Preliminary Draft
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Teaching New Markets Old Tricks: The Effects of Subsidized Investment on Low-Income Neighborhoods[†]

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This paper examines the effects of investment subsidized by the federal government's New Markets Tax Credit (NMTC) program, which provides tax incentives to encourage private investment in low-income neighborhoods. I identify the impacts of the program by taking advantage of a discontinuity in the rule determining the eligibility of census tracts for NMTC-subsidized investment. Using this discontinuity as a source of quasi-experimental variation in commercial development across tracts, I find that subsidized investment has modest positive effects on home values, poverty, and employment in low-income communities. The results point to tangible, albeit small, benefits from targeted investment in low-income neighborhoods. (JEL Codes: H25, O12, R23, R38, J48)

1. Introduction

Over the past several decades, the federal government in the U.S. has revisited its approach to tackling the problem of persistent poverty in low-income communities. Emphasis has shifted away from government-run income maintenance programs and toward market-based incentive schemes that rely on the private sector to provide resources perceived as necessary to alleviate poverty and blight in distressed cities and neighborhoods. As interest in business-oriented mechanisms to address stagnation in disadvantaged communities grew, a number of new programs emerged that attempt to encourage private investments in low-income areas, often using tax incentives.

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This paper evaluates the effectiveness of the New Markets Tax Credit (NMTC) program in reducing poverty and improving other neighborhood conditions over the course of the 2000s. The NMTC, which was signed into law in 2000 as part of the Community Renewal Tax Relief Act, arose out a desire to encourage private capital investment in neighborhoods thought to be overlooked during the economic boom of the 1990s. The program provides tax credits to investors who make equity investments in Community Development Entities. These entities are charged with investing the proceeds from the equity investments in businesses and real estate projects in certain designated low-income census tracts.

In order to identify the effects of NMTC investment on neighborhood conditions, I take advantage of a discontinuity in the formula used to designate tracts as low-income. The discontinuity generates pseudo-random assignment of NMTC investment in tracts around a certain income threshold. Tracts immediately below the threshold are eligible to receive NMTC-subsidized investment, whereas those above it are generally not eligible. However, on all other dimensions, the tracts on either side of the threshold are similar. Hence, comparing outcomes among tracts within a sufficiently narrow window around the cutoff permits one to draw causal inferences regarding the effects of investment subsidized by the NMTC on neighborhood conditions.

Using data from the 2000 Decennial Census and from the 2005-2009 American Community Survey, I find modest benefits associated with targeted investment in low-income neighborhoods. In particular, $1 million in NMTC-subsidized investment increases median home values in relatively poor census tracts by an imprecisely measured 2%. Poverty and unemployment rates fall by statistically significant amounts in tracts that receive NMTC-subsidized investment relative to similar tracts that do not, but the differences are not large. Meanwhile, household turnover rates in affected communities are slightly higher, which suggests that the observed changes in neighborhood characteristics may not be entirely driven by improvements in the conditions of existing residents, but rather may at least in part be attributable to changes in neighborhood composition in the wake of new investment. Consistent with the modest positive impact of subsidized investment I find using survey data from residents, I also detect small but positive effects on total employment and the quality of jobs using administrative data derived

from unemployment insurance tax records. The results suggest that while there may be some crowd out of unsubsidized investment, it is not complete.

This paper makes several important contributions. First, I shed new light on the effectiveness of tax incentives in encouraging local economic development. Much of what we know about the usefulness of tax incentives in revitalizing communities comes from work on state Enterprise Zones (EZs). State EZs provide tax incentives to new and expanding businesses in designated cities and neighborhoods. These tax incentives can take the form of employment credits or income, property, or sales tax breaks. Evaluating the effectiveness of EZs has proven challenging, in part because of the high degree of variation in program characteristics across states; not only do the programs differ in the generosity and types of incentives offered to businesses, but they also vary in the criteria used to determine communities' eligibility for the program. As a result, the findings of existing studies on the effects of the EZs are mixed. Several papers, such as Papke (1994), O'Keefe (2004), Billings (2009), and Ham et al. (2011) find positive effects of EZs on local economic activity and neighborhood conditions.[1] However, Boarnet and Bogart (1996), Bondonio and Engberg (2000), Peters and Fischer (2002), Elvery (2009), Neumark and Kolko (2010), and others find that state EZ programs have little or no effect on local employment, casting doubt on the effectiveness of tax incentives in spurring growth in targeted areas.[2]

More broadly, this paper contributes to the growing literature on the impact of a new generation of place-based policies in the U.S. Much of this research has focused narrowly on housing policy (e.g., Baum-Snow and Marion 2009, Gabriel and Rosenthal 2009, Freedman and Owens 2011). The work that has been done outside housing has typically struggled with identification, often due to nonrandom selection of communities into programs. I exploit plausibly exogenous variation in subsidized investment across communities that results from federal rules determining the eligibility of census tracts for NMTC funds.

[1] Recent work on federal Empowerment Zones and Enterprise Communities, which were first established in 1994, suggests that they have increased economic activity in targeted areas (Busso and Kline 2008, Busso et al. 2010, Ham et al. 2011). Federal Empowerment Zones and Enterprise Communities differ from state Enterprise Zones in that, in addition to providing employers with hiring tax credits, they allow states to issue tax exempt bonds to finance certain types of investments in designated areas. Empowerment Zones also offer a credit of $3000 per resident of the zone and allow for increased depreciation expensing.

[2] Notably, most EZ programs involve employment tax credits and target high poverty areas. In contrast, the NMTC program uses investment subsidies and targets only moderately low-income areas.

The paper is organized as follows. The next section provides background on the NMTC. Section 3 details my econometric approach. After describing the data and providing descriptive statistics in Section 4, I present results on the effect of the NMTC program on new investment in distressed communities in Section 5. Section 6 examines how this new investment affects housing and resident characteristics, and Section 7 takes up the issue of crowd out and the impact of subsidized investment on employment and the composition of jobs in communities. Section 8 concludes.

2. The New Markets Tax Credit Program

2.1. Program Structure

Introduced in the late 1990s as a pro-business way to stimulate investment in the nation's distressed areas, the NMTC program was signed into law in December 2000 as part of the Community Renewal Tax Relief Act of 2000. The NMTC program, which allocated a total of $26 billion in tax credits between fiscal years 2002 and 2009, encourages capital investment in businesses that are located in low-income neighborhoods by offering tax incentives to investors who make qualified equity investments (QEIs) in Community Development Entities (CDEs).[3] The credit totals 39% of the cost of the investment and is claimed over a seven-year credit allowance period, with 5% being claimed over the first three years and 6% over the final four years.

CDEs are domestic corporations or partnerships that meet several criteria. First, their primary mission must be to serve or provide investment capital for low-income communities or persons. Second, CDEs must maintain accountability to the community by including resident representation on any governing or advisory board. Finally, CDEs must be certified by the Treasury Department's Community Development Financial Institutions Fund (CDFI). A CDE remains certified for the life of the organization as long as it continues to meet the mission and accountability requirements. As of November 2010, there were 4,634 CDEs distributed across all 50 states and the District of Columbia.[4] Among the currently certified CDEs are community

[3] The original NMTC program was authorized to allocate $15 billion between fiscal years 2002 and 2006. In subsequent years, the program has been amended and re-authorized a number of times.

[4] The information in this section is derived in large part from the Community Development Financial Institutions Fund's website (www.cdfifund.gov), which outlines CDE eligibility requirements in detail and provides a list of current CDEs.

development financial institutions, community development corporations, other non-profit financial intermediaries, government agencies, commercial and investment banks, and other for-profit financial institutions (Armistead 2005).

Each year between 2003 and 2009, between 40 and 100 CDEs received tax credit allocation rights totaling between $2 billion and $5 billion. The average allocation to a CDE any given year is close to $50 million. While the NMTC program represents only a small fraction of total spending and foregone taxes among federal community and economic development programs, it has expanded over time and continues to grow both because more allocations have been made available by Congress and because tax credits from early rounds continue to be claimed.[5]

Unlike the Low-Income Housing Tax Credit or the Community Development Block Grant programs, which leave decisions about the allocation of funds to states or localities, NMTC allocations flow directly from the federal government to CDEs. The CDEs that receive allocations are selected through a competitive application process, with less than one-fifth of applicants receiving allocations in any given year.[6] Once a CDE is awarded a NMTC allocation, it has five years to use the proceeds of QEIs to provide equity or debt capital to what are termed qualified active low-income community businesses (QALICBs).[7,8]

NMTC program rules dictate that "substantially all" of the investments made by CDEs go to designated low-income communities (LICs), but qualified low-income community investments (QLICIs) can take a number of different forms. Over 85% of QLICIs take the form of loans. However, since investors' returns are at least in part covered by the tax credit, CDEs have the flexibility to offer below-market interest rates or other preferential terms to qualified projects or businesses. Nonetheless, CDEs still have an incentive to assist viable projects with strong

[5] Abravanel et al. (2010) estimate that the NMTC program represented 3% of total spending and foregone taxes associated with the nine largest federal community and economic development programs in 2007.

[6] Applications to the CDFI Fund require CDEs to describe their intended use of the funds in four areas. Those areas include business strategy, capitalization strategy, management strategy, and community impact. Each of these areas is given a score by each member of a panel of CDFI reviewers that ranges from 0 to 25. Extra points are also awarded if the applicant has a demonstrable history of serving disadvantaged communities or businesses, or if the NMTC plans to invest most of its capital in unrelated entities. Each reviewer tallies his or her own points and makes a recommendation of whether the CDE should receive funding and, if so, how much. CDFI staff then review the top proposals, and the NMTC program manager makes the final allocation determination (Rubin and Stankiewicz 2005).

[7] CDEs may be for-profit or not-for-profit; the latter account for approximately one-fourth of all CDEs that receive NMTC financing. However, to make investments in eligible projects, a not-for-profit CDE must create a for-profit subsidiary.

[8] Figure A.1 in the Appendix provides an overview of the process by which NMTC allocation rights are awarded to CDEs by the CDFI Fund, investors make QEIs in CDEs, and CDEs use the proceeds to invest in QALICBs.

prospects. Indeed, there is some concern that the NMTC program crowds out some private investment. Gurley-Calvez et al. (2009) argue that crowd-out is not complete and that investment dollars are not only redirected from higher income to lower income communities under the program, but that the program also increases the overall amount of resources available for investment in low-income areas.[9]

Over two-thirds of CDE investment has historically gone to commercial real estate development (70% of all investment dollars through 2009). Commercial real estate projects are typically easier to pair with other tax incentives. Further, because they are fixed in place, real estate projects are unlikely to fall out of compliance with NMTC rules (Lambie-Hanson 2008). Of the investment dollars not directed toward commercial real estate investment, most go to business development, which mainly constitutes loans to firms. Investments of this kind, which constitute about 26% of all NMTC investment dollars to date, are about half the size of commercial real estate investments on average. Meanwhile, only about half of a percent of NMTC funds go to residential real estate development, in part because the financing of residential rental property is not permitted under the NMTC.[10] The remainder of the funds (about 4%) largely goes toward financing CDE activities and loan purchases.

Through 2009, $16 billion of QEI proceeds had been funneled to 3,278 QALICBs.[11] The average amount of funding provided by a CDE to a QALICB through 2009 was about $4.9 million, but this is skewed higher by several very large projects. The median investment was $2.3 million. Relative to project costs, NMTC funding is often substantial. Using cost estimates reported by CDEs, NMTC financing covers well over one-third of project costs on average (U.S. Government Accountability Office 2010).

2.2. Low-Income Communities

In general, LICs eligible for NMTC-subsidized investment through CDEs are census tracts that meet at least one of two criteria. Tracts outside metropolitan areas with median family income (MFI) that does not exceed 80% of their state's MFI qualify for NMTC investment, as do

[9] I discuss the implications of crowd out for my analysis and present some suggestive evidence on the extent of crowd-out in Section 7.

[10] Residential rental property is eligible for funding under the Low-Income Housing Tax Credit.

[11] Some QALICBs received multiple investments from CDEs. In total, 4,444 investments were made through 2009.

tracts in metropolitan areas with MFI that does not exceed 80% of the greater of metropolitan area MFI or statewide MFI. Tracts with poverty rates of at least 20% also qualify as LICs. A handful of "low-population" tracts also qualify; these tracts have populations less than 2,000, are located in Empowerment Zones, and are contiguous with another LIC. Finally, several "rural, high out-migration" tracts qualify; these tracts have MFI less than or equal to 85% of statewide MFI and net out-migration of at least 10% of the population between 1980 and 2000.[12]

CDEs are also permitted to finance businesses outside of LICs as long as the businesses serve a targeted population, which constitutes "individuals, or an identified group of individuals, including an Indian tribe, who (a) are low-income persons; or (b) otherwise lack adequate access to loan or equity investments."[13] In practice, qualified LICs have received 95% of NMTC investment dollars and 96% of NMTC projects.[14]

Of the 65,443 tracts in the 50 states and the District of Columbia, 39% currently qualify as LICs. Of those that qualify, over 98% qualify either on the MFI or the poverty rate criterion. Of those, 95% qualify on the MFI criterion; only 1,305 tracts qualify on the poverty rate criterion alone.[15] Figure 1 shows a scatterplot of all the tracts in the U.S., with the poverty rate on the y-axis and the ratio of the tract MFI to state (or MSA) MFI on the x-axis. LICs, which are shaded more darkly, are located mainly in the lower-left, upper-left, and upper-right quadrants. A handful of low-population and rural, high out-migration tracts below the poverty rate cutoff and above the income cutoff also qualify as LICs. From the figure, it is clear that the vast majority of tracts that qualify as LICs do so under the MFI criteria. This fact allows me to exploit a fuzzy

[12] The NMTC and the Community Reinvestment Act (CRA), which aims to encourage commercial banks and savings institutions to assist in meeting the credit needs of lower-income communities (Bostic and Gabriel 2006), have similar, but not identical, formula structures. Census tracts in MSAs are designated underserved under the CRA if tract MFI is less than or equal to 80% of MSA MFI (as opposed to 80% of the maximum of statewide and MSA MFI). Census tracts outside of MSAs are designated underserved under the CRA if tract MFI is less than or equal to 80% of non-metropolitan state MFI (as opposed to state MFI more broadly defined). Hence, the income ratio used to determine CRA eligibility is always different than the income ratio used to determine NMTC eligibility status for tracts outside MSAs, and is different for 36% of tracts within MSAs. Further, not only are previous estimates of the magnitude of the CRA's effects on neighborhood outcomes modest (Gabriel and Rosenthal 2009, Bhutta 2010), but using CRA eligibility status (along with a flexible control function using the CRA income ratio) yields no significant results in a reduced-form regression analogous to equation (2).

[13] American Jobs Creation Act of 2004 (HR 4520). The NMTC statute originally allowed the Treasury Department to designate portions of non-qualifying census tracts as "Targeted Areas" that were eligible for NMTC investment, subject to certain eligibility requirements. However, the American Jobs Creation Act of 2004 removed the Treasury's authority to designate Targeted Areas and added the "low-population" and "rural, high out-migration" criteria for qualification.

[14] These figures exclude NMTC investment put toward financing CDE activities and loan purchases.

[15] As described in Section 4, current designations are based on 2000 Decennial Census data.

regression discontinuity design in my main analysis to identify the effects of investment spurred by the NMTC on neighborhood outcomes.

3. Empirical Approach

3.1. Model

This paper aims to identify the effects of investment subsidized by the NMTC, denoted N, on each of several neighborhood outcomes, denoted y. I conduct the analysis at the level of census tract; tracts have populations that average 4,000 and are designed by the U.S. Census Bureau to approximate neighborhoods.

Following Chay and Greenstone (2005) and Baum-Snow and Marion (2009), we are interested in estimating β_1 in the following equation:

$$\Delta y_i = \beta_0 + \beta_1 \Delta N_i + \mathbf{X}_i \Omega + \varepsilon_i \quad (1)$$

In equation (1), i indexes census tracts and $\mathbf{X}$ is a set of baseline (year 2000) tract characteristics. Simply estimating equation (1) on all tracts is unlikely to yield consistent estimates of β_1 given that unobserved and unmeasured local characteristics could affect both the amount of investment in a neighborhood and also be correlated with the outcome of interest. The decision of a CDE to allocate funds to a particular area is likely to be influenced by local characteristics as well as expectations about the future prospects of an area, each of which may not be fully captured in $\mathbf{X}_i$ and might also affect Δy_i. To the extent that we cannot control for such factors, the error term ε_i will be correlated with the treatment ΔN_i, which in turn will bias estimates of β_1.

In order to address the endogeneity problem, I adopt a regression discontinuity (RD) design that takes advantage of the formula determining the eligibility of tracts for NMTC program funding from CDEs. The approach in this paper builds on recent work exploiting the formula structure of various placed-based programs on neighborhoods (Baum-Snow and Marion 2009, Gabriel and Rosenthal 2009, Bhutta 2010). In a RD framework, whether an observed covariate (i.e., the forcing variable) lies on either side of a fixed cutoff value at least partly determines treatment.[16]

[16] For detailed discussions of RD designs, see Imbens and Lemieux (2008) and Lee and Lemieux (2010).

For the purposes of identifying the effects of NMTC investment on outcomes, I focus on the ratio of tract MFI to state or MSA MFI (the greater of the two in MSAs) as the forcing variable. In general, tracts with MFI at or below 80% of the greater of metropolitan area or statewide median family income are eligible for NMTC investment, whereas similar tracts just above the 80% threshold are not. The discontinuity I use is fuzzy since a handful of tracts qualify as LICs on criteria other than the income ratio criterion. However, the vast majority of qualifying tracts are eligible based on the income ratio criterion. Only 5.1% of qualifying tracts in the entire U.S. qualify on the poverty rate criterion, the low-population criterion, or the rural high out-migration criterion and not on the income ratio criterion.

The crucial assumption underlying my econometric approach is that tracts in a sufficiently narrow window around the 80% income ratio are similar along observable dimensions as well as unobservable dimensions. More specifically, and as I verify in Section 4.3, covariates besides the treatment that might affect the outcomes of interest do not change discontinuously at the MFI threshold for LIC qualification. Meanwhile, although some tracts that fail to satisfy the income criterion qualify as LICs and receive NMTC investment, the probability of treatment changes sharply at the MFI threshold. More specifically, as I show in the Section 5, tracts just below the 0.8 cutoff are substantially more likely to receive NMTC investment than otherwise similar tracts just above the threshold. Given this, and that the association of other covariates with outcomes is smooth through the threshold, we can interpret any discontinuity in the conditional distribution of outcomes as a causal effect of the treatment.

For a population of tracts near the 80% income ratio, LIC designation is assigned essentially at random. To the extent that it only affects other outcomes through its effect on where investment is likely to take place, LIC status may act as an instrument for investment. The first-stage regression is therefore

$$\Delta N_i = \alpha_0 + \alpha_1 LIC_i + f(m_i) + \mathbf{X}_i \Sigma + v_i, \tag{2}$$

where LIC_i is a treatment indicator that takes a value of 1 if the tract is a LIC and 0 otherwise. The running variable m denotes the ratio of tract MFI to the greater of MSA MFI or statewide MFI among tracts in MSAs, and the ratio of tract MFI to statewide MFI for tracts outside of

MSAs. I use a variety of specifications for the control function *f*, though my preferred specifications use a cubic and quartic polynomials in which the polynomial coefficients are permitted to differ above and below the cutoff.[17] As I show in the results, the estimates vary only slightly with different specifications of the control function. Further, as I show in the results and as would be expected if the identification strategy outlined here is valid, the inclusion of controls in **X** does not affect the results substantively, although they tend to improve the precision of the estimates by reducing sampling variability.

The reduced-form relationship between NMTC eligibility and neighborhood outcomes is as follows:

$$\Delta y_i = \gamma_0 + \gamma_1 LIC_i + f(m_i) + \mathbf{X}_i \Psi + u_i . \quad (3)$$

Since the model is just-identified, the IV estimate of β_1 is simply the ratio of the estimates of γ_1 and α_1 from the reduced-form and first-stage regressions, respectively.

3.2. Identification

The critical identifying assumption underlying the RD design employed in this paper is that unobservable determinants of Δy_i do not differ among tracts within in a narrow window on either side of the cutoff. One possible threat to this assumption is that sorting occurred among neighborhoods around the threshold. While self-selection into treatment is a problem in the analysis of EZs, it is highly unlikely that such sorting occurred in the case of the NMTC. The 2003 designations I use are based on data from the 2000 Decennial Census, which was conducted months before the NMTC legislation was even signed into law. Even if communities anticipated the formula structure of the NMTC, it is unlikely that they would be able to manipulate the census results. Although one could imagine that local officials might somehow influence the returns from the census, it is technically only necessary that they did not have perfect control over the assignment variable (Lee 2008). It is unlikely that any official had the

[17] Specifically, I use control functions that take the following general form:

$$f(m_i) = \sum_{k=1}^{p} [\varphi_{1k} (m_i - 0.8)^k + \varphi_{2k} LIC_i (m_i - 0.8)^k]$$

where *p* is the order of the polynomial.

ability to determine with pinpoint accuracy the value of the forcing variable for any given tract; the sampling variability associated with the one-in-six sample drawn for the long-form Decennial Census, as well as imputation and confidentiality protection procedures conducted by the Census, add some degree of noise to the data that would have to be predicted by local officials. Further, officials would not only need to have complete control over measured MFI for local areas (tracts), but also either have prior knowledge of or control over MFI for the state and/or MSA in which those areas are located given how the forcing variable is calculated. All these factors militate against any unobserved sorting around the threshold that might invalidate the RD design. As further checks on the assumption that no sorting has occurred around the cutoff, in Section 4.3 I provide descriptive evidence and test formally that there is no discontinuity in the distribution of the forcing variable at the cutoff and that observable baseline covariates evolve smoothly through the threshold.

Crucially, the fuzzy RD design provides a weighted average of the effects of the treatment for the subpopulation of neighborhoods near the cutoff that receive investment, where the weights are proportional to the ex-ante likelihood of having MFI near the threshold. It is unlikely that the treatment effect is homogenous across all neighborhoods, and hence it would be misguided to assume that the estimated effects would be similar in very high income or very low income neighborhoods far from the threshold. The lack of external validity is a common feature of RD designs, but it does not imply that the estimates in this paper are not of interest. Indeed, the local average treatment effect that I identify is of critical importance to understanding how the NMTC program spurs investment, and how this investment affects disadvantaged (albeit not extremely poor) communities (i.e., those tracts with MFI near 80% of the metro area or state MFI).

4. Data

4.1. Data Sources

The data used in this analysis come from several sources. The first is the Community Development Financial Institutions (CDFI) Fund at the U.S. Treasury. The CDFI Fund provided data on all CDE investments, including the amount of the investment (including total project cost and NMTC funding), the type of investment (commercial real estate, business development, etc.),

and the location of the investment (street address). Using commercial GIS software, I geocoded each investment to the tract level. These data were then merged with information at the tract level on LIC eligibility, which is derived from 2000 Decennial Census data.

Baseline resident characteristics of tracts were extracted from the 2000 Decennial Census. These data include a host of demographic characteristics, including information on total population, racial and ethnic composition, the age distribution, educational attainment levels, household and family income, household size, household mobility, and poverty rates. The data also include a number of housing-related variables, including total housing units, share vacant, share occupied, share owned, share rented, median age of units, median number of rooms per unit, and median house value.

In order to examine how neighborhoods changed over the course of the 2000s, I use small-area American Community Survey (ACS) estimates for 2005-2009. These data are based on information collected over a five-year period in the second half of the decade. The geographic boundaries largely match those used in the 2000 Decennial Census.[18] I extract from the ACS information on house values, household income, poverty rates, unemployment rates, and household mobility at the tract level. The neighborhood outcomes of interest are measured as changes between 2000 and 2005-2009.

The Decennial Census and ACS are each survey-based and provide information on the demographic and economic characteristics of tract residents. To the extent that the intent of the NMTC program was to revitalize blighted communities, the effects of investment subsidized by the program on tract residents are of particular policy interest. Also important, however, are the effects on commercial activity in affected areas. Ideally, one would have information on all subsidized and unsubsidized commercial real estate investment, business loans, and job growth for all tracts, in which case one could quantify the cumulative effect of subsidized investment on economic activity as well as the amount of crowd out associated with the program.

While I do not have data on all commercial real estate investment and loans for all tracts, I obtained administrative data on total employment and the composition of jobs within tracts from

[18] There were several exceptions. After 2000, changes in county or county equivalents occurred in Clifton Forge, Virginia; Broomfield County, Colorado; and several areas in Alaska. Additionally, nine states used 2010 Census boundaries for census tracts in the ACS. I normalized all geography to 2000 using crosswalks provided by the Census.

the Longitudinal Employer-Household Dynamics (LEHD) program at the U.S. Census Bureau.[19] These data, which are derived from state unemployment insurance records and cover over 98% of private sector employment, contain job counts as well as pay categories (fraction of jobs paying less than $15,000 annually, fraction of jobs paying between $15,000 and $39,999 annually, and fraction of jobs paying $40,000 or more annually).[20] While these data are only available for 2002-2009 and only for 45 states,[21] they allow me to test directly for the impact of subsidized investment on the number of jobs and the types of jobs available within affected communities. In turn, while I cannot quantify the total amount of crowd out associated with the program, I can shed some light on whether subsidized investment is generating more or better jobs. To the extent that there is differentially greater job growth or a shift toward better paying jobs in communities that receive subsidized investment, it would suggest that if there is crowd out of unsubsidized investment, it is not complete.

4.2. Sample

Over seven years through 2009, CDEs had allocated $16 billion of QEI proceeds to 3,191 QALICBs (excluding transactions with other CDEs). Altogether, these QALICBs were distributed across 527 counties and 1,775 tracts in the U.S. In the main analysis, I sum up the amount of NMTC investment for each tract and for each block group over 2003-2009. However, since not only might it take some time for a project to have a measurable impact a community, but also because the ACS data are collected over multiple years, I consider alternative specifications in which I use sums of NMTC investment over 2003-2007.[22] Not surprisingly, given that the there are fewer projects over these shorter time frames, the estimates become even

[19] These data are derived from LEHD's OnTheMap program, which provides annual cross-sectional information on jobs at detailed geographies. I include in the sample only private primary jobs; a primary job represents the highest paying job for each worker in each year. This eliminates from the sample many low-earnings, transient jobs and allows for a closer comparison to past work on the employment effects of EZs. The results are qualitatively and quantitatively similar if one uses all private-sector jobs. See Andersson et al. (2008) for details regarding the data.

[20] These thresholds are not adjusted for inflation each year, and hence there is a gradually declining fraction of jobs in the low-earnings bin and a gradually increasing fraction of jobs in the high-earnings bin. In the empirical analysis, I test for whether tracts that received subsidized investment experienced differentially large or small changes in the shares.

[21] Arizona, Arkansas, DC, Massachusetts, Mississippi, and New Hampshire are excluded because they did not provide data to the LEHD program one or more years between 2002 and 2009.

[22] The limited number of projects over shorter time frames resulted in weak first stages, and therefore I do not present the results for intervals shorter than five years.

less precise. However, as would be expected, the magnitudes of the estimates are similar, and occasionally somewhat larger, with shorter time frames.

For the regression discontinuity assumptions to be valid, a sufficiently narrow window around the relevant threshold must be used to ensure that observations on either side of the threshold are similar along both observable and unobservable dimensions. Although the latter cannot be verified conclusively, the former can be. In the main analysis, I limit attention to census tracts with income ratios (based on 2000 Decennial data) between 0.7 and 0.9 (inclusive). The final sample of tracts in the U.S. (excluding Puerto Rico) with all requisite variables available and that are not in Gulf Opportunity (GO) Zones[23] is 17,271 tracts.[24] As robustness checks, I consider alternative windows around the 0.8 threshold as well as placebo cutoffs in subsequent sections.

4.3. Descriptive Statistics

In Figure 2, I plot the number of tracts in each half percentage point bin of the MFI ratio in a 60 percentage point window around the 0.8 cutoff that largely determines eligibility for NMTC-subsidized investment. The shaded region between 0.7 and 0.9 constitutes the main sample of tracts used the analysis. While there is a large concentration of tracts near the threshold, there is no indication of a discontinuity in the distribution of the forcing variable at the cutoff. A McCrary (2008) test confirms there is no statistically significant jump in the density function at 0.8. This is consistent with a lack of any manipulation in the value of the MFI ratio that might undermine the RD design.

Table 1 presents descriptive statistics for census tracts in the main sample. In Panels A and B, average values for the baseline demographic and housing variables are presented in bins of the forcing variable on either side of the 0.8 threshold. There is little evidence that the covariates are anything but smooth through the cutoff. Consistent with the density test of the forcing variable

[23] About two-thirds of tracts in Louisiana and Mississippi and one-fifth of tracts in Alabama (a total of 1,403 tracts) were designated part of the GO Zone. Developments in these areas were given special preference in the wake of Hurricane Katrina. Including these tracts in the sample has little effect the findings overall, but results in a weaker first-stage and affects the precision of some of the estimates.

[24] Due to missing data for five states and DC, I lose an additional 895 observations in the LEHD sample. I also drop from the LEHD sample 209 tracts that have fewer than 20 jobs in either 2002 or 2009 due to several tracts with implausibly large percentage increases or decreases in employment over the period. The results are qualitatively similar, but even less precise with the inclusion of these outliers.

itself, tests of the null hypothesis of continuity of the density of each of the covariates, as well as that of the initial (i.e., year 2000) values of the outcome variables, against the alternative of a jump in the density suggest that there is no sorting around the threshold. Graphical evidence of this can be seen in Figure A.2 in the Appendix, which shows the densities for a select set of the baseline demographic and housing variables.

Panel C of Table 1 shows average levels of NMTC investment within each of the bins on either side of the threshold. In contrast to the baseline characteristics presented in panels A and B, there is clear evidence of a higher NMTC activity immediately below the threshold relative to immediately above the threshold. I focus in on the spatial patterns of development in the next section.

5. NMTC Investment

First, I present graphical evidence on the effects of LIC status on NMTC investment in communities at the tract level. Figure 3 plots predicted values of each of the two outcome variables, total NMTC-subsidized investment (Panel A) and NMTC projects (Panel B), using various control functions (linear, quadratic, cubic, and quartic) as well as average values of each of the two variables within half percentage point bins of the forcing variable.[25] There are conspicuous discontinuities at the cutoff, with sharp drops in both the total amount of NMTC investment and the number of projects on average within each bin above the 0.8 cutoff. While substantially lower, investment in neighborhoods above the threshold is not zero; a small number of tracts with MFI ratios above 0.8 qualify on other criteria and are also eligible for NMTC investment. However, it is clear that there is a discrete increase in the probability of receiving investment for projects just below the 0.8 income ratio cutoff.

Corresponding regression estimates of the discontinuities in NMTC investment and projects appear in Panel A of Table 2. Each cell reports an estimate of α_1 for a different specification of equation (2), including specifications with different functional forms of *f(m)* and with different sets of controls in **X**. The tracts included in the sample have income ratios between 0.7 and 0.9.[26] The first row of coefficients in Panel A shows the estimated effects of LIC status on NMTC-subsidized investment between 2003 and 2009, while the second row shows the effects of LIC

[25] Figures with varying sized bins appear in Appendix Figure A.3.
[26] I consider alternative windows around the threshold in Section 6.2.1.

status on the number of NMTC-subsidized projects between 2003 and 2009. Columns (1) and (4) include only cubic and quartic terms in the control function, respectively. The intervening columns include additional local demographic and housing market controls as explanatory variables. All regressions include county dummies, and standard errors in each regression are adjusted for heteroscedasticity and clusters at the county level.

Consistent with the discontinuity gap in Panel A of Figure 3, the first row of Panel A in Table 2 indicates that LICs receive on average about $1 million more than similar neighborhoods that are not LICs. The results are not highly sensitive to the particular specification of the control function or set of covariates included; the estimated effects range from $859,000 to $1,110,000. All the estimated coefficients are significant at least at the 1% level. The second row of Panel A in Table 2 shows that LICs receive on average 0.04 QALICBs; again, the effects are precisely estimated and vary little across each of the different specifications.[27]

Given the lack of independent exogenous variation in each type of investment, I am limited in my ability to investigate the potentially differential effects of real estate projects and business development projects on neighborhoods. However, it is useful from a policy evaluation perspective to understand to what extent the NMTC program seems to favor different types of investment. Further, to the extent that the first-stage estimates in Panel A are being driven by one particular type of project, it may provide some insight into what kind of developments are mainly responsible for the changes in neighborhood characteristics discussed in the next section.

Therefore, I run the first-stage regressions separately for commercial real estate projects and business development projects. The results appear in Panels B and C of Table 2. LICs receive greater volumes of investment in both commercial real estate and business development projects. However, commercial real estate investment constitutes the majority of investment dollars flowing to LICs. In particular, of the approximately $1 million in NMTC investment that tracts just below the 0.8 threshold receive on average, slightly over half is in the form of commercial real estate investment.

To verify that the observed jumps are in fact being driven by the NMTC eligibility threshold, I conduct a placebo exercise using a series of alternative thresholds. The results of this

[27] The first-stage regressions reported in Panel A of Table 2 pass standard weak instrument tests (Staiger and Stock 1997). Kleibergen-Paap test statistics, which are robust to heteroscedasticity, fall between 10.6 and 11.5 for the estimates in columns (1)-(6) of Panel A. Weak instruments would tend to bias the IV estimates (reported in the next section) upward in absolute value.

robustness check appear in Figure 4, in which I plot discontinuity estimates from separate regressions run using 20 percentage point windows around each percentage point between 0.7 and 0.9. I present results from both regressions including only a cubic polynomial in the MFI ratio around the false threshold and county dummies (Panel A) as well as regressions that also include demographic and housing controls (Panel B). Due to small sample sizes, the estimates tend to be noisier and more volatile for placebo cutoffs at the lower end of the tract income distribution. Importantly and as expected, though, except for at the actual cutoff of 0.8, the estimated discontinuity gaps are always statistically indistinguishable from zero at conventional test levels. These results, together with Figure 3, suggest that the observed jump at 0.8 is not an artifact of the data, but rather is a real effect driven by the formula structure of the NMTC program.[28]

6. The Effects of NMTC Investment on Housing and Resident Characteristics

Congress established the NMTC as part of an effort to revitalize blighted communities. The belief was that, by encouraging private investment in neighborhoods in which access to capital through traditional channels might be limited, the NMTC could inject new life into stagnant low-income communities (U.S. Government Accountability Office 2007). Not only might the fresh investment in real estate projects and operating businesses facilitated by the NMTC directly generate new jobs, but it might eliminate vacant lots and abandoned buildings as well as generate other positive externalities in affected neighborhoods. To the extent that these benefits arise, they should be capitalized into local home values. Additionally, new investment, and any accompanying revitalization of neighborhoods, could affect the economic conditions of existing residents as well as attract new residents to an area. I explore the effects of NMTC investment on housing and resident characteristics in this section before turning to an analysis of its effects on employment in Section 7.

6.1. Main Results

6.1.1. Baseline Estimates

[28] Figures 3, 4, 5, and A.3 include all QLICIs that took place between 2003 and 2009. Appendix Figure A.4 depicts the discontinuity in NMTC funds and projects for QLICIs that took place between 2003 and 2007. With fewer QLICIs over the shorter timeframe, the gaps are less stark, but the discontinuities remain highly significant.

I begin by examining the relationship between NMTC investment and changes in housing and resident characteristics at the tract level. Table 3 presents OLS estimates of β_1 in equation (1), with the change in log median house value, the change in log median household income, the change in the poverty rate (measured in percentage points), the change in the unemployment rate (measured in percentage points), and the change in the percentage of households that changed residences in the past year (measured in percentage points) as the outcome variables.[29] I examine how each of these outcomes correlates with the amount of NMTC investment (in millions of dollars).[30] For brevity, I present only results using third-order polynomial and fourth-order polynomial forms of the control function, but show estimates from specifications with no other covariates, with only the control function and demographic covariates, and with the control function and demographic and housing covariates. All regressions include county dummies, such that the relationships between NMTC investment and outcomes are identified off variation across tracts within counties.[31] Standard errors, which appear below the coefficients in parentheses, are clustered at the county level. The assumption in these regressions is that observations are correlated within counties, but independent across counties.

The OLS estimates suggest that there are small and generally insignificant relationships between NMTC investment and each outcome. The estimates in the first row of Table 3 imply that, regardless of the particular set of controls used, receiving $1 million in NMTC-subsidized investment is associated with a 0.01-0.03% decrease in median home values at the tract level. The relationship between NMTC investment and median household income is positive, but also small in magnitude; receiving $1 million in NMTC investment is associated with a 0.02% increase in median household income. There is some indication that NMTC investment is negatively associated with poverty and unemployment rates, but the coefficient estimates are generally insignificant and economically trivial in magnitude. Indeed, differences in

[29] I consider changes in each of the outcome variables for consistency and ease of interpretation. Results using levels in the outcome years are qualitatively similar.

[30] Given that project size varies substantially and that we would generally expect more expensive projects to have larger impacts on communities, I focus on investment dollars rather than number of projects. The results are qualitatively similar when I instead use number of projects.

[31] The results are very similar without county dummies, suggesting that spillovers across proximal tracts are unlikely to bias the results. Ham et al. (2011) also find little evidence of spillovers across tracts in their analysis of state and federal zone programs. The results are also qualitatively similar when one weights the estimates by tract population, which is not surprising given that the Census Bureau defines tracts in a manner that ensures that all have close to 4,000 residents.

unemployment rates among low-income tracts that do and do not receive $1 million in investment are less than a tenth of a percentage point on average. In the final row of Table 3, there is some indication that tracts that receive investment experience more household turnover, but the estimated relationship is weak. Taken alone, these results might be taken as evidence that subsidizing the financing of commercial real estate investment and business development in low-income neighborhoods does little to encourage revitalization.

However, the OLS estimates may be biased by unobserved factors that are correlated with NMTC investment and also affect the outcomes of interest. Table 4 presents analogous results from a fuzzy RD approach in which I instrument NMTC investment with an indicator for LIC status. Again, the assumption is that LIC status only affects the outcomes through its effect on where NMTC investment occurs. As shown in the previous section, LIC status is strongly predictive of the locations of NMTC investment by CDEs.

The tract-level IV estimates are an order of magnitude larger than the OLS estimates. However, the standard errors, again clustered at the county level, are also larger; as a result, many of the estimates remain statistically indistinguishable from zero. The results for changes in median home values in the first row indicate that $1 million in NMTC investment leads to about a 2% increase in median home values at the tract level. With a p-value of 0.15, the estimate from the preferred specification in column (3) is close to statistically significant. Although median household income appears unaffected, $1 million in NMTC investment reduces poverty rates by about one percentage point off a base of about 13%, or by about 8%. Meanwhile, unemployment rates in tracts that receive investment fall by about a third of a percentage point off a base of 6%. Finally, household turnover rates increase by about three fourths of a percentage point in tracts that receive $1 million in NMTC investment (off a base of 16%).[32] This suggests that the observed changes in neighborhood characteristics are not entirely driven by improvements in the circumstances of existing residents, but instead are at least in part attributable to changes in neighborhood composition in the wake of new investment.[33]

The fact that the IV estimates are considerably larger than the OLS estimates may indicate that treatment is endogenous. The difference in estimated effect sizes between the OLS and IV

[32] Unfortunately, ACS data do not break out moves among owners and renters.

[33] Notably, adding covariates has only modest effects on the estimated standard errors. The stability of the estimates, though, helps to establish the validity of the RD design in this setting. For all of the outcomes, we cannot reject the null that the coefficients are the same across specifications.

could also reflect the fact that the IV estimates are local; the fuzzy RD design generates estimates of the average effect of the treatment for only those neighborhoods near the cutoff that are recipients of NMTC investment. These estimates may not generalize to the broader sample of neighborhoods.

Overall, the IV results are consistent with research on other place-based programs showing that the effects of new development has positive spillovers on nearby home values and other neighborhood characteristics (e.g., Baum-Snow and Marion 2009, Freedman and Owens 2011). The magnitude of the estimated effects of NMTC-subsidized investment, however, is consistent with much of the past work on state EZs, which point to relatively small impacts of business tax incentives on economic activity (e.g., Neumark and Kolko 2010). Indeed, the results suggest that to the extent that there are benefits of NMTC investment in poor areas, those benefits are limited, and for many outcomes we cannot rule out that there is no effect at all.

6.1.2. Metropolitan Areas

Given the differences in the formula structure and in the potential heterogeneous effects of development in urban as opposed to rural neighborhoods, I break out the results for areas in metropolitan statistical areas separately. The results for MSAs, which receive over 80% of all NMTC financing, appear in Table 5.[34] Panel A shows OLS estimates of the relationship between NMTC investment and neighborhood characteristics, while panel B shows IV estimates.

The estimated relationships between NMTC investment and neighborhood characteristics are qualitatively and quantitatively similar for MSAs as they are for the full sample. In particular, while the OLS results in Panel A suggest that there exists a weak negative correlation between NMTC investment and home values, the IV results suggest that $1 million in NMTC investment is associated with a roughly 2% increase in median home values. However, the effects are again imprecisely estimated. As in the full sample, the effects of NMTC investment on poverty and unemployment rates in MSAs are more marked, with both poverty rates and unemployment rates about 6-8% lower in tracts that received $1 million in NMTC investment. However, the effects are only marginally significant, particularly for unemployment rates. In line with the previous results, household turnover rates appear to increase in response to new investment; $1 million

[34] Given there are few projects outside MSAs, the first-stage is relatively weak for the non-MSA sample. Therefore, I do not show results for non-MSA tracts.

more in NMTC investment increases the share of households in a tract that changed residences in the past year by nearly a percentage point.

6.1.3. Gentrifying vs. Non-Gentrifying Areas

One might expect new investment to have heterogeneous effects across areas on different growth or development trajectories. In particular, new investment subsidized by the NMTC program might have different impacts on gentrifying areas than on stable or declining areas. Indeed, Baum-Snow and Marion (2009) find differences in the effects of low-income housing development on neighborhoods that appeared to be improving prior to the new investment relative to neighborhoods that were not improving.

Thus, I categorize tracts into those showing signs of improvement during the 1990s and those not showing signs of improvement based on whether median home values increased over the course of the decade. Those tracts with median home values (in 2000 dollars) that increased over the course of the 1990s were deemed gentrifying, while those that experienced no change or a decline in median home values were deemed non-gentrifying.[35] The main OLS and IV results are presented separately for gentrifying and non-gentrifying tracts in Table 6.

The effects of new investment appear to be larger for non-gentrifying areas than for gentrifying areas. Though insignificantly different than zero in both cases (in part because of smaller sample sizes), $1 million in NMTC investment has essentially no effect on house prices in gentrifying areas, but translates into a 6% increase in house prices in non-gentrifying areas. The results suggest that poverty and unemployment rates also exhibit steeper declines in response to new investment in non-gentrifying areas than in gentrifying areas. This is little surprise, as one might expect more crowd out of unsubsidized investment in gentrifying areas and that the positive amenity effects associated with fresh investment might be larger in distressed neighborhoods.[36]

[35] The 1990 home values are converted to 2000 values using the consumer price index for shelter published by the Bureau of Labor Statistics.

[36] Some areas with large student populations (e.g., tracts containing colleges and universities) tend to have low household income and higher poverty rates, although many such areas would not be considered blighted. Limiting the sample to tracts with less than one-third of the population enrolled in school in 2000 (which reduces the sample by about 2,200 tracts, or 12%), has qualitatively little effect on the results. In fact, it improves the precision of the estimates for home values.

6.2. Specification Tests and Robustness

6.2.1. Varying the Window around the Threshold

To determine whether the particular window around the threshold chosen affects the main results, I conducted the main analysis for a number of different bandwidths. An abridged set of results appear in Table 7. The OLS results for larger and smaller bandwidths around the threshold, which appear in Panel A of Table 7, are similar to the main results using a bandwidth of 0.7-0.9. The estimated effects are all small in magnitude, although not surprisingly, estimates using larger bandwidths tend to be somewhat more precisely estimated given the larger sample size.

Turning to the IV results in Panel B of Table 7, the estimated effects of NMTC investment on various neighborhood characteristics are of very similar magnitudes across different windows around the cutoff. For example, $1 million in NMTC investment in a tract translates into a 1-2% increase in median home values regardless of the particular window chosen. Meanwhile, poverty rates are one percentage points lower in tracts that receive investment relative to those that do not, and for narrower windows around the cutoff, unemployment rates are consistently estimated to be about quarter of a percentage point lower in tracts that receive investment relative to those that do not. Finally, notwithstanding the choice of window, NMTC investment is associated with higher turnover in neighborhoods; $1 million in NMTC investment increases the fraction of households that changed houses in the past year by about a half to three fourths of a percentage point. The stability of the estimates across different windows suggests that the particular choice of bandwidth is not driving the main results.

6.2.2. NMTC Investment Timeframe

For the main analysis, I sum over all investments in LICs subsidized under the NMTC program over 2003-2009. Given that the ACS is conducted over several years and that one might expect the effects of new investment to take time to emerge, I consider investments over a shorter timeframe, 2003-2007. The results appear in Table 8.

As expected, the IV results using shorter time frames are larger. This may reflect the fact that it takes time for new developments to have effects of neighborhoods, but it also may reflect measurement error in the previous results arising from the timing of the ACS data. The IV results

suggest that $1 million in investment between 2003 and 2007 translates into increases in median home values of between 2% and 4%. Poverty rates and unemployment rates also fall somewhat more sharply in the wake of new investment over the 2003-2007 period. However, partly as a result of the scarcity of projects over the shorter time interval, the estimates are very imprecise. Except for those for poverty rates, none of the IV estimates are statistically significant at conventional levels.

6.2.3. Exploiting the Dual Thresholds

As previously discussed, areas eligible for NMTC investment are determined largely as a function of the MFI income ratio and the poverty rate. Since only about 5% of tracts qualify as LICs on the poverty rate criterion alone, I ignore those tracts in the previous analyses. As a check on the robustness of the results to the dual thresholds, I run the analysis on the subsample of tracts with poverty rates in 2000 less than 20%.[37] Except for a very small number of tracts that qualify on other criteria (i.e., the low population or high out-migration criteria), those tracts in this subsample must qualify on the MFI criteria alone.

While conducting the analysis for this limited group of tracts reduces the sample size and thus the precision of the estimates, it provides for a cleaner discontinuity to exploit to identify the effects of interest. This can be seen in Figure 5, which shows NMTC investment and projects in tracts around the 0.8 cutoff, but excluding those tracts with poverty rates exceeding 20%. The discontinuity is starker in these figures than in Figure 3, where more investment occurred in tracts above the 0.8 cutoff due to the existence of some tracts to the right of the threshold that qualified as LICs based on the poverty rate criterion.

The results for the subsample of tracts with poverty rates less than 20% appear in Table 9. The coefficient estimates are qualitatively similar to the main results for all tracts near the 80% MFI cutoff. The effects of NMTC investment on home values are positive but still statistically indistinguishable from zero. The effect on the unemployment rate in the low-poverty sample is very similar to that reported for the full sample in Table 4, but not surprisingly given the lower baseline level of poverty in the restricted sample, the decline in poverty rates in response to investment is more muted.

[37] This approach is similar to that of Matsudaira (2008).

That there are some differences in effect sizes between Tables 4 and 9 is not surprising, as it is merely a reflection of the local nature of the estimates and heterogeneous treatment effects. Tracts qualifying on the poverty rate criterion skew younger, and a number of them have relatively large student populations. Neighborhoods that receive investment based on their eligibility under the MFI criterion alone, which tend to have less transient populations, generally see a greater capitalization of any positive amenity effects of NMTC-subsidized projects into home values, but smaller effects on the characteristics and composition of residents.

7. Crowd Out and the Effects of NMTC Investment on Employment

A major concern regarding the NMTC is that funds may be allocated to projects that would have received financing regardless (Armistead 2005). A direct test of the extent of crowd out, which has been significant in placed-based housing programs (Baum-Snow and Marion 2009, Eriksen and Rosenthal 2010), would require data not only on NMTC business investment and commercial real estate transactions, but all business investment and commercial real estate transactions. The lack of a discontinuity in these indicators at the LIC threshold would indicate that the program is having little effect on overall business activity.

I do not attempt to quantify the precise amount of crowd out associated with the NMTC in this paper given the lack of such expansive and detailed data. However, to the extent that there is crowd out of unsubsidized investment, one would expect to find little to no effect of NMTC investment on housing and resident characteristics. Yet as discussed in the previous section, there is some indication that subsidized investment has positive, albeit small, effects on neighborhood conditions. Though still merely suggestive, a substantive change in total employment and the composition of jobs in an area would provide more compelling evidence that NMTC investment is not merely crowding out other private investment.

Using LEHD data for 45 states between 2002 and 2009, I exploit the discontinuity generated by the rule determining LIC status to test whether investment subsidized by the NMTC program between those years affected the total number of private-sector jobs and the composition of those jobs within tracts. Finding a positive effect on employment and the quality of jobs (in this case measured by earnings) would help to rationalize some of the findings with respect to home values, poverty, and unemployment. On the other hand, the finding of no effect on employment

or the types of jobs in a community would not be entirely inconsistent with the previous results for neighborhood residents; even if they do not create new jobs, to the extent that NMTC investments have amenity effects (e.g., by tearing down abandoned properties) or attract relatively affluent people to an area, they could have positive implications for home values and other neighborhood conditions.

I present OLS and IV results using the LEHD data in Table 10. The IV results in the first row of Panel B suggest that investment subsidized under the NMTC program has a modest positive effect on private-sector employment. Although imprecisely estimated, the estimates suggest that $1 million in investment increases the number of private-sector jobs in a relatively poor tract by about 1-2%. For tracts near the cutoff, which on average have about 1,320 private-sector jobs, that translates into roughly 20 jobs, each coming at a cost of approximately $50,000. This is consistent with cost estimates from other place-based programs aimed at fostering business activity in distressed areas; recent research has suggested that the cost of creating a job under state EZ programs and federal Empowerment Zones and Enterprise Communities programs is in the range of $20,000 to $100,000.[38] Notably, though, while the job counts exclude secondary jobs, there is no restriction on earnings or hours on the primary jobs included in the sample.[39] Hence, the cost per full-time equivalent job is likely well above $50,000.

The results in Table 10 also show that NMTC investment is associated with a reduction in the share of jobs that pay less than $15,000 annually and a commensurate increase in the share of jobs paying $15,000 annually or more. Though there was a rightward shift in the distribution of earnings across tracts over the time period considered, the shift was more pronounced in tracts that received NMTC investment. This suggests that, to the extent that subsidized investment generated jobs, those jobs tended to be higher quality jobs on average. These results are consistent with Busso et al. (2010), who find modest increases in wages among workers in federal urban Empowerment Zones. Nonetheless, the changes in shares of jobs in each pay category in response to new investment are not large, and in general, we cannot rule out that

[38] Although program structures vary across states, Peters and Fisher (2002) estimate that each net new job generated by state EZ programs costs state and local governments between $20,000 and $60,000 ($24,242 and $72,727 in 2010 dollars) in tax abatements. Busso and Kline's (2008) results, meanwhile, imply a federal government cost per job for Empowerment Zones and Enterprise Communities of between $20,000 and $100,000 (see also Glaeser and Gottleib 2008).

[39] A primary job represents the job that accounts for the largest fraction of an individual's annual earnings. The results are similar if one includes both primary and secondary jobs in the sample.

investment had no effect on average job quality. However, the pattern that emerges from these results and those results in the previous section suggests that, even though the program is relatively new and many of its projects might still be taking root, there may be some positive impact of new investment.

While not conclusive, these results also suggest that to the extent that there is crowd out associated with the NMTC program, it is not complete. This finding is consistent with Gurley-Calvez et al. (2009), who analyze individual and corporate income tax data and argue that the NMTC crowds out some, but not all private investment. The results are also in line with recent qualitative work on the NMTC, including reports by the U.S. Government Accountability Office (2007, 2010) and Abravanel et al. (2007). These reports suggest that while a concern, crowd out does not appear to be complete and that some projects would not be feasible without NMTC support.[40] Further, both the GAO and Abravanel et al. conclude that although community benefits were not a chief concern in CDEs' selection of projects, there was some evidence that NMTC investment in poor areas had some positive spillovers.

Finally, these results speak to the continuing debate over the efficacy of place-based policies specifically aimed at economic development in disadvantaged regions. State EZs have been at the center of this debate for decades, with some papers pointing to positive and significant effects of EZ designation on local labor markets and others indicating no effect at all (Ham et al. 2011, Neumark and Kolko 2010). Recent work has suggested that federal Empowerment Zones and Enterprise Communities have some positive impacts on communities, but whether they are worth the cost is not clear (Busso and Kline 2008, Glaeser and Gottlieb 2008). The NMTC appears to have positive but small impacts on affected tracts. Furthermore, echoing results on state EZs, the impacts are heterogeneous depending on the initial circumstances of neighborhoods that receive subsidized investment under the program. However, as with state and federal zone programs, it is difficult to know whether the impacts of NMTC investment would be different for more or less affluent areas; the estimated effects in this paper apply only to the subpopulation of tracts with MFI near 80% of the greater of state and MSA MFI.

[40] In a survey by the U.S. Government Accountability Office (2007), 64% of NMTC investors reported allocating more of their investment budget to LICs as a result of the credit. However, as the U.S. Government Accountability Office acknowledges, these investors have a vested interest in preserving the program, which may have colored their answers to the survey.

8. Conclusion

Although place-based policies have grown in importance in recent decades, many remain skeptical of their efficacy. Lending credence to this skepticism are numerous studies on programs such as state EZs that suggest there is little to no benefit associated with subsidizing investment in struggling cities and neighborhoods. However, many of these studies have struggled themselves with identification, due in large part to self-selection of areas into place-based programs.

The paper adds to the literature on place-based programs by evaluating the effects of the New Markets Tax Credit (NMTC) program on neighborhoods. The structure of the program allows me to overcome endogeneity and selection problems that have plagued past studies on different place-based programs. In particular, a discontinuity in the formula used to determine the eligibility of census tracts for investment generates pseudo-random assignment of NMTC investment in tracts around a certain income threshold. Tracts immediately below the threshold are eligible to receive NMTC investment, whereas those above it are generally not eligible. However, the tracts on either side of the threshold are otherwise similar. Hence, comparing outcomes among tracts within a sufficiently narrow window around the cutoff permits one to draw causal inferences regarding the effects of NMTC investment on neighborhoods.

I find some evidence that NMTC investment reduces poverty rates in relatively low-income census tracts. The effects on other neighborhood characteristics, including home values, are positive but statistically indistinguishable from zero. There is also some evidence to suggest that investment increases total private-sector employment and improves the quality of jobs in affected areas. However, the estimated effects are not large and are often statistically imprecise. I tentatively conclude that while there appear to be some positive effects of subsidized investment in disadvantaged neighborhoods, the benefits associated with subsidized investment are modest. This finding is consistent with results from studies on other place-based programs, such as the Low-Income Housing Tax Credit (Baum-Snow and Marion 2009) and the Community Reinvestment Act (Gabriel and Rosenthal 2009).

More broadly, this paper builds on a burgeoning literature exploiting geographic boundaries to identify the effects of various policies and programs. Research along these lines include studies on education (Black 1999), the environment (Ito 2011), social insurance programs

(Lalive 2008), minimum wages (Dube et al. 2010), personal bankruptcies (Dick et al. 2008), and other areas. This paper adds to this literature by evaluating a large-scale place-based program that aims to reinvigorate particularly distressed communities. While the NMTC program is still in its infancy and further research is necessary to establish its longer-run impacts on neighborhoods, this paper suggests that its initial effects may be positive, but not large.

References

Abravanel, Martin, Nancy Pindus, and Brett Theodos. 2007. "Analysis of Selected New Markets Tax Credit Projects." Urban Institute, Report for the US Department of Treasury, Community Development Financial Institutions Fund.

____. 2010. "Evaluating Community and Economic Development Programs: A Literature Review to Inform Evaluation of the New Markets Tax Credit Program." Urban Institute, Report for the US Department of Treasury, Community Development Financial Institutions Fund.

Andersson, Fredrik, Matthew Freedman, Marc Roemer, and Lars Vilhuber. "LEHD OnTheMap Technical Documentation." Technical Paper DATA-OTM-2.0.3, U.S. Census Bureau.

Armistead, P. Jefferson. 2005. "Community Perspective: Is the NMTC Program Making a Difference in Low-Income Communities?" *Community Development Investment Review* 1(1): 13-20.

Baum-Snow, Nathaniel, and Justin Marion. 2009. "The Effects of Low-Income Housing Tax Credit Development on Neighborhoods." *Journal of Public Economics* 93(5-6): 654-666.

Bhutta, Neil. 2010. "GSE Activity and Mortgage Supply in Lower-Income and Minority Neighborhoods: The Effect of the Affordable Housing Goals." *The Journal of Real Estate Finance and Economics*.

Billings, Stephen. 2009. "Do Enterprise Zones Work? An Analysis at the Borders." *Public Finance Review* 37(1): 68-93.

Black, Sandra. 1999. "Do Better Schools Matter? Parental Valuation of Elementary Education." *Quarterly Journal of Economics* 114(2): 577-599.

Boarnet, Marlon and William Bogart. 1996. "Enterprise Zones and Employment: Evidence from New Jersey." *Journal of Urban Economics* 40(2): 198-215.

Bondonio, Daniele and John Engberg. 2000. "Enterprise Zones and Local Employment: Evidence form the States' Programs." *Regional Science and Urban Economics* 30(5): 519-549.

Bostic, Raphael and Stuart Gabriel. 2006. "Do the GSEs Matter to Low-Income Housing Markets? An Assessment of the Effects of the GSE Loan Purchase Goals on California Housing Outcomes." *Journal of Urban Economics* 59(3): 458-475.

Busso, Matias, Jesse Gregory, and Patrick Kline. 2010. "Assessing the Incidence and Efficiency of a Prominent Place Based Policy." Center for Economic Studies Working Paper CES-WP-11-07, U.S. Census Bureau.

Busso, Matias, and Patrick Kline. 2008. "Do Local Economic Development Programs Work? Evidence from the Federal Empowerment Zone Program." Cowles Foundation Working Paper 1638.

Chay, Kenneth and Michael Greenstone. 2005. "Does Air Quality Matter? Evidence from the Housing Market." *Journal of Political Economy* 113(2): 376-424.

Dick, Astrid, Andreas Lehnert, and Giorgio Topa. 2008. "Social Spillovers in Personal Bankruptcies." Federal Reserve Bank of New York Working Paper.

Dube, Arindrajit, William Lester, and Michael Reich. 2010. "Minimum Wage Effects Across State Borders: Estimates Using Contiguous Counties." *Review of Economics and Statistics* 92(4): 945-964.

Elvery, Joel. 2009. "The Impact of Enterprise Zones on Residential Employment: An Evaluation of the Enterprise Zone Programs of California and Florida." *Economic Development Quarterly* 23(1): 44–59.

Eriksen, Michael and Stuart Rosenthal. 2010. "Crowd Out Effects of Place-Based Subsidized Rental Housing: New Evidence from the LIHTC Program." *Journal of Public Economics* 94(11-12): 953-966.

Freedman, Matthew and Emily Owens. 2011. "Low-Income Housing Development and Crime." *Journal of Urban Economics* 70(2-3): 115-131.

Gabriel, Stuart and Stuart Rosenthal. 2009. "Government-Sponsored Enterprises, the Community Reinvestment Act, and Homeownership in Targeted Underserved Neighborhoods." In

Housing Markets and the Economy, eds. Edward Glaeser and John Quigley. Cambridge, MA: Lincoln Institute of Land Policy.

Glaeser, Edward and Joshua Gottlieb. 2008. "The Economics of Place-Making Policies." *Brookings Papers on Economic Activity* Spring: 155-253.

Gurley-Calvez, Tami, Thomas Gilbert, Katherine Harper, Donald Marples, and Kevin Daly. 2009. "Do Tax Incentives Affect Investment: An Analysis of the New Markets Tax Credit." *Public Finance Review* 37(4): 371-398.

Ham, John, Charles Swenson, Ayşe İmrohoroğlu, and Heonjae Song. 2011. "Government Programs Can Improve Local Labor Markets: Evidence from State Enterprise Zones, Federal Empowerment Zones, and Federal Enterprise Community." *Journal of Public Economics* 95(7-8): 779-797.

Imbens, Guido and Thomas Lemieux. 2008. "Regression Discontinuity Designs: A Guide to Practice." *Journal of Econometrics* 142(2): 615-635.

Ito, Koichiro. 2011. "Do Consumers Respond to Marginal or Average Prices? Evidence from Nonlinear Electricity Pricing." University of California-Berkeley Working Paper.

Lalive, Rafael. 2008. "How Do Extended Benefits Affect Unemployment Duration? A Regression Discontinuity Approach." *Journal of Econometrics* 142(2): 785-806.

Lambie-Hanson, Lauren. 2008. "Assessing the Prevalence of Real Estate Investments in the New Markets Tax Credit Program." Federal Reserve Bank of San Francisco, Community Development Investment Center Working Paper.

Lee, David. 2008. "Randomized Experiments from Non-Random Selection in U.S. House Elections." *Journal of Econometrics* 142(2): 675-697.

Lee, David and Thomas Lemieux. 2010. "Regression Discontinuity Designs in Economics." *Journal of Economic Literature* 48(2): 281-355.

Matsudaira, Jordan. 2008. "Mandatory Summer School and Student Achievement." *Journal of Econometrics* 142(2): 829-850.

McCrary, Justin. 2008. "Testing for Manipulation of the Running Variable in the Regression Discontinuity Design." *Journal of Econometrics* 142(2): 698-714.

Neumark, David and Jed Kolko. 2010. "Do Enterprise Zones Create Jobs? Evidence from California's Enterprise Zone Program." *Journal of Urban Economics* 68(1): 1-19.

O'Keefe, Suzanne. 2004. "Job Creation in California's Enterprise Zones: A Comparison Using a Propensity Score Matching Model." *Journal of Urban Economics* 55(1): 131-150.

Papke, Leslie. 1994. "Tax Policy and Urban Development: Evidence from the Indiana Enterprise Zone Program." *Journal of Public Economics* 54(1): 37-49.

Peters, Alan and Peter Fisher. 2002. *State Enterprise Zones: Have They Worked?* Kalamazoo, Michigan: W.E. Upjohn Institute for Employment Research.

Rubin, Julia, and Gregory Stankiewicz. 2005. "The New Markets Tax Credit Program: A Midcourse Assessment." *Community Development Investment Review* 1(1): 1-11.

Staiger, Douglas, and James Stock. 1997. "Instrumental Variables Regression with Weak Instruments." *Econometrica* 65(3): 557-586.

U.S. Government Accountability Office. 2007. "Tax Policy: New Markets Tax Credit Appears to Increase Investment by Investors in Low-Income Communities, but Opportunities Exist to Better Monitor Compliance." GAO-07-296.

____. 2010. "New Markets Tax Credit: The Credit Helps Fund a Variety of Projects in Low-Income Communities, But Could Be Simplified." GAO-10-334.

Table 1
Descriptive Statistics Near the MFI Eligibility Threshold

	Value of MFI Ratio			
	[0.70, 0.75]	(0.75, 0.80]	(0.80, 0.85]	(0.85, 0.90]
A. Demographic Characteristics (2000)				
Population	4153	4207	4291	4365
Share of Pop. Black	0.15	0.11	0.10	0.09
Share of Pop. Hispanic	0.13	0.12	0.09	0.09
Share of Pop. Under Age 5	0.07	0.07	0.06	0.06
Share of Pop. 65+	0.14	0.15	0.15	0.14
Share of Pop. Enrolled in School	0.27	0.26	0.26	0.26
Share of Pop. Less Than HS Degree	0.26	0.24	0.22	0.20
Share of Pop. With Just HS Degree	0.34	0.34	0.35	0.34
Share of Pop. With Some College	0.26	0.26	0.27	0.28
Share of Pop. With Bachelors or More	0.14	0.15	0.16	0.18
Average Household Size	2.59	2.56	2.55	2.55
B. Housing Characteristics (2000)				
Number of Housing Units	1791	1826	1865	1858
Share Vacant	0.11	0.11	0.10	0.09
Share Occupied	0.89	0.89	0.90	0.91
Share Owner Occupied	0.55	0.58	0.61	0.63
Share Renter Occupied	0.34	0.31	0.29	0.28
Share Owner Occupied w/ Mortgage	0.62	0.63	0.63	0.65
Median Age of Housing Units	37.25	36.22	35.43	34.39
Median Number of Rooms	4.99	5.10	5.23	5.31
C. NMTC Activity				
NMTC Investment, 2003-2009 (Mil.)	0.86	0.75	0.19	0.08
NMTC Funds, 2003-2009 (Mil.)	0.30	0.24	0.05	0.04
NMTC Projects, 2003-2009	0.07	0.06	0.01	0.01
NMTC Investment, 2003-2007 (Mil.)	0.58	0.53	0.12	0.05
NMTC Funds, 2003-2007 (Mil.)	0.20	0.15	0.03	0.03
NMTC Projects, 2003-2007	0.05	0.04	0.01	0.01
Tracts	3773	4322	4579	4597

Notes: Excludes tracts in GO Zones and that are missing 2000 Census or 2005-2009 ACS data.

Table 2
Tract-Level Investment Location Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
A. NMTC Investment						
NMTC Investment, 2003-2009 (Mil.)	0.957***	0.899***	0.859***	1.110***	1.038***	0.979***
	[0.307]	[0.296]	[0.284]	[0.359]	[0.347]	[0.326]
NMTC Projects, 2003-2009	0.048***	0.044***	0.043***	0.047***	0.044***	0.043***
	[0.013]	[0.013]	[0.012]	[0.013]	[0.013]	[0.013]
B. NMTC Investment: Commercial Real Estate						
NMTC Investment, 2003-2009 (Mil.)	0.554***	0.500***	0.488***	0.581***	0.517***	0.495***
	[0.208]	[0.187]	[0.183]	[0.207]	[0.182]	[0.176]
NMTC Projects, 2003-2009	0.029***	0.027***	0.027***	0.032***	0.030***	0.029***
	[0.008]	[0.008]	[0.008]	[0.008]	[0.007]	[0.007]
C. NMTC Investment: Business Development						
NMTC Investment, 2003-2009 (Mil.)	0.392*	0.388*	0.361*	0.516*	0.508*	0.473*
	[0.224]	[0.229]	[0.215]	[0.296]	[0.298]	[0.275]
NMTC Projects, 2003-2009	0.016**	0.015*	0.015*	0.013	0.012	0.012
	[0.008]	[0.008]	[0.008]	[0.009]	[0.009]	[0.009]
Cubic in MFI Ratio	Y	Y	Y			
Quartic in MFI Ratio				Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y
Demographic Controls		Y	Y		Y	Y
Housing Controls			Y			Y
Observations	17271	17271	17271	17271	17271	17271

Notes: Includes tracts with income ratios between 0.7 and 0.9 (inclusive) that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

Table 3
Tract-Level OLS Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Change in Log Home Values	-0.0003	-0.0003	-0.0001	-0.0003	-0.0003	-0.0001
	[0.0004]	[0.0004]	[0.0003]	[0.0004]	[0.0004]	[0.0003]
Change in Log Median Household Income	0.0002	0.0002*	0.0002**	0.0002	0.0002*	0.0002**
	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Change in Poverty Rate	-0.0022	-0.0025	-0.0033	-0.0021	-0.0024	-0.0032
	[0.0063]	[0.0060]	[0.0062]	[0.0063]	[0.0060]	[0.0061]
Change in Unemployment Rate	-0.0088*	-0.0068	-0.0068	-0.0088*	-0.0068	-0.0068
	[0.0045]	[0.0043]	[0.0042]	[0.0045]	[0.0043]	[0.0042]
Change in Household Turnover	0.0035	0.0016	0.0094	0.0034	0.0016	0.0093
	[0.0090]	[0.0079]	[0.0071]	[0.0090]	[0.0079]	[0.0071]
Cubic in MFI Ratio	Y	Y	Y			
Quartic in MFI Ratio				Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y
Demographic Controls		Y	Y		Y	Y
Housing Controls			Y			Y
Observations	17271	17271	17271	17271	17271	17271

Notes: Includes tracts with income ratios between 0.7 and 0.9 (inclusive) that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

Table 4
Tract-Level IV Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Change in Log Home Values	0.0211	0.0238	0.0228	0.0148	0.0169	0.0189
	[0.0160]	[0.0164]	[0.0157]	[0.0170]	[0.0173]	[0.0168]
Change in Log Median Household Income	-0.0018	0.0040	0.0079	-0.0041	0.0007	0.0029
	[0.0075]	[0.0079]	[0.0083]	[0.0079]	[0.0081]	[0.0085]
Change in Poverty Rate	-0.8049**	-1.0027**	-1.1247**	-0.552	-0.7183*	-0.8097*
	[0.3915]	[0.4504]	[0.4806]	[0.3572]	[0.4021]	[0.4275]
Change in Unemployment Rate	-0.3815	-0.2987	-0.2701	-0.4476*	-0.3626	-0.3408
	[0.2384]	[0.2403]	[0.2428]	[0.2497]	[0.2494]	[0.2553]
Change in Household Turnover	0.7266*	0.5493	0.6208	0.8265*	0.7159	0.8252*
	[0.4086]	[0.4063]	[0.4207]	[0.4437]	[0.4368]	[0.4658]
Cubic in MFI Ratio	Y	Y	Y			
Quartic in MFI Ratio				Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y
Demographic Controls		Y	Y		Y	Y
Housing Controls			Y			Y
Observations	17271	17271	17271	17271	17271	17271

Notes: Includes tracts with income ratios between 0.7 and 0.9 (inclusive) that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

Table 5
Tract-Level OLS and IV Estimates, MSAs

	(1)	(2)	(3)	(4)	(5)	(6)
A. OLS Results						
Change in Log Home Values	-0.0010	-0.0011*	-0.00041	-0.0010	-0.0011*	-0.0004
	[0.0007]	[0.0006]	[0.0006]	[0.0007]	[0.0006]	[0.0006]
Change in Log Median Household Income	0.0004	0.0002	0.0003	0.0004*	0.0002	0.0003
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
Change in Poverty Rate	-0.0064	-0.0048	-0.0058	-0.0056	-0.0042	-0.0051
	[0.0147]	[0.0142]	[0.0148]	[0.0147]	[0.0141]	[0.0147]
Change in Unemployment Rate	-0.0169*	-0.0111	-0.0102	-0.0166	-0.0109	-0.0100
	[0.0101]	[0.0111]	[0.0104]	[0.0102]	[0.0111]	[0.0104]
Change in Household Turnover	-0.0022	-0.0055	0.0094	-0.0030	-0.0060	0.0090
	[0.0156]	[0.0146]	[0.0147]	[0.0156]	[0.0146]	[0.0147]
B. IV Results						
Change in Log Home Values	0.0241	0.0246	0.0225	0.0175	0.0170	0.0194
	[0.0205]	[0.0213]	[0.0195]	[0.0238]	[0.0249]	[0.0235]
Change in Log Median Household Income	-0.0089	-0.0055	-0.0016	-0.0134	-0.0104	-0.0084
	[0.0095]	[0.0097]	[0.0095]	[0.0112]	[0.0114]	[0.0117]
Change in Poverty Rate	-1.0397**	-1.2560**	-1.3751**	-0.8475*	-1.0563*	-1.1782**
	[0.5218]	[0.6031]	[0.6329]	[0.4911]	[0.5597]	[0.5948]
Change in Unemployment Rate	-0.5249*	-0.3888	-0.3254	-0.6034*	-0.4258	-0.3533
	[0.3154]	[0.3152]	[0.3086]	[0.3425]	[0.3403]	[0.3423]
Change in Household Turnover	0.8595*	0.6496	0.6663	1.0841*	0.8993	0.9346
	[0.5153]	[0.5189]	[0.5193]	[0.6112]	[0.5937]	[0.6220]
Cubic in MFI Ratio	Y	Y	Y			
Quartic in MFI Ratio				Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y
Demographic Controls		Y	Y		Y	Y
Housing Controls			Y			Y
Observations	10853	10853	10853	10853	10853	10853

Notes: Includes tracts with income ratios between 0.7 and 0.9 (inclusive) that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

Table 6
Tract-Level IV Estimates, Gentrifying and Non-Gentrifying Neighborhoods

	(1)	(2)	(3)	(4)	(5)	(6)
	Gentrifying			**Non-Gentrifying**		
	A. OLS Results					
Change in Log Home Values	-0.0010*	-0.0011**	-0.0008*	0.0003	0.0002	0.0003
	[0.0006]	[0.0005]	[0.0004]	[0.0003]	[0.0002]	[0.0003]
Change in Log Median Household Income	0.0002	0.0002	0.0003	0.0001	0.0001	0.0002*
	[0.0002]	[0.0002]	[0.0002]	[0.0001]	[0.0001]	[0.0001]
Change in Poverty Rate	-0.0104	-0.0119	-0.0122	0.0028	0.0024	0.0012
	[0.0124]	[0.0109]	[0.0114]	[0.0034]	[0.0033]	[0.0033]
Change in Unemployment Rate	-0.01695*	-0.0135	-0.0111	-0.0031	-0.0024	-0.0038
	[0.0097]	[0.0097]	[0.0095]	[0.0025]	[0.0032]	[0.0037]
Change in Household Turnover	0.0072	0.0015	0.0073	-0.0018	-0.0019	0.0063
	[0.0182]	[0.0170]	[0.0141]	[0.0061]	[0.0051]	[0.0059]
	B. IV Results					
Change in Log Home Values	-0.0024	0.0012	0.0020	0.0619	0.0583	0.0610
	[0.0120]	[0.0127]	[0.0129]	[0.0495]	[0.0497]	[0.0539]
Change in Log Median Household Income	0.0027	0.0082	0.0122	-0.0097	-0.0052	-0.0027
	[0.0083]	[0.0092]	[0.0100]	[0.0159]	[0.0163]	[0.0182]
Change in Poverty Rate	0.2009	0.0823	0.0118	-2.3849	-2.7168	-3.1312
	[0.3349]	[0.3494]	[0.3571]	[1.6475]	[1.9817]	[2.3787]
Change in Unemployment Rate	-0.1843	-0.1506	-0.1038	-0.6937	-0.6109	-0.6444
	[0.2362]	[0.2519]	[0.2574]	[0.6073]	[0.6111]	[0.6768]
Change in Household Turnover	0.7272	0.5665	0.6720	0.8072	0.7515	0.8641
	[0.4515]	[0.4416]	[0.4676]	[0.9044]	[0.9608]	[1.1133]
Cubic in MFI Ratio	Y	Y	Y	Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y
Demographic Controls		Y	Y		Y	Y
Housing Controls			Y			Y
Observations	10497	10497	10497	6774	6774	6774

Notes: Includes tracts with income ratios between 0.7 and 0.9 (inclusive) that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

Table 7
Tract-Level OLS and IV Estimates, Varying Windows around the Threshold

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	[0.50, 1.10]	**[0.60, 1.00]**	**[0.70, 0.90]**	**[0.71, 0.89]**	**[0.72, 0.88]**	**[0.73, 0.87]**	**[0.74, 0.86]**	**[0.75, 0.85]**
A. OLS Results								
Change in Log Home Values	0.0003*	0.0003	-0.0001	-0.0002	-0.0001	-0.0001	-0.0002	-0.00003
	[0.0002]	[0.0002]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]
Change in Log Median HH Income	0.0002*	0.0001	0.0002**	0.0002*	0.0002*	0.0003*	0.0003**	0.0002**
	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0002]	[0.0001]
Change in Poverty Rate	-0.0016	-0.0022	-0.0033	-0.0026	-0.0019	-0.0026	-0.0061	-0.0018
	[0.0018]	[0.0018]	[0.0062]	[0.0063]	[0.0067]	[0.0071]	[0.0076]	[0.0051]
Change in Unemployment Rate	-0.0047	-0.0036	-0.0068	-0.0057	-0.0075	-0.0064	-0.0066	-0.0020
	[0.0029]	[0.0026]	[0.0042]	[0.0044]	[0.0053]	[0.0052]	[0.0057]	[0.0041]
Change in Household Turnover	0.0063	0.0073	0.0094	0.0087	0.0071	0.0054	0.0022	0.0035
	[0.0056]	[0.0059]	[0.0071]	[0.0075]	[0.0062]	[0.0059]	[0.0053]	[0.0052]
B. IV Results								
Change in Log Home Values	0.0114	0.0161	0.0228	0.0251*	0.0195	0.0178	0.0156	0.0048
	[0.0071]	[0.0113]	[0.0157]	[0.0147]	[0.0155]	[0.0152]	[0.0167]	[0.0203]
Change in Log Median HH Income	0.0108**	-0.0011	0.0079	0.0038	0.0040	0.0010	0.0023	0.0068
	[0.0053]	[0.0058]	[0.0083]	[0.0070]	[0.0079]	[0.0079]	[0.0085]	[0.0099]
Change in Poverty Rate	-1.2174***	-1.1921***	-1.1247**	-0.7404**	-0.9458**	-1.0588**	-1.1680**	-1.3383**
	[0.3202]	[0.4451]	[0.4806]	[0.3633]	[0.4431]	[0.4533]	[0.5590]	[0.6496]
Change in Unemployment Rate	-0.0017	0.1113	-0.2701	-0.1703	-0.2408	-0.2689	-0.2419	-0.1868
	[0.1325]	[0.1721]	[0.2428]	[0.2100]	[0.2360]	[0.2320]	[0.2504]	[0.2858]
Change in Household Turnover	0.4149*	0.5260*	0.6208	0.6311*	0.4353	0.4570	0.7474	0.6313
	[0.2390]	[0.3179]	[0.4207]	[0.3829]	[0.4093]	[0.3864]	[0.4687]	[0.5200]
Cubic in MFI Ratio	Y	Y	Y	Y	Y	Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y	Y	Y
Demographic Controls	Y	Y	Y	Y	Y	Y	Y	Y
Housing Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	41652	31333	17271	15661	13928	12222	10535	8901

Notes: Includes tracts with income ratios at the top of each column that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

Table 8
Tract-Level OLS and IV Estimates, 2003-2007 Investments

	(1)	(2)	(3)	(4)	(5)	(6)
A. OLS Results						
Change in Log Home Values	-0.0001	-0.0002	-0.0001	-0.0001	-0.0002	-0.0001
	[0.0003]	[0.0003]	[0.0002]	[0.0003]	[0.0003]	[0.0002]
Change in Log Median Household Income	0.0002*	0.0002*	0.0003**	0.0002*	0.0002*	0.0003**
	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Change in Poverty Rate	-0.0027	-0.0026	-0.0038	-0.0026	-0.0025	-0.0037
	[0.0063]	[0.0058]	[0.0060]	[0.0062]	[0.0058]	[0.0059]
Change in Unemployment Rate	-0.0102*	-0.0088*	-0.0089**	-0.0101**	-0.0087*	-0.0089**
	[0.0052]	[0.0046]	[0.0042]	[0.0052]	[0.0045]	[0.0042]
Change in Household Turnover	0.0025	0.0017	0.0091	0.0024	0.0017	0.0091
	[0.0106]	[0.0095]	[0.0082]	[0.0105]	[0.0095]	[0.0081]
B. IV Results						
Change in Log Home Values	0.0355	0.0387	0.0384	0.0230	0.0254	0.0288
	[0.0300]	[0.0302]	[0.0303]	[0.0281]	[0.0278]	[0.0280]
Change in Log Median Household Income	-0.0030	0.0065	0.0133	-0.0064	0.0011	0.0044
	[0.0125]	[0.0130]	[0.0146]	[0.0123]	[0.0122]	[0.0130]
Change in Poverty Rate	-1.3526*	-1.6322*	-1.8952**	-0.8569	-1.0799	-1.2338*
	[0.7516]	[0.8540]	[0.9651]	[0.6047]	[0.6751]	[0.7359]
Change in Unemployment Rate	-0.6412	-0.4863	-0.4552	-0.6947	-0.5451	-0.5193
	[0.4395]	[0.4165]	[0.4331]	[0.4292]	[0.4023]	[0.4143]
Change in Household Turnover	1.2211	0.8941	1.0462	1.2829*	1.0763	1.2573
	[0.7818]	[0.7251]	[0.7953]	[0.7763]	[0.7296]	[0.8027]
Cubic in MFI Ratio	Y	Y	Y			
Quartic in MFI Ratio				Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y
Demographic Controls		Y	Y		Y	Y
Housing Controls			Y			Y
Observations	17271	17271	17271	17271	17271	17271

Notes: Includes tracts with income ratios between 0.7 and 0.9 (inclusive) that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

Table 9

Tract-Level OLS and IV Estimates: Excluding Tracts with Poverty Rates Exceeding 20%

	(1)	(2)	(3)	(4)	(5)	(6)
A. OLS Results						
Change in Log Home Values	0.00001	-0.0001	-0.00001	0.00001	-0.0001	-0.00001
	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Change in Log Median Household Income	0.0001	0.0002	0.0002**	0.0001	0.0002	0.0002**
	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Change in Poverty Rate	-0.0007	-0.0022	-0.0025	-0.0007	-0.0022	-0.0025
	[0.0053]	[0.0053]	[0.0052]	[0.0053]	[0.0053]	[0.0052]
Change in Unemployment Rate	-0.0051***	-0.0047**	-0.0051**	-0.0051***	-0.0047**	-0.0051**
	[0.0019]	[0.0019]	[0.0026]	[0.0019]	[0.0019]	[0.0026]
Change in Household Turnover	0.0037	0.0025	0.0078	0.0037	0.0025	0.0078
	[0.0095]	[0.0080]	[0.0061]	[0.0095]	[0.0080]	[0.0061]
B. IV Results						
Change in Log Home Values	0.0272	0.0364	0.0403	0.0091	0.0175	0.0250
	[0.0334]	[0.0341]	[0.0355]	[0.0298]	[0.0290]	[0.0295]
Change in Log Median Household Income	0.0093	0.0135	0.0174	-0.0010	0.0029	0.0026
	[0.0155]	[0.0157]	[0.0174]	[0.0138]	[0.0134]	[0.0139]
Change in Poverty Rate	-0.3862	-0.4826	-0.5571	-0.0075	-0.0975	-0.0935
	[0.6354]	[0.6348]	[0.6799]	[0.5355]	[0.5313]	[0.5525]
Change in Unemployment Rate	-0.3523	-0.4190	-0.4212	-0.2982	-0.3200	-0.3064
	[0.4608]	[0.4619]	[0.4787]	[0.4107]	[0.4068]	[0.4157]
Change in Household Turnover	0.1722	0.2028	0.3695	0.4763	0.5119	0.6347
	[0.7332]	[0.7106]	[0.7501]	[0.7006]	[0.6751]	[0.7096]
Cubic in MFI Ratio	Y	Y	Y			
Quartic in MFI Ratio				Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y
Demographic Controls		Y	Y		Y	Y
Housing Controls			Y			Y
Observations	15349	15349	15349	15349	15349	15349

Notes: Includes tracts with income ratios between 0.7 and 0.9 (inclusive) that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

Table 10
Tract-Level OLS and IV Estimates: Employment and Job Composition

	(1)	(2)	(3)	(4)	(5)	(6)
A. OLS Results						
Change in Log Private Employment	-0.0001	-0.00002	-0.0002	-0.0001	-0.00002	-0.0002
	[0.0004]	[0.0004]	[0.0004]	[0.0004]	[0.0004]	[0.0004]
Change in Percentage Jobs Paying < $15K/Year	0.0060	0.0056	0.0043	0.0060	0.0056	0.0043
	[0.0041]	[0.0042]	[0.0042]	[0.0041]	[0.0042]	[0.0042]
Change in Percentage Jobs Paying $15K-$40K/Year	-0.0102**	-0.0067	-0.0057	-0.0102**	-0.0067	-0.0056
	[0.0046]	[0.0044]	[0.0045]	[0.0046]	[0.0044]	[0.0045]
Change in Percentage Jobs Paying $40K+/Year	0.0043	0.0011	0.0014	0.0042	0.0011	0.0014
	[0.0057]	[0.0051]	[0.0052]	[0.0057]	[0.0051]	[0.0052]
B. IV Results						
Change in Log Private Employment	0.0117	0.0130	0.0129	0.0168	0.0185	0.0163
	[0.0319]	[0.0339]	[0.0355]	[0.0310]	[0.0331]	[0.0343]
Change in Percentage Jobs Paying < $15K/Year	-1.0575	-1.0640	-1.1296	-1.2601*	-1.2670	-1.3487
	[0.6821]	[0.7217]	[0.7695]	[0.7442]	[0.7891]	[0.8419]
Change in Percentage Jobs Paying $15K-$40K/Year	0.4738	0.5007	0.5676	0.4574	0.4624	0.5191
	[0.5450]	[0.5854]	[0.6240]	[0.5570]	[0.5973]	[0.6328]
Change in Percentage Jobs Paying $40K+/Year	0.5838	0.5632	0.5620	0.8027	0.8046	0.8296
	[0.5777]	[0.6042]	[0.6371]	[0.6329]	[0.6587]	[0.6961]
Cubic in MFI Ratio	Y	Y	Y			
Quartic in MFI Ratio				Y	Y	Y
County Dummies	Y	Y	Y	Y	Y	Y
Demographic Controls		Y	Y		Y	Y
Housing Controls			Y			Y
Observations	16167	16167	16167	16167	16167	16167

Notes: Includes tracts with income ratios between 0.7 and 0.9 (inclusive) that are not in GO Zones and that are not missing 2000 Census or 2005-2009 ACS data. Excludes AZ, AR, DC, MA, MS, and NH and tracts with fewer than 20 jobs. Demographic controls and housing controls are listed in Table 1. Standard errors are adjusted for heteroscedasticity and clusters at the county level. Significant at the * 10% level, ** 5% level, and *** 1% level.

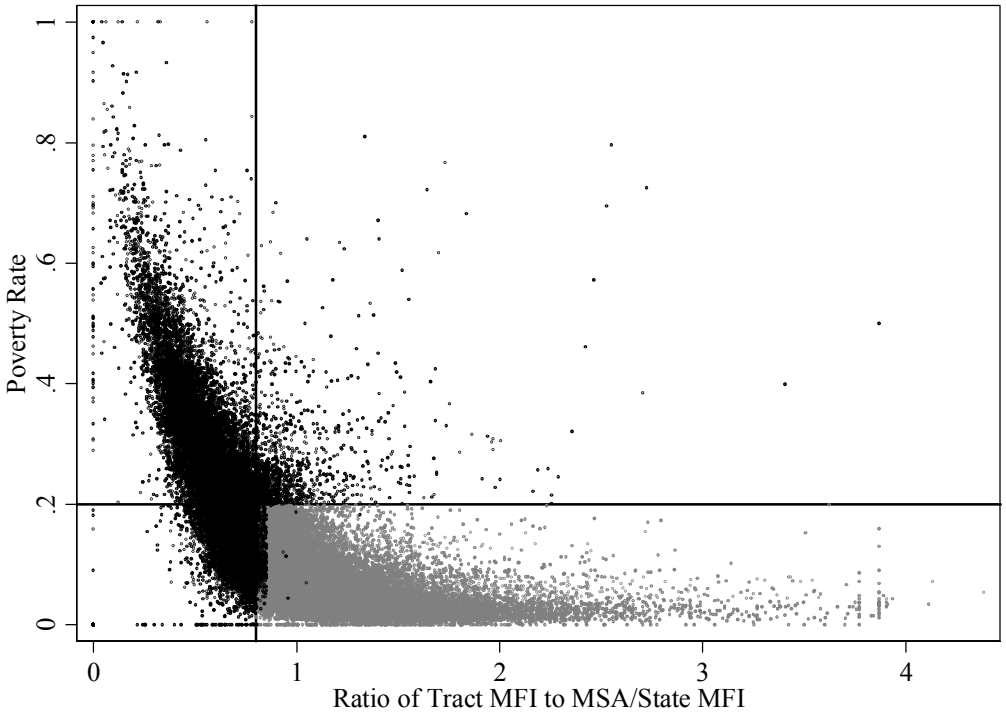


Fig. 1. Dual Eligibility Thresholds for Census Tracts

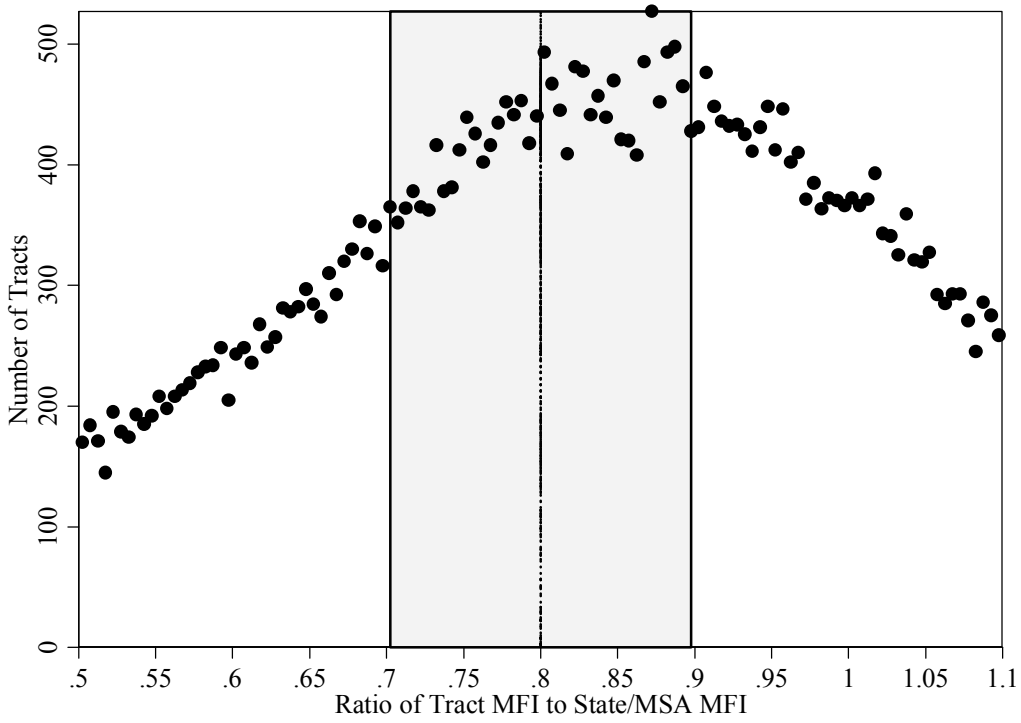
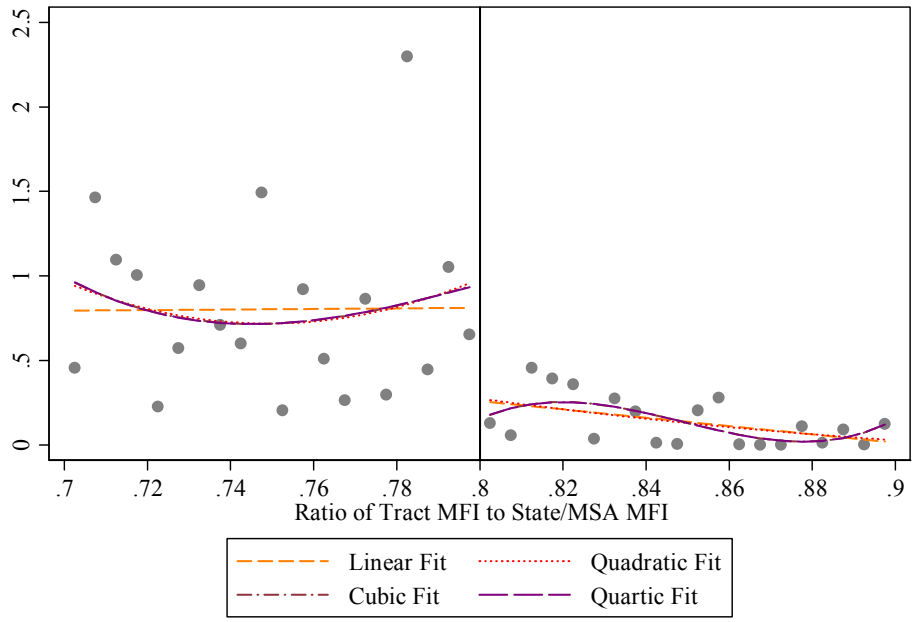


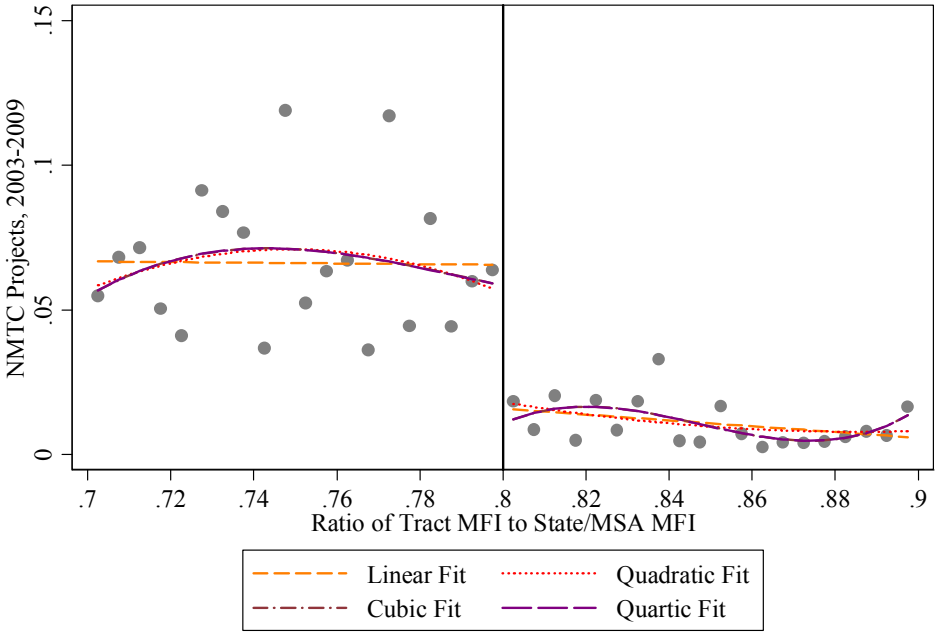
Fig. 2. Density of the Forcing Variable. Bin Size = 0.005

A. NMTC Investment



Note: Sample includes 17271 tracts. Bin size = 0.005.

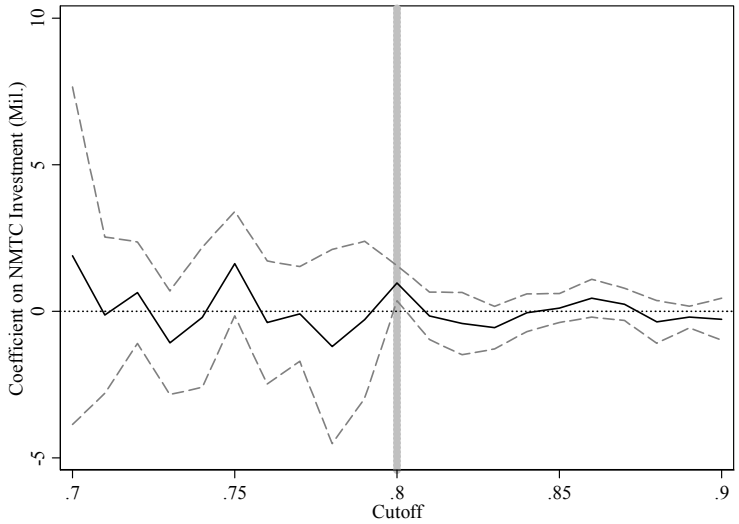
B. NMTC Projects



Note: Sample includes 17271 tracts. Bin size = 0.005.

Fig. 3. NMTC Investment at the LIC MFI Eligibility Threshold

A. Cubic in MFI Ratio, County Dummies, No Demographic or Housing Controls



B. Cubic in MFI Ratio, County Dummies, and Demographic and Housing Controls

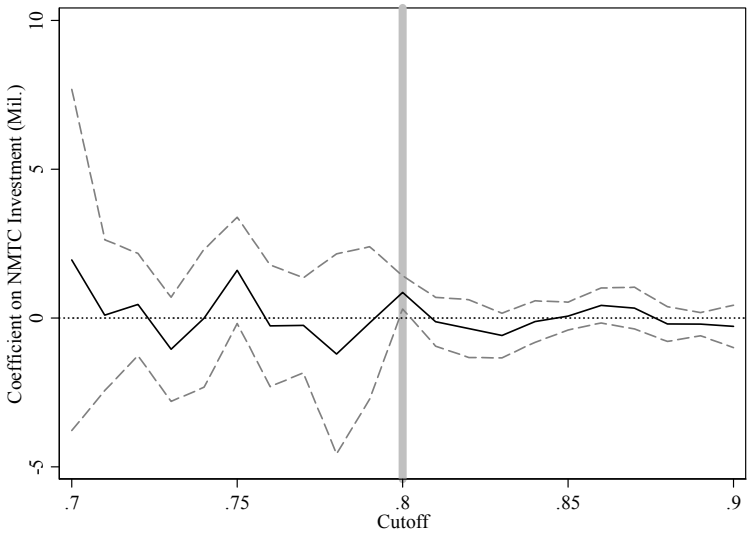
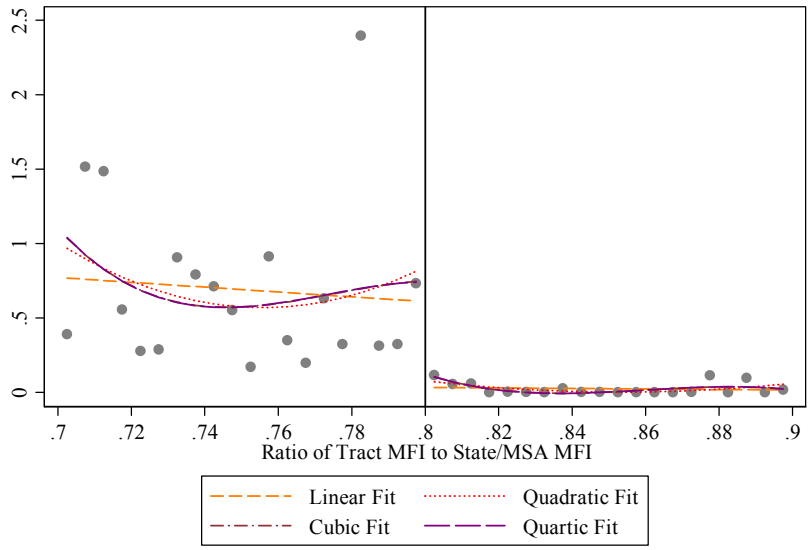


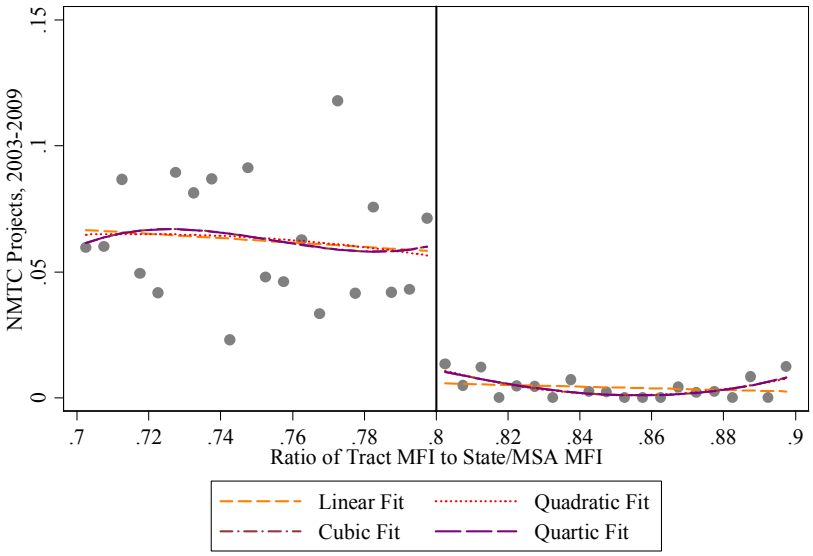
Fig. 4. Placebo Tract-Level Investment Location Estimates

A. NMTC Investment



Note: Sample includes 15349 tracts. Bin size = 0.005.

B. NMTC Projects



Note: Sample includes 15349 tracts. Bin size = 0.005.

Fig. 5. NMTC Investment at the LIC MFI Eligibility Threshold, Excluding Tracts with Poverty Rates Exceeding 20%

Appendix

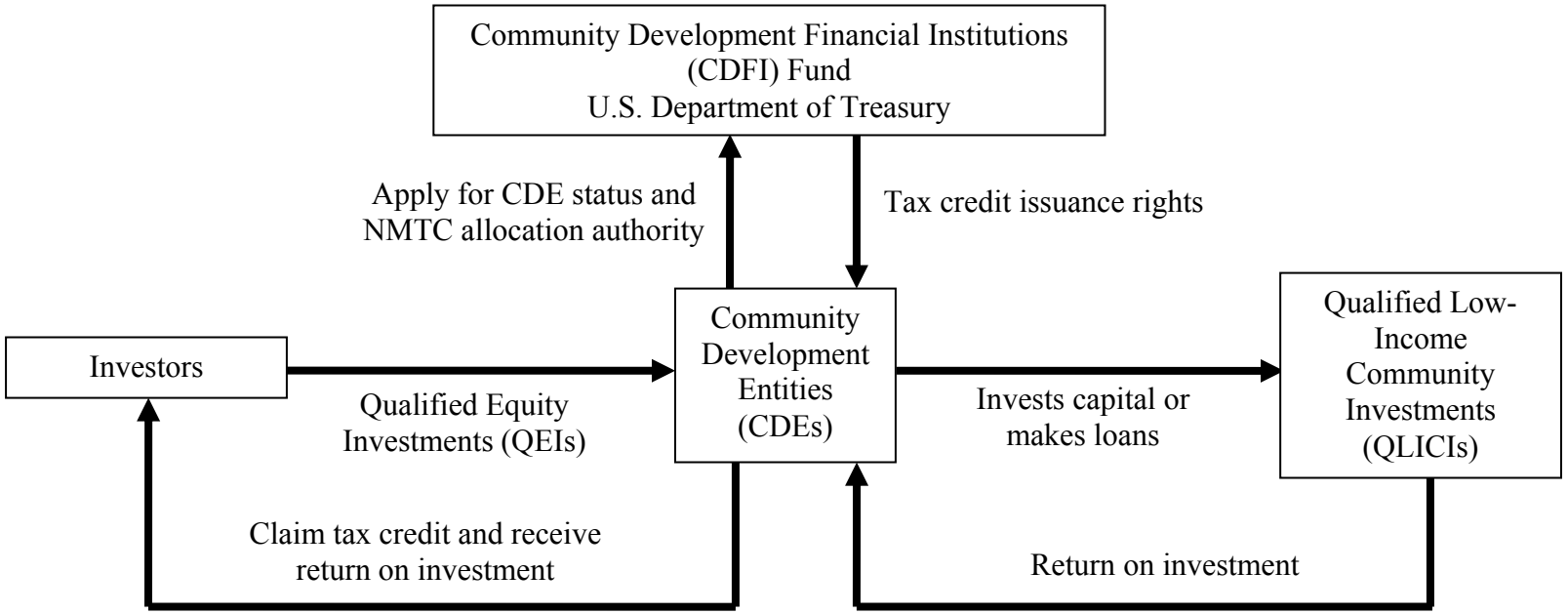
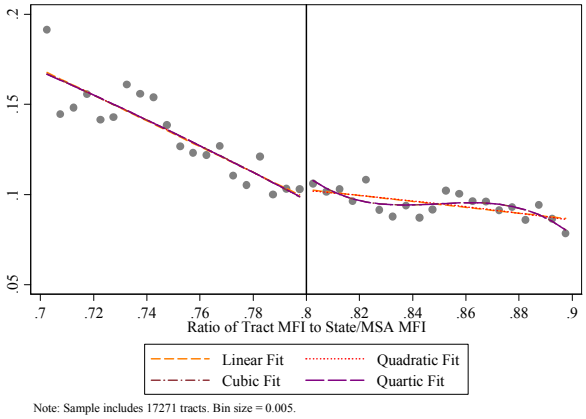


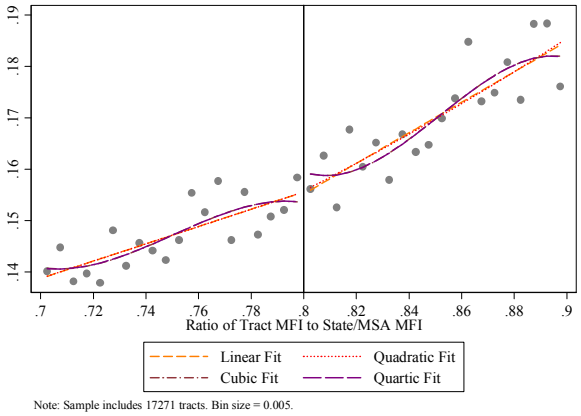
Fig. A.1. New Markets Tax Credit Flow Chart. Adapted from the U.S Government Accountability Office (2010). Only for-profit CDEs may receive QEIs from investors. They may use the proceeds either to invest directly in LICs or to invest in or make loans to other for-profit or not-for-profit CDEs. Not-for-profit CDEs may receive tax credit allocation authority from the CDFI Fund, but must transfer the rights to a for-profit CDE before they can make QLICIs.

A. Share of Population Black



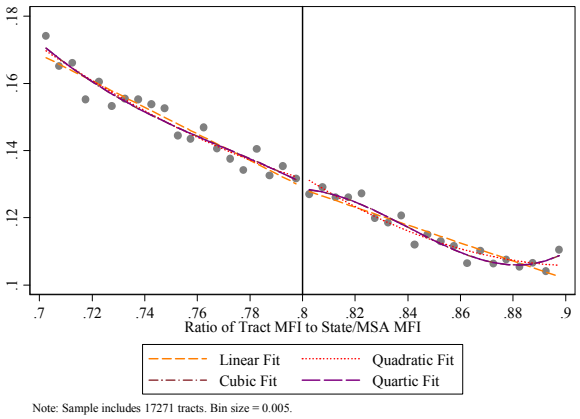
Note: Sample includes 17271 tracts. Bin size = 0.005.

B. Share of Population with a Bachelor's Degree or More



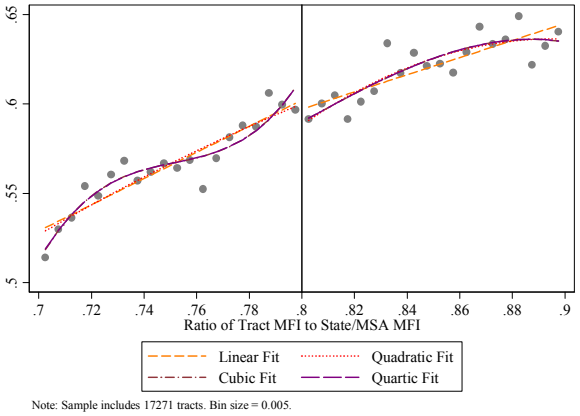
Note: Sample includes 17271 tracts. Bin size = 0.005.

C. Poverty Rate



Note: Sample includes 17271 tracts. Bin size = 0.005.

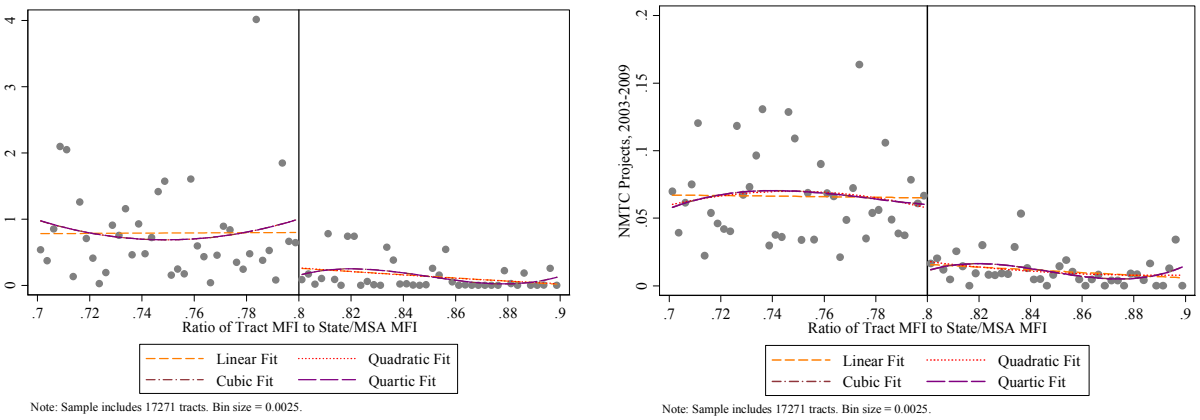
D. Share of Homes Owner-Occupied



Note: Sample includes 17271 tracts. Bin size = 0.005.

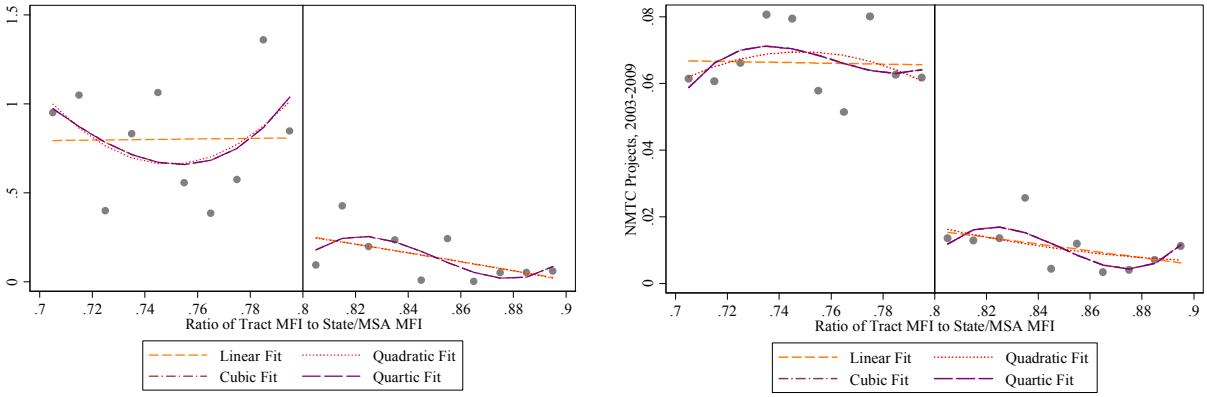
Fig. A.2. Selected Baseline Characteristics at the LIC MFI Eligibility Threshold

A. Bins Size = 0.0025



Note: Sample includes 17271 tracts. Bin size = 0.0025.

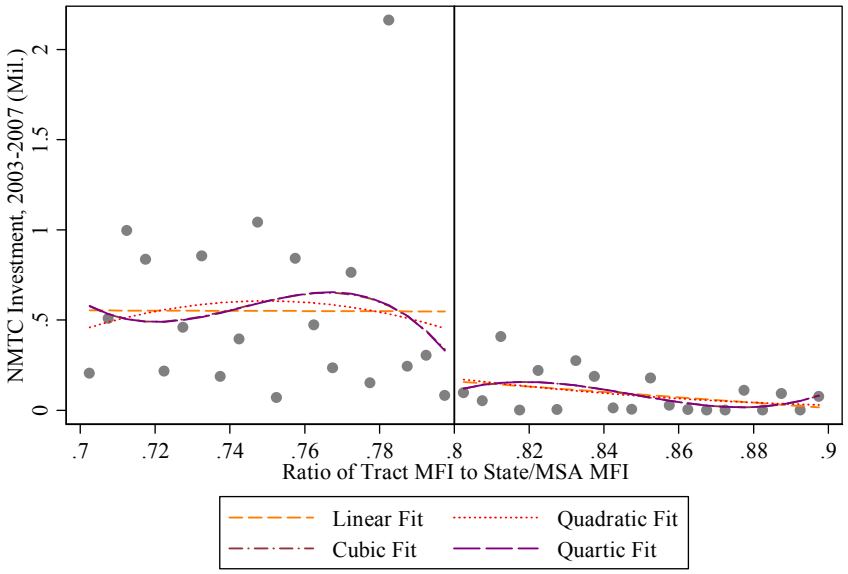
B. Bin Size = 0.01



Note: Sample includes 17271 tracts. Bin size = 0.01.

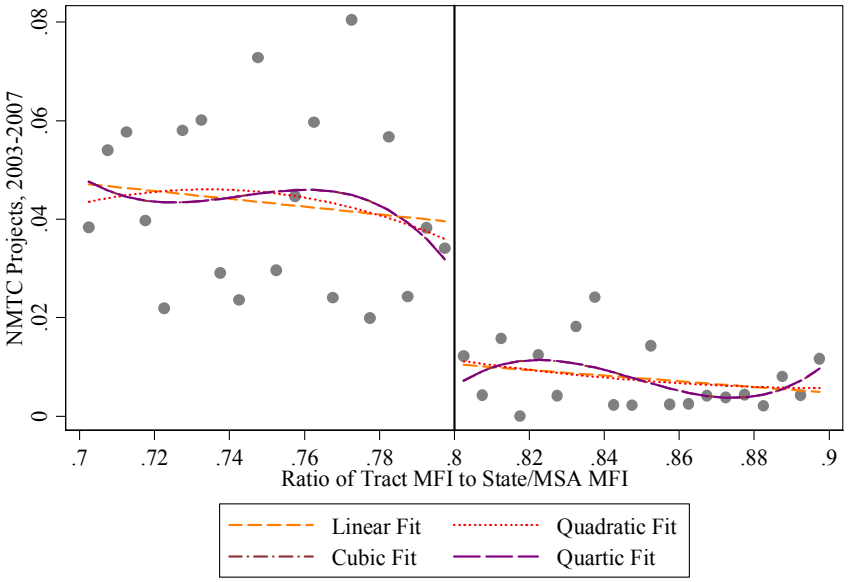
Fig. A.3. NMTC Investment at the LIC MFI Eligibility Threshold, Varying Bin Size

A. NMTC Investment



Note: Sample includes 17271 tracts. Bin size = 0.005.

B. NMTC Projects



Note: Sample includes 17271 tracts. Bin size = 0.005.

Fig. A.4. NMTC Investment at the LIC MFI Eligibility Threshold, 2003-2007