TN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Signal Mountain
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37406
Chattanooga
37315
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37411
East Ridge
37419
37409
37407
37412
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
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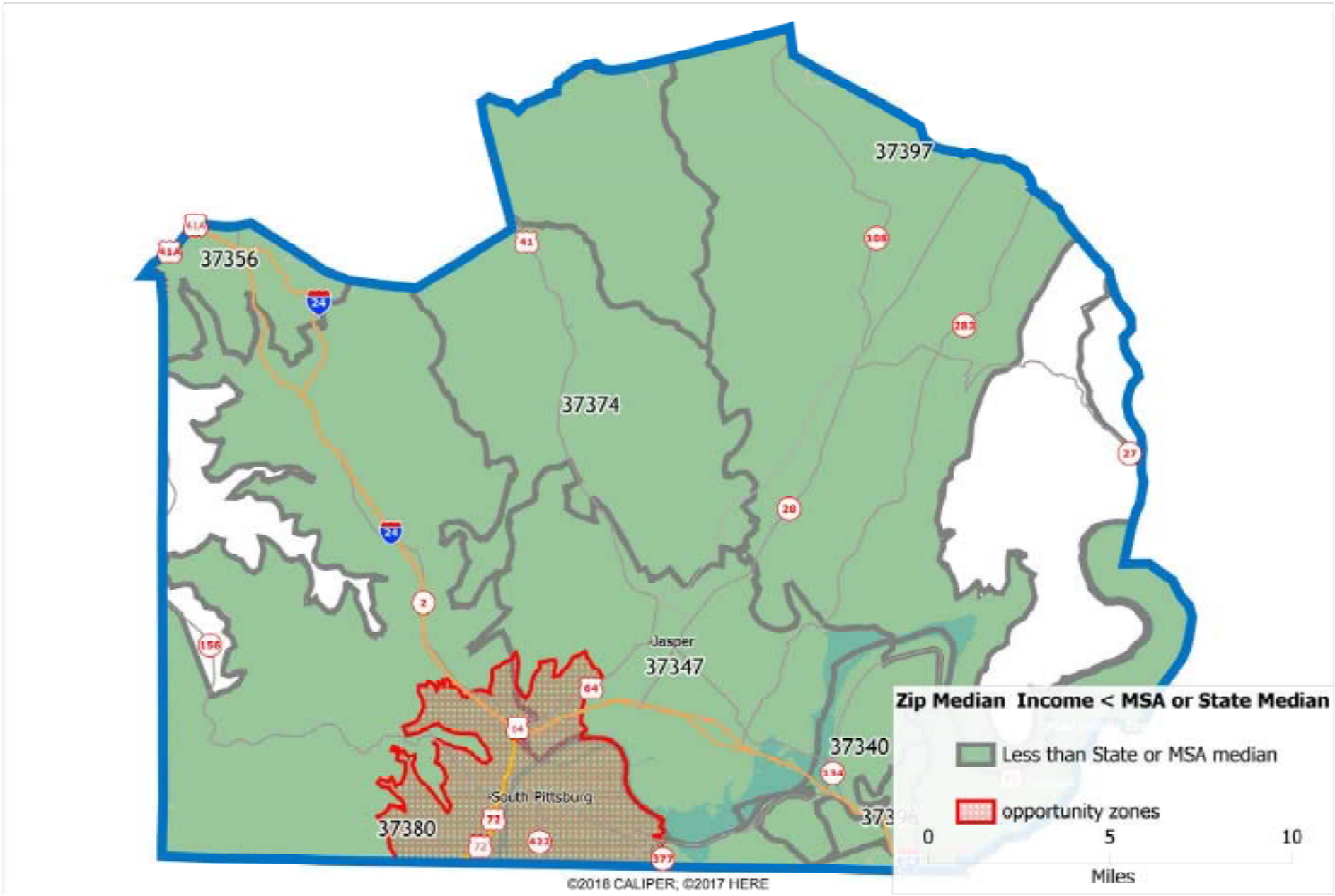
Marion TN


37397
37356
37374
Jasper
37347
37340
South Pittsburg
37380
Zip Median Income < MSA or State Median
Less than State or MSA median
opportunity zones
0
5
10
Miles
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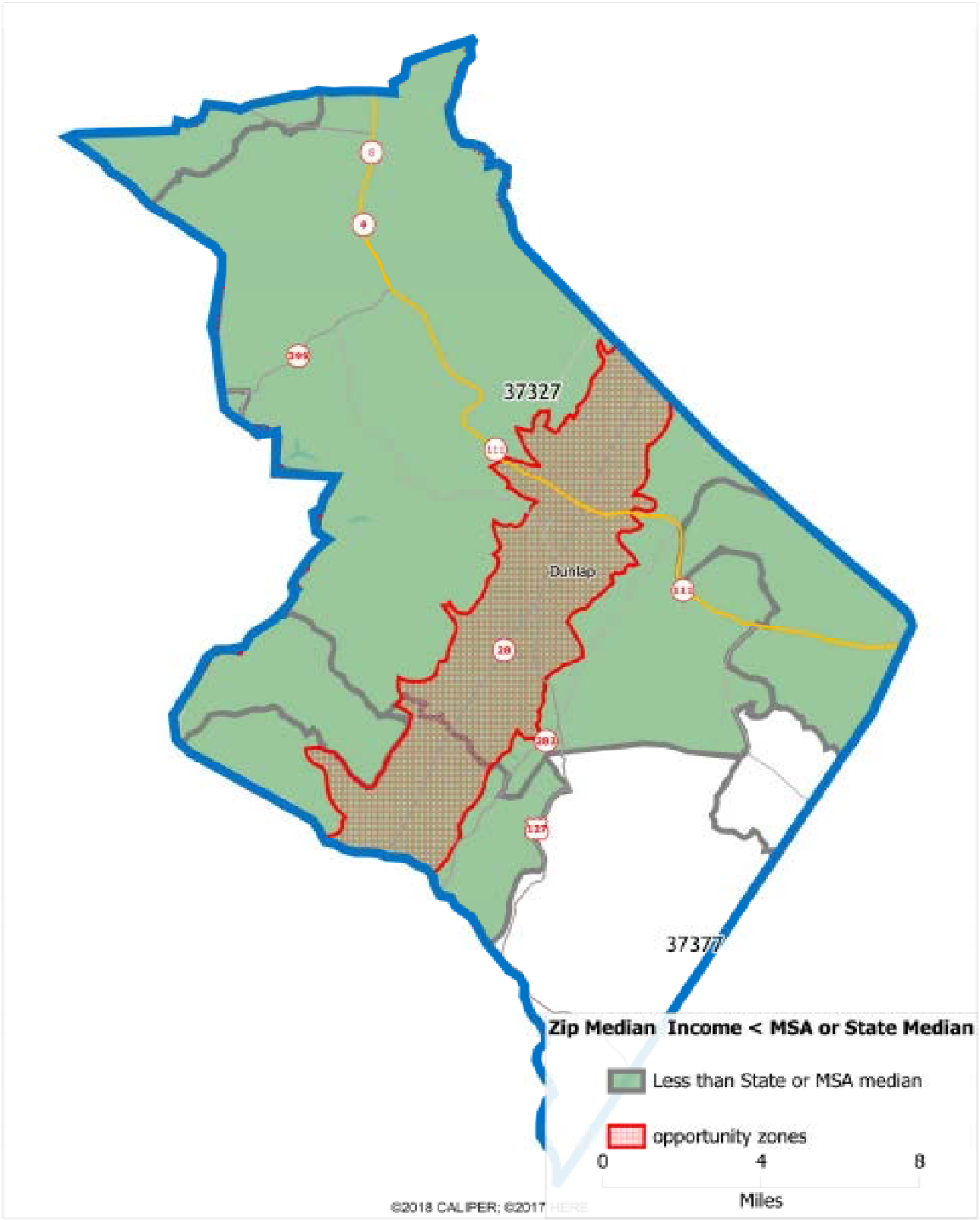
Sequatchie TN



Rest-of-Tennessee Report

Tennessee has 645 ZIP code areas. Of those, 288 are in the Memphis, Chattanooga, Nashville, and Knoxville MSAs. 357 zips are the rest of the state. Since the outskirts of those four MSAs have the highest concentrations of Tennessee's higher-income families, 307 of the remaining 357 have a median family income that is below the state median.

Of those 307, 57 of the ZIP codes are very poor, having median family incomes that are less than 70% of the state median. 85 ZIP codes have median family incomes between 70% and 80% of the state median. 101 ZIP codes are between 80% and 90%, and 64 ZIP codes are only slightly below the state median, between 90%-100%.

Sensitivity Analysis

The most striking and significant aspect of Table 1 below is the effect of the cutoff level on how many counties have enough ESA-eligible children to significantly increase the demand for private schools (ΔPRIV). Most likely, ΔPRIV<100 in a county may only enough to decrease the vacancy rate of existing private schools. A single, or even two, new private schools might struggle to provide an improved fit for enough children to garner sufficient enrollment to be viable.

It may be worth considering whether a county needs ΔPRIV > 200 to motivate much of an increase in private school supply (new private school seats for children to fill) to meet the increased demand. With an ESA worth $7000, and an 80% Relative MFI cut-off, only 19 of the 67 counties outside of the state's four largest MSAs with enough eligibility to increase private school demand by more than 200. With the 100% Relative MFI cut-off, nearly every county has enough increase in private school demand to prompt some significant additions to the menu of private schooling options.

Table 2 indicates the increase in private school use at four different ESA values. Following that is a list of ZIP codes within ten percentage points of the cut-off level at the top of the column.

Table 1: Qualification Outcomes (ΔPRIV based on $7,000 ESA)

Cut-Off level for ZIP code eligibility calculated as:
(ZIP code Median Family Income as a percent of MSA Median Family Income)

	80%		90%		100%		110%	
Counties	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV
Bedford	0	0	8,276	663	8,276	663	9,164	734
Benton	2,071	166	2,629	211	2,680	215	2,680	215
Bledsoe	1,754	141	1,754	141	2,383	191	2,383	191
Carroll	899	72	4,947	396	5,968	478	5,968	478
Claiborne	3,105	249	5,647	452	5,647	452	5,647	452
Clay	1,096	88	1,096	88	1,096	88	1,096	88
Cocke	5,148	412	6,367	510	6,367	510	6,367	510
Coffee	779	62	1,345	108	6,086	488	11,233	900
Cumberlan	3,607	289	9,457	758	9,906	794	9,906	794
Decatur	1,088	87	1,088	87	1,884	151	1,884	151
DeKalb	3,020	242	3,369	270	3,369	270	3,737	299
Dyer	35	3	35	3	7,483	600	7,518	602
Fentress	3,098	248	3,098	248	3,098	248	3,098	248
Franklin	1,091	87	2,587	207	6,311	506	7,009	562
Gibson	3,178	255	8,437	676	8,444	676	9,085	728
Giles	0	0	600	48	4,703	377	4,703	377
Greene	2,285	183	11,164	894	11,566	927	11,566	927
Grundy	2,029	163	2,029	163	2,202	176	2,202	176
Hamblen	4,014	322	10,465	838	11,242	901	11,242	901
Hancock	907	73	907	73	907	73	1,025	82
Hardeman	1,512	121	4,089	328	4,438	356	4,438	356
Hardin	0	0	3,625	290	3,813	305	3,813	305
Haywood	3,374	270	3,917	314	5,116	410	5,116	410
Henderson	1,017	81	5,008	401	5,313	426	5,313	426
Henry	506	41	5,505	441	5,785	463	5,785	463
Houston	591	47	591	47	1,641	131	1,641	131
Humphrey:	0	0	2,944	236	2,944	236	2,944	236
Jackson	1,541	123	1,541	123	1,541	123	1,541	123
Jefferson	0	0	5,590	448	9,876	791	9,876	791
Johnson	2,210	177	2,914	233	2,914	233	2,914	233
Lake	560	45	1,091	87	1,091	87	1,093	88
Lauderdale	5,256	421	5,256	421	5,256	421	5,256	421
Lawrence	1,701	136	71,657	5,741	8,917	714	8,917	714
Lewis	1,769	142	2,040	163	2,040	163	2,040	163
Lincoln	1,083	87	5,971	478	6,494	520	7,006	561
McMinn	0	0	8,369	670	9,253	741	9,253	741
McNairy	5,116	410	5,476	439	5,476	439	5,476	439
Marshall	0	0	4,124	330	4,738	380	4,738	380
Meigs	1,948	156	1,948	156	1,948	156	1,948	156
Monroe	4,634	371	7,382	591	8,362	670	8,362	670
Moore	0	0	0	0	0	0	584	47

(Table 1 continued...)

	80%		90%		100%		110%	
Counties	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV	S.A.POP	ΔPRIV
Moore	0	0	0	0	0	0	584	47
Obion	581	47	4,755	381	5,508	441	5,718	458
Overton	753	60	2,923	234	3,336	267	3,336	267
Perry	1,277	102	1,277	102	1,277	102	1,277	102
Pickett	737	59	737	59	737	59	737	59
Putnam	9,436	756	10,980	880	11,134	892	16,119	1,291
Rhea	128	10	4,734	379	6,493	520	6,493	520
Scott	4,223	338	4,223	338	4,223	338	4,223	338
Sevier	669	54	7,312	586	13,208	1,058	17,581	1,409
Stewart	0	0	630	50	2,180	175	2,444	196
VanBuren	285	23	979	78	979	78	979	78
Warren	0	0	7,186	576	8,563	686	8,564	686
Wayne	1,957	157	2,796	224	2,796	224	2,796	224
Weakley	1,101	88	3,131	251	3,131	251	6,059	485
White	4,870	390	4,870	390	4,870	390	4,870	390
Chester	0	0	190	15	3,243	260	3,243	260
Bradley	5,649	453	5,649	453	11,700	937	12,517	1,003
Carter	7,488	600	7,758	622	7,758	622	7,758	622
Crockett	16	1	1,809	145	1,821	146	1,821	146
Hawkins	6,130	491	6,130	491	8,759	702	9,727	779
Madison	7,060	566	7,060	566	8,816	706	9,123	731
Montgome	5,309	425	21,518	1,724	31,585	2,530	32,431	2,598
Polk	342	27	2,571	206	3,040	244	3,040	244
Sullivan	1,077	86	17,091	1,369	18,230	1,460	24,742	1,982
Unicoi	2,183	175	2,183	175	2,917	234	2,917	234
Washingto	0	0	8,374	671	13,901	1,114	18,894	1,514
TOTAL	133,293	10,679	371,201	29,739	386,779	30,987	422,976	33,887

Table 2: Expected Change in MSA Private School Demand (ΔPRIV) at various ESA amounts

Cut-off level for ZIP code eligibility

(Calculated as in Table 1)

ESA Amount	80%	90%	100%
$4,000	6,102	16,994	17,707
$5,000	7,628	21,242	22,133
$6,000	9,153	25,490	26,560
$7,000	10,679	29,739	30,987

Table 3: Near-miss ZIP codes when qualification level is set at 80%, 90% and 100% cut-offs

alternative zip code cut-off levels					
80%		90%		100%	
near miss zip codes					
zip codes with MFI ratio between 80% and 90%		zip codes with MFI ratio between 90% and 100%		zip codes with MFI ratio between 100% and 110%	
37018	38008	37019	38044	37012	37731
37042	38034	37028	38059	37023	37865
37050	38069	37040	38220	37052	38007
37059	38075	37047	38235	37142	38047
37078	38080	37058	38256	37183	38077
37079	38201	37061	38257	37310	38226
37091	38225	37144	38259	37352	38237
37101	38229	37171	38311	37355	38253
37110	38230	37306	38313	37360	38316
37160	38231	37323	38321	37375	38362
37180	38232	37325	38329	37394	38453
37185	38236	37338	38332	37617	38459
37303	38242	37345	38333	37645	38488
37307	38251	37357	38340	37659	38506
37309	38254	37366	38348	37664	
37317	38258	37381	38356		
37321	38260	37388	38361		
37329	38261	37398	38366		
37330	38327	37604	38381		
37331	38328	37642	38388		
37332	38334	37656	38389		
37334	38337	37686	38390		
37359	38341	37692	38391		
37362	38343	37725	38392		
37369	38344	37810	38455		
37370	38345	37826	38460		
37376	38347	37860	38469		
37601	38351	37876	38477		
37618	38352	37877	38478		
37620	38358	37885	38483		
37640	38359	38006	38548		
37641	38370	38021	38558		
37660	38372	38024	38580		
37681	38376	38030			
37688	38425				
37690	38457				
37694	38461				
37713	38463				
37722	38464				
37743	38468				
37745	38472				
37752	38473				
37760	38475				
37764	38481				
37814	38486				
37820	38570				
37825	38571				
37854	38572				
37862	38573				
37863	38574				
37874	38581				
37890	38585				
38001					

Maps for the following counties can be accessed via this link:

https://www.effective-ed.org/economic-development-zones/tn

Bedford	**Hamblen**	**Meigs**
Benton	**Hancock**	**Monroe**
Bledsoe	**Hardeman**	**Montgomery**
Bradley	**Hardin**	**Moore**
Carroll	**Hawkins**	**Obion**
Carter	**Haywood**	**Overton**
Chester	**Henderson**	**Perry**
Claiborne	**Henry**	**Pickett**
Clay	**Houston**	**Polk**
Cocke	**Humphreys**	**Putnam**
Coffee	**Jackson**	**Rhea**
Crockett	**Jefferson**	**Scott**
Cumberland	**Johnson**	**Sevier**
Decatur	**Lake**	**Stewart**
DeKalb	**Lauderdale**	**Sullivan**
Dyer Unicoi	**Lawrence**	**Van Buren**
Fentress	**Lewis**	**Warren**
Franklin	**Lincoln**	**Washington**
Gibson	**Madison**	**Wayne**
Giles	**Marshall**	**Weakley**
Greene	**McMinn**	**White**
Grundy	**McNairy**	

APPENDIX A
Projected Increases in Private School Enrollment

The projected change in private school enrollment in each county is calculated as follows:

$$\Delta Private\ School\ Enrollment = (\#\ of\ Eligible\ Students) * \left[\frac{\Delta Prob.\ of\ attending}{\$} \times \$\ amount\right]$$

This equation is taken from Ford and Merrifield (2013)[1] which used regression results from Chiswick and Koutroumanes (1996)[2] to estimate the increase in the probability that a child would attend a private school if the tuition price was raised or lowered. The following term:

$$\left[\frac{\Delta Prob.\ of\ attending}{\$}\right]$$

is the increased probability that a single child will attend a private school if the price is lowered by a single dollar. Therefore the term

$$\left[\frac{\Delta Prob.\ of\ attending}{\$} \times \$7{,}000\right]$$

is the increased probability that a single child will attend private school if the payment required for the child is reduced by $7,000. We have treated the availability of a $7,000 ESA as though it reduces the cost of private school tuition by $7,000. The base case used in the sensitivity analyses for each MSA assumes an ESA of $7,000.

For each county, multiplying this probability for a single student by the number of students who are eligible for an ESA in each county yields the expected increase in private school enrollment.

In the sensitivity analysis, we vary the median family income eligibility for ZIP codes to be designated as Economic Development Zones, and we vary the dollar amount of the proposed ESA.

Ford and Merrifield estimate that the increased probability that a single child will attend a private school if the price is lowered by a single dollar is 0.00114%. Therefore, if we assume the that a $7,000 ESA will be available only in ZIP codes with median family incomes less than 80% of the state or MSA median, and if there are ten thousand school-age children in these ZIP codes, then the estimated increase in private school children (ΔPRIV) will be 798 children, calculated as follows:

$$\Delta PRIV = (10{,}000) * \left[\frac{.00114\%}{\$1} \times \$7{,}000\right] = 798$$

[1] Michael Ford & John Merrifield (2013) School Choice Legislation: Impact Assessment and Fiscal Notes, Journal of School Choice, 7:1, 37-60

[2] Chiswick, B. R., & Koutroumanes, S. (1996). An econometric analysis of the demand for private schooling. *Research in Labor Economics*, 15, 209–237.

If the ZIP code cut-off were raised to include all ZIP codes with median family incomes below 90% of the state or MSA median, there will be more than ten thousand children who are eligible for the ESA (it is impossible that there will be fewer). Assuming that there are two thousand more children in ZIP codes between 80% and 90%, then there will be a total of 12 thousand students in the county who are eligible for ESAs, and (ΔPRIV) will be 958 children, calculated as follows:

$$\Delta PRIV = (12{,}000) * \left[\frac{.00114\%}{\$1} \times \$7{,}000\right] = 958$$

Caveats to this analysis:

Estimates of ΔPRIV are subject to estimation error of an unknown magnitude. While the number of eligible students is relatively easy to estimate, and the amount of the ESA offered is known, the coefficient value (probability change per dollar) originally estimated by Chiswick and Koutroumanes is based on nation-wide census data from 1980. The study only considered two-parent families with both parents living in the same home. Obviously, there are many single-parent households, and it is not known whether these families are more (or less) price sensitive than two-parent families. Chiswick observed regional differences in the demand for private schools, but they did not test for regional differences in price sensitivity. It is unknown whether the sensitivity of Tennesseans to private school tuition levels conform to the national average.

Chiswick and Koutromanes included numerous control variables, (e.g race, religious affiliation, family income, parents' age, mother in the workforce, etc.) and most of these variables affected the probability that a child would attend private school. However, none of these variables were used to interact with the tuition price. As a result, we cannot say anything about how an urban black family's response to a change in tuition might differ from that of a white suburban family. We cannot predict urban versus suburban versus rural uptake of the program. In short, while the demographics of Tennessee's 95 counties differ significantly, but we cannot estimate how these differences would impact the propensity of parents in each county to apply for an ESA.

APPENDIX B
Distressed Counties in Tennessee

Distressed counties rank among the 10 percent most economically distressed counties in the nation. Each year, the Appalachian Regional Commission (ARC) prepares an index of county economic status for every county in the United States. Economic status designations are identified through a composite measure of each county's three-year average unemployment rate, per capita market income, and poverty rate. Based on these indicators, each county is then categorized as distressed, at-risk, transitional, competitive or attainment.[3]

Tennessee Counties that qualify as distressed for 2019 are the following:

- Bledsoe
- Clay
- Cocke
- Fentress
- Grundy
- Hancock
- Hardeman
- Jackson
- Lake
- Lauderdale
- McNairy
- Morgan
- Perry
- Scott
- Van Buren

[3] https://www.tn.gov/transparenttn/jobs-economic-development/openecd/tnecd-performance-metrics/openecd-long-term-objectives-quick-stats/distressed-counties.html

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