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Neighborhood Land Uses as Predictors of the Upward Mobility of Poor Youth*

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Abstract: Land uses within the neighborhood where poor youths reside have important effects on their development and therefore may predict their welfare as adults. Mean household incomes as adults and teenage birth rates of youth growing up in poor households are predicted based upon the land uses within the neighborhood they occupied as teenagers. Controlling for an extensive set of neighborhood socioeconomic and demographic variables, land uses are found to add to our understanding of the characteristics of places with upward mobility. Differences in land use between white and minority youth neighborhoods are also found to explain racial gaps in adult outcomes.

Keywords: neighborhood land use, youth development, adult welfare

JEL Codes: R14, I39, I30

1. INTRODUCTION

Chetty et al. (2020a) have demonstrated that demographic and socioeconomic characteristics of the neighborhoods where poor youth grow up can predict their welfare as adults. In the interest of better designing national and local subsidy policies to improve the housing and neighborhood conditions of indigent households, they have constructed a publicly available Opportunity Atlas at the census tract level for every tract in the United States. The Atlas relates the characteristics of tracts where youth grew up to how they are faring as adults, based on welfare measures, including mean household incomes, incarceration rates, and teenage birth rates.[1] The objective is to identify neighborhoods that provide upward mobility. Policies may then be tailored to either make the home neighborhoods of disadvantaged youth more like these neighborhoods or enable the guardians of these children to move into these places.

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[1]Census tracts are designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions and average about 4,000 inhabitants. They are the most frequently used census geographical unit to represent a "neighborhood".

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In this paper, I first review studies that relate neighborhood land uses to youth development. This review suffices to motivate my inquiry of whether the land uses within the neighborhoods where poor youth grow up helps to predict their welfare as adults. Based on neighborhoods in Florida, I provide evidence that suggests the pursuit of upwardly mobile neighborhoods should not be limited to the characteristics identified by Chetty et al. (2020a), but also examined should be the types of land uses within the neighborhood where youth resided as adolescents. The evidence I present may help in answering the Chetty et al. (2020a) overarching question: "What are the characteristics of places that have upward mobility?"

My data allow a new set of land use predictors to be added to the Opportunity Atlas, including the types of residential units, parks, and industrial and commercial uses. The data are for tracts in the state of Florida where land uses measured using county property tax rolls for the year 1995, which places 1978–1983 youth cohorts within the Opportunity Atlas within the tract when they were 12 to 17 years old. My purpose is to use the Opportunity Atlas, along with my detailed neighborhood land use data, to study correlations between the land uses in the neighborhood where poor youth resided as adolescents and their welfare as adults, after controlling for the incomes of their parents and an extensive set of neighborhood descriptors from the Opportunity Atlas.[2] I emphasize that my analysis is not causal, rather I subscribe to Chetty et al. (2020a) position that "From the perspective of predicting children's future incomes, observational differences in outcomes across areas are of direct interest; it does not matter whether these outcomes arise from the causal effect of the neighborhood or from the selection."

My results show that the mix of land uses within neighborhoods where poor youth grew up predicts their incomes and teenage birth rates as adults beyond what can be obtained by relying solely on the demographic and socioeconomic characteristics of the neighborhood. Differences in land uses are also found to play a role in explaining gaps in incomes and teenage birth rates across racial groups. Overall, the associations I find between specific land uses and adult outcomes may prioritize future research in the direction of causal analyses. More importantly, they help identify the types of neighborhoods that public policies should target in improving the upward mobility of poor youth.

In the next section, I review the evidence suggesting that the land uses I am able to identify from the tax rolls have important impacts on youth development, which motivates my use of them as possible predictors of adult outcomes. The adult outcomes I chose to analyze and the land uses I used to predict these outcomes are described in section 3. The specifications of my estimated models are covered in section 4. Sections 5 and 6 present the results obtained from predicting my two adult outcomes, namely mean household income and the expected fraction of women who had children as teenagers. Section 7 compares my results for Florida to those obtained at the national level by Chetty et al. (2020a) using the neighborhood descriptors contained in the Opportunity Atlas. A final set of results in section 8 report Oaxaca (1973) decompositions of the differences in mean outcomes between

[2]Other studies that have made use of the Opportunity Atlas are (Manduca and Sampson, 2019; Colmer, 2019; Park and Quercia, 2020; Aliprantis et al., 2019; Davis et al., 2018; Ludwig and Kraus, 2019; Chetty et al., 2020b). None of these studies consider the land uses within a poor youth's neighborhood as predictors of adult outcomes.

racial groups that can be attributed to differences in land uses and differences in the effects that land uses have on adult outcomes. My conclusions and suggestions for future research are in section 9.

2. BACKGROUND AND LITERATURE REVIEW

As described more fully in the next section, the Florida tax rolls allowed the identification of a wide range of neighborhood land uses, including residential properties (broken down into single-family homes, condominiums, and apartments), alcohol-serving outlets, public parks, total commercial properties, total industrial properties, and vacant lots (divided into residential, commercial, and industrial). My review of the literature highlights the effects that these uses may have on youth development, which suggests that they may be successful predictors of adult outcomes.

Formally, each alternative neighborhood land use may produce one or more external effects affecting a particular characteristic or condition within the neighborhood, affecting youth development that may help predict adult welfare. In addition, given land use may impact more than one neighborhood characteristic that matters. These impacted conditions may work in the same direction or oppose one another, so what matters is the overall net impact of land use on youth development. In addition, the same characteristic may be affected by multiple lands uses. For simplicity, assume linearity and the existence of two land uses $\boldsymbol{x}$(for example, alcohol establishments) and $\boldsymbol{y}$(for example, industrial properties). The net effect of each of these land uses may raise the level of violent crime in the neighborhood, but they may also produce additional external effects that affect other neighborhood characteristics, for example, neighborhood employment opportunities. The impact on characteristic i (in my example crime) from both land uses in neighborhood j ($\boldsymbol{C_{ij}}$) can be expressed as:

$$\boldsymbol{C_{ij}}=\boldsymbol{x_j}\boldsymbol{\beta}+\boldsymbol{y_j}\boldsymbol{\theta}, \tag{1}$$

where $\boldsymbol{\beta}$ and $\boldsymbol{\theta}$ register the contribution of each land use to the neighborhood characteristic. In turn, the youth development of a particular subgroup ($\boldsymbol{YD_k}$), where k identifies a group by race and gender, is a function of the combined influence of these neighborhoods characteristics and the socioeconomic and demographic characteristics of neighborhood residents ($\boldsymbol{D}$):

$$\boldsymbol{YD_{kj}}=\boldsymbol{C'_{ij}}\boldsymbol{\gamma'}+\boldsymbol{D'_j}\boldsymbol{\theta'}, \tag{2}$$

where $\boldsymbol{C}$ and $\boldsymbol{\gamma'}$ are vectors of characteristics and their impacts and $\boldsymbol{D'}$ and $\boldsymbol{\theta'}$ are similarly defined for socioeconomic/demographic variables describing the neighborhood. The mean welfare of the adults in group k growing up in neighborhood j($\boldsymbol{WA_{kj}}$) is affected by their development from neighborhood conditions during the time they occupied the neighborhood as youths ($\boldsymbol{\sigma}$), along with effects($\boldsymbol{\delta}$) associated with their parents' income($\boldsymbol{I_k}$):

$$\boldsymbol{WA_{kj}}=\boldsymbol{YD_{kj}}\boldsymbol{\sigma}+\boldsymbol{I_k}\boldsymbol{\delta} \tag{3}$$

In summary, land uses **x** and **y** impact $\boldsymbol{WA_{kj}}$by generating external effects that impact neighborhood conditions, or characteristics that raise or lower youth development and the

change in their development may be correlated with their outcomes as adults, suggesting that they may help to predict these outcomes:

$$\frac{\partial \boldsymbol{WA_{kj}}}{\partial \boldsymbol{x_j}} = \sum \left(\frac{\partial \boldsymbol{WA_{kj}}}{\partial \boldsymbol{YD_{kj}}} * \frac{\partial \boldsymbol{YD_{kj}}}{\partial \boldsymbol{C_{ij}}} * \frac{\partial \boldsymbol{C_{ij}}}{\partial \boldsymbol{x_j}} \right) \tag{4}$$

$$\frac{\partial \boldsymbol{WA_{kj}}}{\partial \boldsymbol{y_j}} = \sum \left(\frac{\partial \boldsymbol{WA_{kj}}}{\partial \boldsymbol{YD_{kj}}} * \frac{\partial \boldsymbol{YD_{kj}}}{\partial \boldsymbol{C_{ij}}} * \frac{\partial \boldsymbol{C_{ij}}}{\partial \boldsymbol{y_j}} \right) \tag{5}$$

Numerous land uses produce external effects that may affect youth development. One of these effects, as used in the example above, is exposure to violent crime, which has been shown to adversely affect youth development across many dimensions (Bell and Jenkins, 1991; Fitzpatrick and Boldizar, 1993; Gorman-Smith and Tolan, 1998; Fitzpatrick et al., 2005; O'Leary et al., 2006; Lambert et al., 2012; Boynton-Jarrett et al., 2013).[3]

One neighborhood land use whose relationship to violent crime has been thoroughly studied is alcohol outlets. Alcohol outlets are commonly disaggregated into on-premises (i.e., places that sell alcoholic beverages meant for consumption while visiting the place, such as a bar or nightclub) and off-premises (i.e., places like liquor and convenience stores that sell alcoholic beverages that are meant for consumption elsewhere). My measure of neighborhood alcohol outlets (the number of bars, nightclubs, and cocktail lounges) is exclusively on-premises.[4] Extensive evidence exists showing a positive association between on-premises alcohol places and violent crime at the neighborhood level (Gruenewald et al., 2006; Gorman et al., 2001; Franklin et al., 2010; White et al., 2015; Raleigh and Galster, 2015; Snowden and Freiburger, 2015; Wo, 2016; Twinam, 2017). Extant evidence suggests that other neighborhood land uses are also associated with violent crime. These include residential apartments located in multifamily properties (Browning et al., 2010; Raleigh and Galster, 2015; Aliprantis and Hartley, 2015), single-family rentals (Ihlanfeldt and Yost, 2019), vacant lots (Branas et al., 2012, 2018), and commercial uses in the aggregate (Stucky and Ottensmann, 2009; Browning et al., 2010; Twinam, 2017). Exposure to crime may be the dominant pathway whereby land uses affect youth development and their subsequent welfare as adults. Unfortunately, I know of no data source for crime rates at the neighborhood level, and this undoubtedly is a variable that would have been a useful addition to the Opportunity Atlas.

Besides crime-related negative external effects on youth development, some land uses expose youth to environmental hazards that may also retard their development. Generally, industrial land uses are associated with these effects, in particular air pollution. Exposure to air pollution can result in youth cognitive deficits and behavioral impairment (Guxens and Sunyer, 2012; Edwards and Whitehouse, 2018). Another neighborhood land use that may expose youth to environmental hazards is mobile homes. A common development pattern is the location of trailer parks on cheap land adjacent to less desirable community features, such as landfills, ditches, industrial activity, or railroad tracks (Hart et al., 2002).

[3]In their review of the evidence, Seal et al. (2014) identify these dimensions as: depression, anxiety and posttraumatic stress disorder, aggressive behavior, suicide ideation, and declines in school achievement and high school completion.

[4]Because off-premises places are fairly ubiquitous within Florida's neighborhoods, failing to include them in my estimated models may not be important in predicting adult outcomes.

However, much remains unknown about the eternal effects surrounding mobile homes that could affect youth development. Evidence exists that mobile homes lower the values of nearby single-family homes (Munneke and Slawson, 1999), but the underlying causal mechanisms have not been identified, at least from the rigorous econometric analysis. However, there has been ethnographic research that suggests several ways mobile home communities may hinder youth development, beyond their possible association with environmental hazards: 1) mobile homes, because they are almost always located in parks, socially isolate youth from the broader community, excluding them from educational and cultural experiences, 2) mobile home parks provide little or no play space for children, and 3) youth living in mobile home parks are stereotyped and stigmatized by outsiders, including teachers, which results in youth having negative views of themselves (Miller and Evko, 1985; Morris, 2005; MacTavish and Salamon, 2006; MacTavish, 2007; Kusenbach, 2009).

Not all neighborhood land uses have detrimental effects on youth development. For example, green space, especially in the form of parks, has been shown to have positive effects by reducing psychiatric disorders (Engemann et al., 2019) and improving cognitive development (Dadvand et al., 2015). These effects are attributed to the opportunity for recreational activities that poor youth may otherwise not have had access to and scientific evidence that greenery lowers the level of air pollution (Zupancic et al., 2015).

Returning to equation (2), it is important to recognize that given land use may impact multiple characteristics of the neighborhood. These impacted characteristics may have effects that are similarly signed, either both reducing or both improving youth development. Alternatively, the characteristics that are affected may have opposing effects, resulting in a relatively small net impact. For example, parks may matter because they offer recreational opportunities but also because they mediate air pollution. Both result in an improvement in youth development. On the other hand, as suggested by Jacobs (1961), with recent evidence provided by McCord and Houser (2017), parks may worsen neighborhood crime. So the net effect of parks on youth development is unclear, a priori. Other examples of land use impacting multiple neighborhood characteristics are vacant industrial lots, which may both increase violent crime and expose youth to toxicity; as noted, mobile homes may stigmatize youth as somehow inferior and expose them to environmental risks.

3. DATA ON NEIGHBORHOOD LAND USES AND FROM THE OPPORTUNITY ATLAS

The measures of land uses found within the neighborhood where the individual resided while aged 12 to 17 are constructed using the 1995 county tax rolls that each county is required to submit to the Florida Department of Revenue. I use the tax rolls for 58 of Florida's 67 counties, resulting in 3582 tracts, representing 81 percent of the total tracts within the state.[5]

[5]One issue that needs to be overcome in using the tax rolls is that the census tract number identified on the rolls is the 1990 tract and not the 2010 tract used in the Opportunity Atlas. To obtain the 2010 tract for each property on the 1995 rolls, I used the parcel identification number to find the property on a later roll after the county adopted the 2010 Census geography. This was not possible for all counties, as some changed their parcel identification system after 1995.

With some specificity, properties are identified by land use on the tax rolls. The following types of residential properties were pulled off of the rolls, along with some identifying characteristics: residential properties identified as multifamily (MF), which are divided by scale into small (less than nine apartments) and large (nine or more apartments), condominiums, mobile homes, and single-family (SF) homes. Nonresidential properties included alcohol-serving establishments other than restaurants (for example, bars, cocktail lounges, and nightclubs), public parks, commercial establishments of any kind, industrial properties, and properties identified as vacant lots, broken down into residential, commercial, and industrial.

From these data, I constructed the following predictors at the tract level for 1995: percentages of total housing units in the neighborhood represented by small MF properties, large MF properties, condominiums, mobile homes, and SF rentals, where the reference category is SF owner-occupied homes; counts of the number of parks and alcohol-serving establishments; separate total amounts of industrial and commercial building square footage; and the total amount of land within the tract separately devoted to parks, vacant residential lots, vacant commercial lots, and vacant industrial lots.[6]

Twelve variables from the Atlas, duplicating those in Figure V of Chetty et al. (2020a) are included as controls in my models.[7] They are listed and described in Table 1. They describe the people, schools, and employment opportunities in the neighborhood where the individual grew up. However, none of the variables relate to the land uses that existed within the neighborhood during this time. I also make use of Chetty et al. (2020a) exposure weights in estimating my models, which control for the amount of time the youth spent in the neighborhood.[8]

There are several variables in the Opportunity Atlas describing the welfare of the neighborhood's youth as adults. A key indicator used by Chetty et al. (2020a) is the mean percentile rank in the national distribution of household income in 2014–2015 for individuals aged 31 to 37 whose parents or guardians were at the 25^{th} percentile rank in the national distribution of household income averaged over 1994–1995 (approximately $27,000). They

[6]The tenure of single-family homes was determined using a flag on the rolls indicating whether the homeowner had claimed the homestead exemption. The exemption is available only to owners who use the home as their primary residence. The exemption reduces the home's taxable value by as much as $50,000 and entitles the owner to a cap on the annual growth in the assessed value of 3 percent or the rate of inflation, whichever is lower. Since these benefits are nontrivial, I have confidence that homes with exemptions are not available for rent. Homes without the exemption are treated as rentals, although these homes may also be vacation homes not available for rent. However, the Florida vacation home market was largely limited to condominiums and not single-family homes in 1995; hence, I have confidence that the homestead exemption is a reliable tenure indicator.

[7]Chetty et al. (2020a) use the variables in their Figure V to show race-controlled correlations with upward mobility. The same variables are also used to run a multivariate regression without reporting estimated coefficients to demonstrate the overall predictive power of the set of variables. The variables explained 50 percent of the variation in upward mobility. Their construction is described in Chetty et al. (2020a) Online Appendix B: Construction of Neighborhood Level Variables. For the reader's convenience, I provide an overview of the variables in Table 1 and in Appendix Table A1.

[8]Chetty et al. (2020a) assign children to tracts in proportion to the amount of time they spend before age 23 in each tract over the years observed by their sample. For example, if a child spent half of his childhood in two tracts, he would receive 50% weight in each of the two tracts.

label this variable "upward mobility," and I use it as one of the variables I predict with the models I estimate. It is the best overall measure of the welfare of youth as adults in the Atlas. The second variable I predict is the expected fraction of girls who had children as teenagers, an outcome that that has garnered the interest of both social scientists and policymakers (Nall, 2016).[9] As for household income, the parents or guardians of the women were at the 25^{th} percentile rank in the national distribution of household income averaged over 1994–1995.[10]

Means and standard deviations of the adult outcomes and the neighborhood land uses are in Table 2. Because I estimate models for females and males with all races pooled together and models broken down by race and gender, eight sets of means are presented. Note that the female and male samples include 3582 and 3581 census tracts, representing 81 percent of the total tracts in Florida.[11] Similar sample sizes to those for the pooled samples are also true for female and male whites. However, because the Opportunity Atlas suppresses estimates based on 20 or fewer children, after breaking down blacks and Hispanics by gender, the number of tracts is roughly cut in half. The models estimated with teenage motherhood as the outcome variable used the full sample of tracts for all females and fewer tracts for white females. For Hispanics and blacks, the sample sizes are again roughly half as large.

[9] In addition to household income and teenage pregnancy, incarceration rates are another Opportunity Atlas variable that I chose to predict. However, compared to the two outcomes I report on, neighborhood land uses had less effect on incarceration rates, although they did result in a statistically significant improvement in model fit after controlling for the Opportunity Atlas variables. These results are available upon request.

[10] Within the Opportunity Atlas a woman is designated as having a teenage birth if she ever claims a dependent who was born while she was between the ages of 13 and 19.

[11] Although I recognize that Hispanics are not a racial group when defining race/ethnicity groups, I divide the race into non-Hispanic whites, non-Hispanic blacks, and Hispanics.

Table 1: Dependent and Predictor Variables from the Opportunity Atlas

Variable	Description
Adult income mean percentile rank	This dependent variable is the adult income mean percentile rank in the national distribution of household income for youth whose parents were in the 25th percentile.
Teenage birth rates of poor youth	This dependent variable is the fraction of female youth birthing a baby as a teenager.
Poverty rate 1990	The poverty rate of the tract is measured for 1990 from the 1990 Census.
Employment rate 2000	The employment rate is measured for 2000 from the Census long form and equals the total employed population divided by the total population 16 years and over
Jobs within 5 mi 2015	Jobs within 5 miles of the centroid of the tract is for 2015 is constructed using LEHD Origin-Destination Employment Statistics (LODES) provided by the Census Bureau.
Avg job growth 2004–2013	Job Growth is the average annualized growth rate from 2004 to 3013 and is also constructed from the LODES data.
HH mean income 2000	Mean Household Income is from the 2000 Decennial Census.
3rd grade math score 2013	The 3rd-grade math test scores are for 2013 and are obtained from the Stanford Education Data Archive and measured at the district level. Tract numbers are assigned using a crosswalk from districts to tracts.
Share college grad 2000	The share of college graduates is from the 2000 Census long form and is calculated as the number of people aged 25 or older with a college degree divided by the total number of people aged 25 or older in a tract.
Single parent share 1990	The single parent share is for from the 1990 Census and equals the number of households with female head (and no husband present) or male head (and no wife present) with own children under 18 years old present divided by the total number of households with own children present.
Census return rate 2010	The 2010 Census return rate is from the Census 2016 Planning Database and is calculated as the number of Census mail forms completed and returned over the number of valid occupied housing units where a Census form was expected to be delivered for mail return to Census.
Black share 2000	Racial Shares are for 2000 and are from the Census long form.
Hispanic share 2000	Racial Shares are for 2000 and are from the Census long form.

Table 2: Means and Standard Deviations of Adult Outcomes and Land Use Predictors

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
Outcomes								
Adult income	0.424	0.385	0.357	0.306	0.454	0.421	0.453	0.416
	(0.07)	(0.064)	(0.057)	(0.064)	(0.075)	(0.074)	(0.076)	(0.067)
Teen birth rate	0.25		0.4		0.252		0.2	
	(0.123)		(0.141)		(0.144)		(0.112)	
Predictors								
MF Small	6.266	6.266	7.897	7.964	7.244	7.364	5.203	5.341
	(11.573)	(11.575)	(12.81)	(12.97)	(12.96)	(13.021)	(9.812)	(10.097)
MF large	9.874	9.857	14.281	14.512	11.841	11.774	9.286	9.263
	(18.89)	(18.96)	(22.74)	(22.799)	(19.115)	(18.845)	(18.622)	(18.488)
SF rentals	13.133	13.118	14.459	14.438	12.417	12.559	13.023	13.027
	(9.186)	(9.076)	(8.773)	(8.792)	(8.5)	(8.721)	(8.773)	(8.763)
Condos	15.507	15.472	10.483	10.477	16.469	16.189	15.754	15.839
	(25.6)	(25.547)	(20.061)	(19.999)	(25.821)	(25.597)	(25.548)	(25.663)
Moblie homes	7.603	7.578	4.514	4.428	3.775	3.82	8.1	8.009
	(16.615)	(16.546)	(11.015)	(10.889)	(11.54)	(11.708)	(17.065)	(16.913)
Alcohol serving	0.641	0.642	0.864	0.868	0.535	0.548	0.63	0.626
	(1.296)	(1.296)	(1.548)	(1.552)	(1.195)	(1.087)	(1.223)	(1.22)
Number Parks	2.431	2.431	1.897	1.8079	1.015	1.108	2.594	2.576
	(20.025)	(20.028)	(26.114)	(25.663)	(8.135)	(9.067)	(20.753)	(20.692)
Park land	1.314	1.312	1.304	1.808	1.03	0.98	2.594	1.333
	(11.633)	(11.634)	(14.592)	(13.33)	(8.807)	(8.783)	(20.753)	(11.895)
Com space	38.393	38.402	47.408	47.351	39.582	39.81	38.915	38.894
	(80.124)	(80.136)	(84.239)	(84.308)	(85.222)	(82.44)	(82.21)	(82.007)
Com vac land	1.363	1.364	1.305	1.37	1.231	1.271	1.438	1.436
	(6.956)	(6.957)	(7.298)	(7.382)	(5.83)	(6.169)	(7.189)	(7.177)
Ind space	19.409	19.409	26.828	27.159	22.257	23.257	18.221	18.597
	(68.545)	(68.545)	(75.79)	(76.497)	(76.877)	(80.478)	(66.83)	(67.9)
Ind vac space	1.783	1.783	2.62	2.658	0.678	0.719	1.179	1.172
	(40.977)	(40.983)	(57.965)	(58.467)	(6.044)	(6.153)	(11.605)	(11.571)
SF vac land	0.481	0.481	0.565	0.549	0.487	0.505	0.507	0.501
	(4.689)	(4.69)	(6.563)	(6.597)	(6.085)	(6.151)	(4.857)	(4.834)
Observations	3.582	3.581	1.695	1.666	1.946	1.905	3.332	3.352

Note: Adult income is the mean percentile rank in the national distribution of household income for youth whose parents were in the 25th percentile. The teen birth rate is the fraction of female youth birthing a baby as a teenager. Residential land uses are percentages of the total number of housing units in the neighborhood. Alcohol outlets and parks are their numbers. Parkland and vacant lots are measured in acres. Industrial and commercial space is measured in square feet (10,000s). Standard deviations are in parentheses.

The mean household income percentile is higher for females (42.4 percentile) than males (38.5 percentile). Among the breakdowns by race and gender, not surprisingly, the income percentile is lowest for black males (30.6 percentile) and females (35.7 percentile). Somewhat unexpected is that it is highest for Hispanic females (45.4 percentile). However, not that much higher than for Hispanic males (42.1 percentile) and white females (45.3 percentile) and males (41.6 percentile).[12] Teen births are highest for black females (40 percent) and lowest for white females, being only half as large (20 percent).

Comparisons of the mean land use across groups show that blacks and Hispanics as youth were more likely to live in neighborhoods with larger percentages of multifamily housing but smaller percentages of mobile homes as youth. The presence of alcohol outlets within the neighborhood is markedly greater for black youth of both genders (roughly 43 percent more) than the other groups. White youth lived in neighborhoods having a distinct advantage in the number of parks (2.6), especially in comparison to Hispanics (1.1). Parks measured in total land acreage within the neighborhood also favored white female youth. Commercial and industrial building square footages were higher in neighborhoods where black youth resided, especially in comparison to white youth. The most striking comparison is that industrial presence is roughly 45% greater in neighborhoods where blacks resided as teenagers. There is also a marked difference in the neighborhood acreage of vacant industrial lots where black youth resided, more than twice as large as within the neighborhoods occupied by Hispanic and white youth.

4. ESTIMATED MODELS

The estimated exposure-weighted OLS models can be expressed as:

$$\boldsymbol{AO_j}=\boldsymbol{L'_j}\boldsymbol{\lambda}+\boldsymbol{O'_j}\boldsymbol{\eta}+\varepsilon_j, \tag{6}$$

where $\boldsymbol{AO}$ is the adult outcome of interest; namely, the mean percentile rank (relative to other children born in the same year) in the national distribution of household income (i.e., own earnings and spouse's earnings) measured as mean earnings in 2014–2015 or the expected fraction of women who had children as teenagers. $\boldsymbol{L'}$ is the vector of land uses measured for 1995, as described above and listed in Table 2.[13] The variables from the Opportunity Atlas are represented by the set $\boldsymbol{O'}$ and are listed and described in Table 1. Using mean household income percentile as the adult outcome, separate models are estimated for the following subgroups: all males, all females, and blacks, Hispanics, and whites broken down by gender; hence, there are eight sets of results. The subgroups for the teenage childbearing models are all females and females divided into blacks, Hispanics, and whites, yielding four sets of results.

[12]There are many origins of the Hispanic population of Florida, but the largest is Cuban. Unfortunately, the Opportunity Atlas lumps all Hispanics together regardless of origin, preventing an investigation of how the land uses affect the adult outcomes of the different Hispanic groups.

[13]Parks, alcohol-serving establishments, commercial space, and industrial space were alternatively measured in per capita terms, while the land area variables for parks and vacant properties were also measured as percentages of the total land area of the tract. These changes had little effect on the estimated beta coefficients but somewhat lessened the fit of the models; hence, these results are not reported but are available upon request.

Each model is estimated with and without the land-use measures, with an eye toward how the importance of the Opportunity Atlas variables (measured using beta coefficients) change with the inclusion of the land-use variables and whether the addition of the land-use variables adds to the explanatory power of the models.[14] I make use of likelihood ratio tests to determine if the variables together (not just individually) result in a statistically significant improvement in model fit. I also report the F-test of the joint significance of the land-use variables.

Equation (6) assumes that only land uses within the home neighborhood matter to outcomes as an adult. Land uses in nearby neighborhoods may also have an effect. In their consideration of the relevant impact area, Chetty et al. (2020a) find that what matters are characteristics in one's own immediate neighborhood rather than nearby areas. While this may not apply with equal force to my land uses, it does lend some support to focusing my analysis exclusively on the home neighborhood, especially since my goal is to determine whether land use adds predictive power to the variables provided by the Opportunity Atlas.

5. PREDICTING ADULT HOUSEHOLD INCOME OF POOR YOUTH

Table 3 reports for each land-use variable three numbers: the estimated coefficient, the robust standard error, and the beta coefficient.[15] Across all eight subgroups, the land uses are jointly significant at the one percent level for all groups, except Hispanic males where significance is at the five percent level. Similarly, the likelihood ratio tests indicate that the land uses result in a statistically significant improvement in model fit at the one percent level, with the exception of Hispanic males.

[14]Beta coefficients are calculated by subtracting the mean from the variable and dividing by its standard deviation. This results in standardized variables having a mean of zero and a standard deviation of 1. Beta coefficients facilitate the comparison of the effect of predictor variables measured in different units of measurement.

[15]The estimated effects of the Opportunity Atlas variables are reported in Appendix Table A.1.

Table 3: Predicting the Adult Household Income of Poor Youth: The Land Use Variables

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
MF small	−0.000 40	−0.000 36	−0.000 27	−0.000 39	−0.000 39	−0.000 23	0.000 07	−0.000 23
	(0.000 80)	(0.000 07)	(0.000 11)	(0.000 12)	(0.000 14)	(0.000 14)	(0.000 13)	(0.000 13)
	[-0.06285]	[-0.06242]	[-0.05116]	[-0.07429]	[-0.06494]	[-0.03982]	[0.00832]	[-0.03331]
MF large	−0.000 25	−0.000 12	−0.000 20	−0.000 06	−0.000 39	−0.000 29	−0.000 26	−0.000 12
	(0.000 06)	(0.000 06)	(0.000 09)	(0.000 29)	(0.000 12)	(0.000 14)	(0.000 08)	(0.000 08)
	[-0.06353]	[-0.03389]	[-0.06852]	[-0.01963]	[-0.08871]	[-0.06770]	[-0.06092]	[-0.03082]
SF rentals	−0.000 69	−0.000 64	−0.000 62	−0.000 60	−0.000 71	−0.000 64	−0.000 73	−0.000 68
	(0.000 15)	(0.000 17)	(0.000 23)	(0.000 23)	(0.000 24)	(0.000 28)	(0.000 23)	(0.000 23)
	[-0.08606]	[-0.08653]	[-0.08414]	[-0.08051]	[-0.07641]	[-0.07183]	[-0.08137]	[-0.08543]
Condos	0.000 27	−0.000 01	0.000 25	0.000 01	−0.000 16	0.000 05	0.000 19	0.000 10
	(0.000 06)	(0.000 05)	(0.000 11)	(0.000 11)	(0.000 09)	(0.000 1)	(0.000 07)	(0.000 08)
	[0.00948]	[-0.00112]	[0.07550]	[0.00323]	[-0.05258]	[0.01717]	[0.06342]	[0.03768]
Mobile homes	−0.000 75	−0.000 41	−0.000 63	−0.000 51	−0.000 64	−0.000 33	−0.000 58	−0.000 33
	(0.000 06)	(0.000 07)	(0.000 16)	(0.000 15)	(0.000 14)	(0.000 15)	(0.000 08)	(0.000 08)
	[-0.17608]	[-0.10474]	[-0.10916]	[-0.08810]	[-0.09593]	[-0.05150]	[-0.12911]	[-0.08229]
Alcohol serving	−0.001 64	−0.001 28	−0.002 26	−0.002 75	−0.003 21	−0.000 85	−0.000 90	−0.000 20
	(0.000 53)	(0.000 48)	(0.000 9)	(0.000 89)	(0.001 54)	(0.001 5)	(0.000 76)	(0.000 77)
	[-0.02995]	[-0.02532]	[-0.05506]	[-0.06510]	[-0.04813]	[-0.01220]	[-0.01447]	[-0.00366]
No. of parks	0.000 16	0.000 05	−0.000 03	0.000 04	0.000 31	0.000 08	−0.000 01	0.000 01
	(0.000 02)	(0.000 01)	(0.000 01)	(0.000 06)	(0.000 1)	(0.000 13)	(0.000 02)	(0.000 02)
	[0.00481]	[0.01572]	[-0.01244]	[0.01776]	[0.03197]	[0.00994]	[-0.00223]	[0.00422]
Park land	−0.064 38	0.060 94	0.047 12	0.107 47	−0.243 36	−0.168 43	−0.055 28	0.087 54
	(0.050 69)	(0.063 36)	(0.076 71)	(0.042 28)	(0.129 58)	(0.089 26)	(0.053)	(0.100 16)
	[-0.01092]	[0.01089]	[0.01090]	[0.02167]	[-0.02634]	[-0.01928]	[-0.00905]	[0.01552]

Table 3 (Continued)

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
Com space	−0.000 01	−0.000 01	0.000 01	−0.000 01	0.000 01	−0.000 01	−0.000 01	0.000 01
	(0.000 01)	(0.000 01)	(0.000 01)	(0.000 01)	(0.000 02)	(0.000 02)	(0.000 01)	(0.000 01)
	[-0.01009]	[-0.01631]	[0.00149]	[-0.01247]	[0.01203]	[-0.00428]	[-0.01171]	[0.00414]
Com vacant	−0.013 63	−0.149 02	0.021 83	0.107 06	−0.551 48	0.068 72	−0.035 60	−0.046 97
land	(0.084 5)	(0.095 4)	(0.102 52)	(0.163 95)	(0.229 76)	(0.186 44)	(0.113 51)	(0.120 46)
	[-0.00137]	[-0.01619]	[0.00241]	[0.01206]	[-0.04130]	[0.00572]	[-0.00345]	[-0.00510]
Ind space	−0.000 02	−0.000 03	−0.000 03	−0.000 01	−0.000 01	−0.000 01	−0.000 03	−0.000 04
	(0.000 01)	(0.000 01)	(0.000 02)	(0.000 01)	(0.000 01)	(0.000 01)	(0.000 02)	(0.000 02)
	[-0.02314]	[-0.02634]	[-0.03025]	[-0.01507]	[-0.00399]	[-0.00457]	[-0.02676]	[-0.03540]
Ind vacant land	−0.005 36	−0.009 08	−0.011 20	−0.013 28	−0.232 62	0.082 81	−0.017 58	−0.034 15
	(0.003 82)	(0.003 08)	(0.003 26)	(0.004 68)	(0.135 64)	(0.130 38)	(0.079 26)	(0.073 72)
	[-0.00348]	[-0.00658]	[-0.01165]	[-0.01442]	[-0.01889]	[0.00706]	[-0.00266]	[-0.00581]
SF vacant land	−0.025 00	0.039 41	−0.396 06	−0.320 17	0.319 41	0.058 71	−0.326 36	0.301 13
	(0.128 24)	(0.137 84)	(0.101 43)	(0.120 22)	(0.128 45)	(0.136 68)	(0.146 97)	(0.167 34)
	[-0.00162]	[0.00276]	[-0.03803]	[-0.03082]	[0.02426]	[0.00438]	[-0.02074]	[0.02179]
N	3.582	3.581	1.695	1.666	1.946	1.905	3.332	3.352
Adjusted R^2	0.574	0.563	0.293	0.239	0.337	0.264	0.409	0.263
F-stat	15	10	8	6	5	2	9	4
p-value	0	0	0	0	0	0.023	0	0
LR stat	209	114	67	40	39	22	119	61
p-value	0	0	0	0	0	0.06	0	0

Note: The dependent variable is the adult income mean percentile rank in the national distribution of household income for youth whose parents were in the 25th percentile. Residential land uses are shares of the total number of housing units in the neighborhood. Alcohol outlets and parks are their total number. Parkland and vacant lots are measured in acres. Industrial and commercial space is measured in square feet (10,000s). Numbers in parentheses () and brackets [] are the robust standard error and the beta coefficient. All models include the complete set of Chetty et al. (2020a) variables (Figure V) as controls. The F-statistics test for whether the land-use variables are jointly significant. The log-likelihood ratio statistics test whether the land-use variables significantly improve the prediction.

Starting with the residential land uses, increases in the units of multifamily apartments, single-family rental homes, and mobile homes as a percentage of the neighborhood's housing units are negatively correlated with adult household income, at the five percent level of significance, across all eight subgroups. The exception is the percentage of condominium homes, which generally is positive in sign, and in two cases, the effects are statistically significant (black and white females). Particularly noteworthy are the strong negative correlations registered for the percentage of mobile homes, which yield the largest beta coefficients of any of the land uses, both residential and non-residential. These estimates range between −.05 (Hispanic males) to −.13 (white females). The magnitude of the latter estimate is twice as large as the beta coefficient on the poverty rate from the Opportunity Atlas and larger than a majority of the beta coefficients on the other Atlas variables (see Appendix Table A.1).

Correlations between the number of alcohol outlets within the neighborhood and adult income are negative and statistically significant for the racially pooled samples of females and males, blacks of both genders, and female Hispanics. For the latter three subgroups, the beta coefficients are similar in magnitude, ranging between −0.05 and −0.06.

Of the two parks measures, their number, and their total acreage within the neighborhood, only the acreage measure shows an important correlation with adult income, which is registered only for black males. It is highly significant, positive in sign, with a beta coefficient of 0.024

Among the commercial and industrial land use measures, the total amount of industrial space in the neighborhood is negative and significantly correlated with adult income for pooled males and females, and within the subgroups broken down by race and gender, for white males, with all beta coefficients around −0.03. Vacant industrial and single-family lots also show negative, highly significant correlations for blacks of both genders, with similar beta coefficients.

The variable that is most commonly used as the indicator of neighborhood disadvantage is the poverty rate; however, it is not clear how neighborhood poverty impacts the development of youth and their future welfare as adults. To some extent, the poverty rate may proxy for land-use effects. That is, the ability of the level of poverty within the neighborhood where adults grew up to predict their current welfare may be due, at least in part, to correlations between the poverty rate and land uses that have their own independent effects as predictors of adult outcomes. To investigate this possible pathway for the poverty rate effect, the significance levels and beta coefficients of the neighborhood poverty rate are compared between models, including, and excluding the land-use variables.[16] Except for Hispanic females, the negative effect of the poverty rate on household income declined precipitously after including the land uses variables, with corresponding declines in the level of significance. Percentage declines in the absolute beta coefficients ranged between 21% for Hispanic males to 83% for white females. Correlations between the poverty rate and the percentage of multifamily units (.41), the percentage of single-family rentals (.13), and alcohol outlets (.24), land uses, which are all significant predictors of adult household income, seem to account for the change in the importance of the poverty rate between models excluding and

[16]The regression results from excluding the land-use variables and including only the Opportunity Atlas variables are in Appendix Table A.2.

including the land-use measures. The results suggest, at least in part, that the poverty rate of the neighborhood where poor youth grow up predicts their income as adults because neighborhoods with higher poverty rates also have an undesirable mix of land uses.

While my results show statistical significance of the land-use variables in predicting the adult household incomes of poor youth, the latter significance does not always translate into economic importance. To investigate this issue, I examined the distribution of each variable and generated the change in value from subtracting the value at the 25^{th} percentile from the value at the 75^{th} percentile. To gauge the importance of an individual predictor, I report in Table 4 the dollar change in adult household income in 2015 that would result from this change.[17] For the pooled female and male samples, there are three columns: income changes obtained from a model including only the land-use variables (Column 1), income changes for the Opportunity Atlas variables from a model only including these variables (Column 2), and changes in income for all predictors from the complete model (Column 3).[18]

The results show that the land-use variables as predictors of adult income are important. The residential land uses, other than condominiums and the presence of alcohol serving places, yield income changes that are similar to the changes registered for many of the Opportunity Atlas variables. The largest change in income is from the change in the neighborhood percentage of single-family rentals (-$2500), which is larger than all but a couple of the Opportunity Atlas variables, based on the results from models limited to each set of predictors (Columns (1) and (2)).

In summary, the results show that land uses within the neighborhood where youth grew up are important predictors of their household income as adults. The signs of the estimated effects are as expected based on the evidence reviewed in section 2. Along with alcohol-serving establishments, the mix of residential land uses within the neighborhood have the strongest power to predict the adult household incomes of poor youth.

6. PREDICTING TEENAGE CHILDBEARING OF POOR YOUTH

The estimated effects of the land-use variables as predictors of the fraction of female youth from poor families having a baby as a teenager are reported in Table 5. Across all four subgroups (all females and females broken down by race), the land uses are jointly significant at the one percent level, and the likelihood ratio tests indicate that the land uses result in a statistically significant improvement in model fit at the one percent level.

The results mirror those obtained for the adult household income models. A higher percentage of neighborhood housing units represented by multifamily housing, especially of the large scale variety, is positively correlated with the fraction of teenage births. Similar results are registered for the percentage of single-family rentals. With the exception of black females, an increase in the percentage of mobile homes produces the largest positive beta

[17] Accompanying the Opportunity Atlas is "Table 8: Crosswalk Between Income/Wage Percentiles and 2015 Dollars" (https://opportunityinsights.org/data/). Percentiles are associated with monetary variables in 2015 dollars, adjusting for inflation using the consumer price index (CPI-U).

[18] The results from models including only the land-use variables are in Appendix Table A.3; results from using only the Opportunity Atlas variables are in Appendix Table A.2; complete model results are in Table 3.

Table 4: Dollar Change in Adult Household Income from an Interquartile Change in the Value of the Prediction Variable

	Females			Males		
	(1)	(2)	(3)	(1)	(2)	(3)
MF Small	-954		-299	-978		-272
MF large	-1002		-299	-916		-150
SF rentals	-2471		-827	-2569		-756
Condos	443		59	202		-17
Mobile homes	-700		-359	-421		-201
Alcohol serving	-784		-178	-721		-144
Number of parks	2		11	35		33
Park land	-38		-37	36		30
Com space	-9		-36	-42		-49
Com vacant land	-9		-1	-7		-7
Ind space	-90		-28	-85		-30
Ind vacant land	-16		-2	-16		-3
SF vacant land	-17		-5	6		7
Poverty rate 1990		-1267	-628		-828	-439
Employment rate 2000		-388	-419		-382	-402
Jobs within 5 mi 2015		501	509		152	220
Avg job growth 2004–2013		144	129		180	164
HH mean income 2000		1462	1310		994	937
3rd grade math score 2013		219	260		432	451
Share college grad 2000		3211	2647		2045	1667
Single parent share 1990		-132	-271		-657	-667
Census return rate 2010		582	416		591	476
Black share 2000		-979	1172		-1432	-1522
Hispanic share 2000		723	618		677	629
Population density 2000		587	190		356	67

Note: Shown in the table are the changes in the adult household income of poor youth from an increase in the predictor from its 25th to the 75th percentile value. Columns (1) and (2) are from models restricted to the land use and Opportunity Atlas variables, respectively. Column (3) is based on models including both sets of predictors.

Table 5: Predicting the Teenage Birth Rates of Poor Youth: The Land Use Variables

	Pooled Female	Black Female	Hispanic Female	White Female
MF Small	0.00034	0.00029	0.00059	0.00036
	(0.00014)	(0.00027)	(0.00028)	(0.00019)
	[0.03053]	[0.02537]	[0.05161]	[0.03027]
	{0.00375}	{0.00358}	{0.00741}	{0.00335}
MF large	0.00041	0.00034	0.0008	0.00023
	(0.00008)	(0.0002)	(0.00022)	(0.00011)
	[0.05937]	[0.05275]	[0.09648]	[0.03742]
	{0.00730}	{0.00745}	{0.01386}	{0.00414}
SF rentals	0.00098	0.00014	0.00197	0.0007
	(0.00023)	(0.00051)	(0.00059)	(0.00028)
	[0.06935]	[0.00881]	[0.11186]	[0.05319]
	{0.00853}	{0.00124}	{0.01607}	{0.00588}
Condos	-0.00018	-0.00048	0.00013	-0.00033
	(0.00007)	(0.00022)	(0.00016)	(0.00009)
	[-0.03544]	[-0.06563]	[0.02264]	[-0.07164]
	{-0.00436}	{-0.00927}	{0.00325}	{-0.00792}
Mobile homes	0.00109	0.00054	0.00172	0.00105
	(0.00034)	(0.00012)	(0.00011)	(0.00036)
	[0.13597]	[0.15742]	[0.14371]	[0.04290]
	{0.01953}	{0.01741}	{0.01768}	{0.00605}
Alcohol serving	0.06387	0.00593	0.00447	0.00205
	(0.00193)	(0.00098)	(0.00237)	(0.00122)
	[0.06548]	[0.04018]	[0.03610]	[0.02244]
	{0.00924}	{0.00474}	{0.00518}	{0.00248}
Number of parks	-0.00005	-0.00012	-0.00074	-0.00001
	(0.00006)	(0.00004)	(0.00044)	(0.00007)
	[-0.00936]	[-0.02239]	[-0.04127]	[-0.00131]
	{-0.00115}	{-0.00316}	{-0.00593}	{-0.00014}

Table 5 (Continued)

	Pooled Female	Black Female	Hispanic Female	White Female
Park land	0.10997	-0.05600	0.39212	0.10434
	(0.0647)	(0.1476)	(0.23055)	(0.0961)
	[0.01058]	[-0.00587]	[0.02250]	[0.01156]
	{0.00130}	{-0.00083}	{0.00323}	{0.00128}
Com space	0.00003	0.00001	-0.00002	-0.00001
	(0.00002)	(0.00003)	(0.00002)	(0.00002)
	[0.01586]	[0.00618]	[-0.01124]	[-0.00279]
	{0.00195}	{0.00087}	{-0.00161}	{-0.00031}
Com vacant land	0.03022	0.35053	1.26616	-0.09219
	(0.16153)	(0.36258)	(0.82624)	(0.14584)
	[0.00172]	[0.01758]	[0.05027]	[-0.00604]
	{0.00021}	{0.00248}	{0.00722}	{-0.00067}
Ind space	0.00004	0.00037	-0.00005	0.00009
	(0.00002)	(0.00034)	(0.00002)	(0.00003)
	[0.02207]	[0.01964]	[-0.02371]	[0.04891]
	{0.00271}	{0.00277}	{-0.00341}	{0.00541}
Ind vacant	0.03804	0.05873	-0.45104	-0.11064
	(0.01003)	(0.00947)	(0.3332)	(0.07604)
	[0.01402]	[0.02768]	[-0.01941]	[-0.01135]
	{0.00172}	{0.00391}	{-0.00279}	{-0.00125}
SF vacant	-0.26470	-0.08920	-0.24172	-0.17510
	(0.15322)	(0.58029)	(0.2212)	(0.2184)
	[-0.00974]	[-0.00388]	[-0.00973]	[-0.00753]
	{-0.00120}	{-0.00055}	{-0.00140}	{-0.00083}
N	3,582	1,695	1,946	3,332
Adjusted R^2	0.681	0.345	0.39	0.472
F-stat	16	5	5	11
p-value	0	0	0	0
LR stat	219	35	64	155
p-value	0	0.001	0	0

Note: The dependent variable is the fraction of female youth birthing a baby as a teenager. Residential land uses are shares of the total number of housing units in the neighborhood. Alcohol outlets and parks are their total number. Parkland and vacant lots are measured in acres. Industrial and commercial space is measured in square feet (10,000s). Numbers in (), [], and {}, are the robust standard error, the beta coefficient, and the change in the birth rate from moving the value of the predictor from the 25th to the 75th percentile of its distribution, respectively. All models include the complete set of Chetty et al. (2020a) variables (Figure V) as controls. The F-statistics test for whether the land-use variables are jointly significant. The log-likelihood ratio statistics test whether the land-use variables significantly improve the prediction.

coefficients (.14 to .16) among the residential land uses, while increases in the percentage of condominiums yield negative correlations. Again, these results are consistent with those obtained for adult household income. Additional alcohol outlets are positively correlated with teenage childbearing for all four subgroups, although for Hispanic and white females, the effects are not significant at the five percent level (but are significant at the ten percent level). The largest alcohol outlets beta coefficient is for black females (.065).

The remaining variables fail to produce consistent results across subgroups. However, there are variables that are significant predictors in isolated cases. A positive correlation between an increase in the number of parks and teenage births is significant for black (beta = -.022) and Hispanic females (beta = -.041). An increase in the presence of industrial activity within the neighborhood measured as either the total amount of industrial space or vacant land is positively correlated with the expected fraction of teenage births for all subgroups, except Hispanics.

Also, similar to the results obtained for the household income model, the predictive power of the poverty rate declines when a model including only the Atlas variables is expanded to include the land-use variables. However, the declines in the beta coefficients are smaller in magnitude, on the order of 20 percent, and the poverty rate remains significant at the one percent level.[19] Finally, the importance of the land uses as predictors of the birthrate is shown from the change in the value of the variable, again moving from the 25^{th} to the 75^{th} percentile of its distribution. (See numbers in curly brackets in Table 5). Mobile homes, apartments within large multifamily properties, and single-family rentals generally produce the largest changes, ranging between one and two percentage points, which is generally in line with the Atlas variables having the largest effects. (See numbers in curly brackets in Appendix Table A.4).

7. RESULTS OBTAINED WITH THE OPPORTUNITY ATLAS VARIABLES

The Opportunity Atlas variables serve as control variables in my models; as such, they are not the focus of this paper. Nevertheless, if they behave in a reasonable fashion, this adds credibility to my conclusion that the mix of land uses within a youth's neighborhood predicts his or her welfare as an adult. My upward mobility results for Florida neighborhoods using the covariates from the Opportunity Atlas are generally consistent with the findings reported by Chetty et al. (2020a) for their sample of national neighborhoods. A direct comparison is not possible because, in lieu of estimates obtained from multivariate regression models, they report race-controlled correlations, which they describe as "computing correlations separately for each race and taking a population-weighted average". However, we both find that upward mobility (recall, as measured by adult household income) is positively associated with the mean household income, third-grade math score, the share of college graduates, less poverty, a smaller share of single-family households, and a higher census form return rate (a proxy for social capital) within the neighborhood where youth resided as adolescents. With but

[19]Because of their similarity to the household income models and in the interest of keeping this paper of reasonable length, results from predicting teenage pregnancy rates from models restricted to just the land-use variables and to just the Opportunity Atlas variables are not reported. I make them available upon request.

a few exceptions, these variables are all statistically significant in the adult income models that I estimate. However, my results are contrary to Chetty et al. (2020a) conclusion that "what predicts upward mobility is not proximity to jobs, but growing up around people who have jobs." This conclusion was based on their correlations showing upward mobility is positively related to the employment rate but negatively related to job density within the neighborhoods where youth grew up. They interpreted their findings as challenging Kain (1968) spatial mismatch theory. Most comparable to Chetty et al.'s racially pooled correlation coefficients are the results I obtained from estimating the adult income models for the racially pooled female and male subgroups. My results show that job density (measured within the Opportunity Atlas as the number of jobs within five miles of the centroid of the census tract) is positive and statistically significant for both genders, while the employment rate is negative and significant.[20] Hence, my conclusion for Florida is that what predicts upward mobility is proximity to jobs and not growing up around people who have jobs. Of course, this does not mean that Chetty et al. (2020a) findings are wrong at the national level, but rather my results for Florida suggest that there may be considerably spatial heterogeneity in the predictive power of individual covariates within the Opportunity Atlas, especially across states.

For the pooled race models estimated with the teenage birth rate as the outcome variable, the significant covariates follow the same pattern as found in the adult income models, although with opposite signs, as expected.[21] The estimates for job density and the employment rate again belie the conclusions of Chetty et al. (2020a) regarding the possible unimportance of spatial mismatch. Job density predicts a lower birthrate, while the employment rate has the opposite effect, and both variables are significant at the one percent level.[22]

8. DECOMPOSING GAPS IN ADULT OUTCOMES BETWEEN RACIAL GROUPS

Gaps in mean adult outcomes between poor white and poor minority youth raise the questions to what extent these gaps can be explained by differences in the land uses within the neighborhoods where these groups resided as youth and possible differences in the effects that these land uses have on predicting these outcomes. To provide some evidence relevant to answering these questions, Oaxaca (1973) decompositions are done. To review the method as applied here, where the comparison minority group is blacks, the mean adult outcome difference (DOA) can be expressed as:

$$DOA_{B,W} = E\left(OA_B\right) - E(OA_w), \tag{7}$$

where *E(OA)* denotes the expected value of the outcome variable. B and W denote blacks and whites, respectively. Based on the linear model estimated,

[20]The estimated equations described in this section do not include Chetty et al. (2020a) second measure of job density, the number of high-paying jobs within 5 miles of the centroid of the census tract, due to its high correlation (.98) with the all jobs density measure. The estimated job density beta coefficients for females and males are .053 and .025, respectively.

[21]Chetty et al. (2020a) did not provide race-controlled correlations for birthrates as the outcome variable; hence, I could not make a comparison of Florida to national results as was possible for upward mobility.

[22]The beta coefficients are -.060 and .061, respectively.

$$DOA_{B,W} = E\left(OA_B\right) - E\left(OA_w\right) = E(X_B)'\beta_B - E(X_W)'\beta_W, \quad (8)$$

where the β's are the estimated parameters and X is a vector containing the land use predictors. Equation (8) can be rearranged as follows:

$$DOA_{B,W} = [E(X_B) - E(X_w)]'\beta_W + E(X_w)'(\beta_B - \beta_W) + [E(X_B) - E\left(X_W\right)]'(\beta_B - \beta_W), \quad (9)$$

The first two components of equation (9) represent, in order, amounts of the differential gap in the adult mean outcome between blacks and whites that are due to group differences in the predictors (land uses) and differences in the estimated coefficients. The last component is an interaction term accounting for the fact that differences in land uses and coefficients exist simultaneously between the two racial groups.

In the decomposition of the mean described in (10), the expected change in the mean outcome of whites is obtained by giving whites the mean land uses of blacks. The decomposition can also be done by obtaining the expected change in the mean outcome of blacks if blacks lived in neighborhoods that have the same land uses as whites:

$$DOA_{B,W} = [E(X_B) - E(X_w)]'\beta_B + E(X_B)'(\beta_B - \beta_W) + [E(X_B) - E\left(X_W\right)]'(\beta_B - \beta_W), \quad (10)$$

Table 6 reports the results from switching mean land uses using both (9) and (10) between the neighborhoods occupied by minority and white youth.[23] There are four cases where there is a gap in mean adult outcomes between groups: black males have a lower mean household income than white males (−.1098), black females have a lower mean household income than white females (−.0952), black females have a higher mean teenage birth rate than white females (.1999), and Hispanic females have a higher mean teenage birth rate than white females (.0528). Regardless of whether the decomposition is based on giving the land uses of the minority group to whites or vice versa, collective differences in land uses to make a statistically significant contribution to the gaps.[24] However, the reductions in the gaps are not large, with percentage changes being in the range of 1 to 3 percent. An exception is the results for the teenage birth rate gap between Hispanic and white females, where the percentage reduction in the gap is 9.6% if the Hispanics are given the white land uses, and 6.6% if the whites are given the Hispanic land uses. While the percentage reductions in the gaps from the decompositions are not large, it is of interest to note that they are similar to those from exchanging neighborhood poverty rates between groups.[25]

Instead of treating the land uses altogether, decompositions were also estimated where each individual land use was allowed to have a separate effect. The specific neighborhood land uses that largely account for the reductions in the racial gaps in the adult outcomes are the percentage of multifamily housing units, the percentage of single-family rentals, and the number of alcohol outlets. Larger amounts of industrial space in the neighborhoods occupied by black females also account for their lower adult income and greater teenage births.

[23]Interaction components were uniformly insignificant and therefore are excluded from Table 4.

[24]Because declines in the gaps are hypothesized, one-tailed tests of significance are employed.

[25]For example, for the gap in black/white male adult household income, giving whites the neighborhood poverty rate of blacks reduces the gap by .0024, in comparison to the .0017 gap reduction if whites are given the mean land uses of blacks.

Table 6: Neighborhood Land Use Counterfactuals: Oaxaco Decompositions (Robust standard errors are in parentheses)

	Mean		Difference	Counterfactual	
	(1)	(2)		(1)	(2)
Male Income					
Black White	0.3065	0.4163	−0.1098	0.0013	−0.0017
	(0.001 6)	(0.001 2)	(0.001 9)	(0.000 8)	(0.000 7)
Hispanic White	0.4208	0.4163	0.0045	−0.0006	0.0007
	(0.001 7)	(0.001 2)	(0.002 1)	(0.000 8)	(0.000 5)
Female Income					
Black White	0.3579	0.4531	−0.0952	0.0028	−0.0019
	(0.001 5)	(0.001 3)	(0.002)	(0.002)	(0.000 7)
Hispanic White	0.4543	0.4531	0.0012	−0.0008	0.002
	(0.001 7)	(0.001 3)	(0.002 2)	(0.000 8)	(0.000 6)
Female Teen Birth					
Black White	0.3996	0.1996	0.1999	−0.0054	0.0016
	(0.003 4)	(0.001 9)	(0.003 9)	(0.001 9)	(0.001 1)
Hispanic White	0.2524	0.1996	0.0528	0.005	−0.0035
	(0.003 3)	(0.001 9)	(0.003 8)	(0.001 9)	(0.000 9)

Note: Mean (1) is the outcome for the minority group and Mean (2) for the white group. Counterfactual (1) gives the expected change in the minority group mean outcome if the minority group had white group land use levels. Counterfactual (2) gives the expected change in the white group mean outcome if the white group had the minority group land use levels.

Generally, differences in the estimated coefficients of the land use between groups do not result in statistically significant reductions in the gaps in adult mean outcomes.[26] The only exception is the gap in teenage birth rates between Hispanic and white females (.053). Differences in the land use coefficients reduce the gap by .035 (p-value=.017), which explains 66 percent of the difference in this relatively small gap. The decomposition allowing for separate effects for each land use coefficient showed that the percentages of apartments in large-scale properties, single-family rentals, condominium, and mobile homes have a greater impact on teenage births for Hispanics in comparison to white females, with each difference in coefficients statistically significant.

9. CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The objective of this paper was to determine whether the mix of land uses within the neighborhoods where poor youth resided as adolescents would help predict their welfare as adults. Motivating this exploration is a substantial body of evidence that has found that neighborhood land uses are associated with the physical, emotional, and cognitive development of youth. Overall, my results suggest that land uses are important predictors of the adult welfare of poor youth, adding to the neighborhood descriptors found within the Opportunity

[26]These results are not reported in Table 4 but are available upon request.

Atlas and used by Chetty et al. (2020a). Attention to land uses in identifying upwardly mobile neighborhoods is warranted. The strongest predictors are the residential types found within the neighborhood. Other than condominiums, increases in multifamily units, single-family rentals, or mobile homes at the expense of single-family owner-occupied homes result in poor youth experiencing worse outcomes as adults. The predictive effects of mobile homes are particularly strong, having the largest beta coefficients of any of the land uses. Because housing affordability advocates favor mobile homes (Dawkins and Koebel, 2009; Solomon, 2018; Brooks and Mueller, 2020), research going beyond prediction to uncovering the causal factors accounting for my results would seem to be warranted. In total, the results obtained with the residential land use suggest that the traditional suburban neighborhood, comprised of owner-occupied single-family homes, provides the greatest upward mobility for poor youth. These neighborhoods have many characteristics that are favorable to youth. Yard space, low crime, good schools, and positive peer group effects frequently describe these neighborhoods. Future research isolating the role played by each factor in explaining the upward mobility provided by the traditional neighborhood is warranted.

The nonresidential land use having the greatest power as a predictor of adult outcomes is on-premises alcohol establishments (limited to bars, cocktail lounges, and nightclubs). While I do not claim causality, my evidence is relevant to arguments that have been made to limit these establishments within minority neighborhoods, where they are in greater number (Jones-Webb and Karriker-Jaffe, 2013; Trangenstein et al., 2020). The link between these places and adult outcomes may come from exposure to crime, either as victims, witnesses, or living in abusive home environments. Again, future research sorting out the relative importance of these factors in accounting for my results is warranted.

Other non-residential land uses predicting worse adult outcomes, especially for blacks, are industrial uses, both the amount of building space and the acreage of vacant lots. While the industry is generally zoned away from residential land use, this is not prevented in hierarchical zoning (common in Florida) and results in poor households living in industrial areas. Exclusive use zoning may be a better alternative, at least from the perspective of the development of minority youth. Interesting future research could be done investigating the relationship between zoning, youth development, and adult outcomes.

Neighborhood parks are a nonresidential use that predicts the household income of black males and Hispanic females and the teenage motherhood of black females. There is an importance attached to these predictions in light of the fact that black males have the worst adult incomes and black females have the highest teenage birth rates of any of the groups. Increasing parks within the neighborhoods of black youth may improve these outcomes and may be an especially desirable option if vacant industrial land, which is disproportionately found within black neighborhoods, could be converted into parks. Less of this land, like more parks, predicts better black outcomes. As noted in Section 2, the positive effect of neighborhood parks on youth development may be partially offset by parks contributing to crime within the neighborhood. Research separating out the positive and negative effects of parks may yield important guidance on the benefits and costs associated with increasing a police presence in the vicinity of parks.

Accounting for all of the above neighborhood land-use effects in predicting the welfare of poor youth in adulthood, the neighborhood providing the greatest upward mobility would

be one where owner-occupied housing is the predominant housing type, there would be no alcohol-serving establishments, one or more public parks would be accessible, and there would be an absence of industrial activity. While this neighborhood may be *ideal* in terms of upward mobility, there is a possible impediment to housing affordability. Housing within the neighborhood may be out of the financial reach of poor families. Included in the Opportunity Atlas is the median monthly rent of a two-bedroom apartment (2011-2015) constructed from tract-level American Community Survey data. Across all of the Florida neighborhoods included in my analysis, the average median rent is $1023, while the average for the *ideal* neighborhood is $1119, or 9.4% greater. This suggests that the *ideal* neighborhood may be an affordable option for many poor families interested in improving the upward mobility of their children. There may, however, be a scarcity of apartments within the *ideal* neighborhood due to exclusionary zoning (Ihlanfeldt, 2004).

The land is allocated to alternative land uses based on market forces, which are subject to the controls imposed by local governments. These controls have legal standing based on the argument that externalities, both positive and negative, are associated with alternative land uses. However, these externalities are limited to the impacts they have on current residents. The results of this study suggest that there are also inter-generational externalities that affect the adult welfare of poor children growing up in neighborhoods with land uses that affect their physical and emotional development. To fully account for the market failure surrounding the neighborhood uses of land, both present and future externalities merit consideration by urban planners in the deployment of their land use regulatory powers.

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APPENDIX A

The dependent variable is the adult income mean percentile rank in the national distribution of household income for youth whose parents were in the 25th percentile. The poverty rate of the tract is measured for 1990 from the 1990 Census. The employment rate is measured for 2000 from the Census long form and equals the total employed population divided by the total population 16 years and over. Jobs within 5 miles of the centroid of the tract is for 2015 is constructed using LEHD Origin-Destination Employment Statistics (LODES) provided by the Census Bureau. Job Growth is the average annualized growth rate from 2004 to 3013 and is also constructed from the LODES data. Mean Household Income is from the 2000 Decennial Census. The 3rd grade math test scores are for 2013 and are obtained from the Stanford Education Data Archive and measured at the district level. Tract numbers are assigned using a crosswalk from districts to tracts. The share of college graduates is from the 2000 Census long form and is calculated as the number of people aged 25 or older with a college degree divided by the total number of people aged 25 or older in a tract. The single parent share is for from the 1990 Census and equals the number of households with female head (and no husband present) or male head (and no wife present) with own children under 18 years old present divided by the total number of households with own children present. The 2010 Census return rate is from the Census 2016 Planning Database and is calculated as the number of Census mail forms completed and returned over the number of valid occupied housing units where a Census form was expected to be delivered for mail return to Census. Racial Shares are for 2000 and are from the Census long form. The population density variable is the total tract-level population divided by tract land area in square kilometers, measured using the 2000 Census. For more complete descriptions of the variables and their construction, see Chetty et al. (2020a): Online Appendix B: Construction of Neighborhood Level Variables. Numbers in parentheses and brackets are the robust standard error and the beta coefficient, respectively. All models include the land use variables in Table 2.

Table A1: Predicting the Adult Household Income of Poor Youth: Variables from Chetty et al. (2020a) Figure V.

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
Poverty rate	-0.05781	-0.03827	-0.04059	0.01666	-0.11639	-0.09359	-0.01484	-0.05768
	(0.01496)	(0.01504)	(0.02259)	(0.02744)	(0.02757)	(0.03126)	(0.0227)	(0.02255)
	[-0.08253]	[-0.05907]	[-0.07705]	[0.03152]	[-0.14056]	[-0.11577]	[-0.01497]	[-0.06683]
Employment rate 2000	-0.02342	-0.02074	0.01602	-0.02221	-0.05321	-0.04153	-0.02215	-0.02967
	(0.01015)	(0.01012)	(0.02014)	(0.01784)	(0.02036)	(0.02239)	(0.01253)	(0.01229)
	[-0.03968]	[-0.03815]	[0.02654]	[-0.03636]	[-0.07192]	[-0.05691]	[-0.03428]	[-0.05172]
Jobs within 5 mi 2015	0.00005	0.00002	0.00004	0.00001	0.00022	0.00002	0.00003	0.00001
	(0.00001)	(0.00001)	(0.00002)	(0.00002)	(0.00023)	(0.00002)	(0.00002)	(0.00002)
	[0.05341]	[0.02453]	[0.04157]	[0.01225]	[0.02587]	[0.02873]	[0.02439]	[0.00630]
Avg job growth 2004–2013	0.01851	0.02085	0.00756	-0.00685	-0.02405	0.01179	0.03371	0.02657
	(0.01156)	(0.01194)	(0.01866)	(0.02157)	(0.02269)	(0.02479)	(0.01688)	(0.01687)
	[0.01837]	[0.02255]	[0.00803]	[-0.00720]	[-0.02037]	[0.00999]	[0.03030]	[0.02708]
HH mean income 2000	0.00037	0.00027	0.00081	0.00075	0.00037	0.00076	0.00025	0.00026
	(0.00008)	(0.00007)	(0.00016)	(0.00015)	(0.00013)	(0.00015)	(0.00011)	(0.00009)
	[0.16446]	[0.13194]	[0.29345]	[0.26398]	[0.14601]	[0.10143]	[0.10115]	[0.11802]
3rd grade math score 2013	0.00693	0.01193	0.00918	0.01695	0.01739	0.00861	0.01088	0.0125
	-0.00252	-0.00241	-0.00476	-0.00525	-0.00661	-0.00691	-0.00297	-0.00295
	[0.03214]	[0.06001]	[0.04223]	[0.07736]	[0.06621]	[0.03305]	[0.04737]	[0.06156]
Share college grad 2000	0.12609	0.02296	-0.02654	0.00777	0.1591	0.12415	0.20252	0.1217
	(0.01428)	(0.01232)	(0.02596)	(0.02393)	(0.02813)	(0.03084)	(0.01796)	(0.01561)
	[0.25630]	[0.17165]	[-0.04928]	[0.01416]	[0.28130]	[0.22382]	[0.38043]	[0.25854]

Table A1 (Continued)

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
Single parent share 1990	-0.01751	-0.04361	-0.04337	-0.07730	-0.00007	-0.03175	-0.05197	-0.03906
	(0.01269)	(0.01201)	(0.0167)	(0.02071)	(0.00031)	(0.02356)	(0.01611)	(0.01633)
	[-0.03481]	[-0.09372]	[-0.11126]	[-0.19751]	[-0.00556]	[-0.05250]	[-0.07669]	[-0.06618]
Census return rate 2010	0.00044	0.0005	-0.00035	-0.00060	-0.00007	0.00051	0.0003	-0.00010
	(0.00016)	(0.00015)	(0.00026)	(0.00026)	(0.0063)	(0.00033)	(0.00022)	(0.00021)
	[0.04213]	[0.05214]	[-0.03387]	[-0.05706]	[-0.00557]	[0.04110]	[0.02558]	[-0.01005]
Black share 2000	-0.07681	-0.09933	0.00468	-0.00436	-0.00130	-0.01209	-0.00387	-0.01011
	(0.00465)	(0.00447)	(0.00725)	(0.00743)	(0.00975)	(0.01069)	(0.00917)	(0.00839)
	[-0.24071]	[-0.33692]	[0.01953]	[-0.01804]	[-0.00330]	[-0.03123]	[-0.00844]	[-0.02525]
Hispanic share 2000	0.04352	0.04436	0.0353	0.03233	0.06575	0.06082	0.01563	0.00042
	(0.0051)	(0.00483)	(0.01299)	(0.01326)	(0.00797)	(0.00838)	(0.00902)	(0.01022)
	[0.13006]	[0.14339]	[0.08609]	[0.08048]	[0.21627]	[0.20542]	[0.03886]	[0.00123]
Population density 2000	0.00113	0.00041	0.00393	0.00457	0.00035	-0.00014	0.00404	-0.00023
	(0.00069)	(0.00067)	(0.00154)	(0.00198)	(0.00086)	(0.00093)	(0.00122)	(0.00133)
	[0.02534]	[0.00992]	[0.07561]	[0.08596]	[0.00853]	[-0.00363]	[0.07258]	[-0.00485]

Table A2: Predicting the Adult Household Income of Poor Youth: Opportunity Atlas Variables Only

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
Poverty rate 1990	-0.11660	-0.07369	-0.09228	-0.01382	-0.14729	-0.12708	-0.07633	-0.09458
	(0.0147)	(0.01402)	(0.02208)	(0.02608)	(0.02638)	(0.02914)	(0.02232)	(0.02177)
	[-0.16647]	[-0.11373]	[-0.17518]	[-0.02614]	[-0.17787]	[-0.15721]	[-0.07706]	[-0.10958]
Employment rate 2000	-0.02170	-0.02028	0.00296	-0.02372	-0.04631	-0.04528	-0.03301	-0.03685
	(0.01071)	(0.00999)	(0.02034)	(0.01783)	(0.02024)	(0.02185)	(0.01258)	(0.01191)
	[-0.03677]	[-0.03730]	[0.00490]	[-0.03901]	[-0.06260]	[-0.06205]	[-0.05109]	[-0.06422]
Jobs within 5 mi 2015	0.00005	0.00001	0.00004	0.00001	0.00003	0.00001	0.00003	0.00000
	(0.00001)	(0.00001)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
	[0.05264]	[0.01615]	[0.04574]	[0.01732]	[0.03591]	[0.01757]	[0.02759]	[0.00057]
Avg job growth 2004–2013	0.02055	0.02312	0.01773	-0.00189	-0.02174	0.01616	0.03611	0.02961
	(0.0117)	(0.0118)	(0.01859)	(0.02137)	(0.02301)	(0.02489)	(0.01682)	(0.01702)
	[0.02040]	[0.02500]	[0.01885]	[-0.00199]	[-0.01840]	[0.01369]	[0.03245]	[0.03019]
HH mean income 2000	0.00041	0.00029	0.00085	0.00077	0.00045	0.00029	0.0003	0.00026
	(0.00008)	(0.00007)	(0.00016)	(0.00015)	(0.00012)	(0.00014)	(0.00011)	(0.00008)
	[0.18356]	[0.13895]	[0.30533]	[0.27019]	[0.17630]	[0.11347]	[0.12109]	[0.11881]
3rd grade math score 2013	0.00584	0.01145	0.00847	0.01529	0.0182	0.00981	0.01056	0.01259
	(0.00256)	(0.0024)	(0.00469)	(0.00515)	(0.00654)	(0.00685)	(0.00298)	(0.00291)
	[0.02709]	[0.05758]	[0.03894]	[0.06979]	[0.06931]	[0.03765]	[0.04596]	[0.06202]
Share college grad 2000	0.15296	0.0962	-0.00443	0.02909	0.15782	0.13162	0.22479	0.14168
	(0.01312)	(0.01125)	(0.02427)	(0.02328)	(0.02465)	(0.02729)	(0.01688)	(0.01453)
	[0.31090]	[0.21181]	[-0.00822]	[0.05302]	[0.27902]	[0.23728]	[0.42226]	[0.30097]

Table A2 (Continued)

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
Single parent share 1990	-0.00850	-0.04359	-0.03634	-0.08009	-0.02773	-0.03185	-0.03075	-0.03424
	(0.01235)	(0.01167)	(0.01635)	(0.02041)	(0.02203)	(0.02255)	(0.01568)	(0.0152)
	[-0.01689]	[-0.09367]	[-0.09321]	[-0.20464]	[-0.04487]	[-0.05266]	[-0.04537]	[-0.05801]
Census return rate 2010	0.00061	0.00062	-0.00011	-0.00052	0.00028	0.0008	0.00048	0.00002
	(0.00015)	(0.00015)	(0.00026)	(0.00025)	(0.00029)	(0.00033)	(0.00021)	(0.00021)
	[0.05885]	[0.06460]	[-0.01080]	[-0.04916]	[0.02170]	[0.06401]	[0.04109]	[0.00165]
Black share 2000	-0.06415	-0.09386	0.00905	-0.00089	0.00793	-0.00789	0.00065	-0.00900
	(0.00439)	(0.00415)	(0.00682)	(0.00698)	(0.00956)	(0.01011)	(0.00887)	(0.00813)
	[-0.20103]	[-0.31836]	[0.03772]	[-0.00368]	[0.02015]	[-0.02037]	[0.00141]	[-0.02248]
Hispanic share 2000	0.05093	0.04751	0.04372	0.03676	0.06781	0.06419	0.02207	0.00329
	(0.00511)	(0.00479)	(0.01243)	(0.01335)	(0.00785)	(0.00821)	(0.00925)	(0.01006)
	[0.15220]	[0.15357]	[0.10662]	[0.09099]	[0.22304]	[0.21679]	[0.05490]	[0.00948]
Population density 2000	0.00349	0.00219	0.00792	0.00684	0.00084	0.00114	0.00807	0.00229
	(0.00068)	(0.00062)	(0.00142)	(0.00164)	(0.00075)	(0.00084)	(0.00119)	(0.0012)
	[0.07835]	[0.05293]	[0.15198]	[0.12860]	[0.02060]	[0.02934]	[0.14500]	[-0.04749]

Note: Numbers in parentheses and brackets are the robust standard error and the beta coefficient, respectively. See notes to Appendix Table A.1 for variable descriptions.

Table A3: Predicting the Adult Household Income of Poor Youth: Land Use Variables Only

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
MF small	-0.00128	-0.00131	-0.00092	-0.00097	-0.00111	-0.00097	-0.00067	-0.00101
	(0.00009)	(0.00009)	(0.00011)	(0.00011)	(0.00012)	(0.00011)	(0.00014)	(0.00012)
	[-0.20343]	[-0.22485]	[-0.17599]	[-0.18587]	[-0.18338]	[-0.16383]	[-0.08414]	[-0.14615]
MF large	-0.00088	-0.00079	-0.00069	-0.00048	-0.00093	-0.00087	-0.00065	-0.00049
	(0.00007)	(0.00007)	(0.0001)	(0.0001)	(0.00012)	(0.00013)	(0.00008)	(0.00007)
	[-0.22617]	[-0.22170]	[-0.23263]	[-0.16161]	[-0.21333]	[-0.20232]	[-0.15280]	[-0.13157]
SF rentals	-0.00226	-0.00224	-0.00202	-0.00197	-0.00238	-0.00218	-0.00180	-0.00147
	(0.00025)	(0.00024)	(0.00029)	(0.00029)	(0.00039)	(0.00038)	(0.00027)	(0.00023)
	[-0.28214]	[-0.30096]	[-0.27286]	[-0.26457]	[-0.25498]	[-0.24317]	[-0.20154]	[-0.18527]
Condos	0.00014	0.00006	0.00015	-0.00006	-0.00019	0	0.00031	0.00011
	(0.00007)	(0.00006)	(0.00011)	(0.00012)	(0.0001)	(0.0001)	(0.00008)	(0.00007)
	[0.05040]	[0.02285]	[0.04620]	[-0.01778]	[-0.06245]	[0.00083]	[0.10081]	[0.04082]
Mobile homes	-0.00147	-0.00089	-0.00138	-0.00114	-0.00163	-0.00111	-0.00148	-0.00090
	(0.00007)	(0.00007)	(0.00017)	(0.00016)	(0.00015)	(0.00015)	(0.00008)	(0.00007)
	[-0.34310]	[-0.22574]	[-0.23988]	[-0.19573]	[-0.24260]	[-0.17168]	[-0.32845]	[-0.22628]
Alcohol serving	-0.00717	-0.00654	-0.04445	-0.00446	-0.00832	-0.00626	-0.00503	-0.00315
	(0.00096)	(0.00089)	(0.00115)	(0.00095)	(0.00203)	(0.0017)	(0.00101)	(0.00096)
	[-0.13106]	[-0.12886]	[-0.10830]	[-0.10558]	[-0.12680]	[-0.08956]	[-0.08108]	[-0.05735]
Number of parks	0.00001	0.00006	-0.00001	0.00008	0.00014	-0.00001	-0.00004	-0.00000
	(0.00003)	(0.00002)	(0.00002)	(0.00006)	(0.0002)	(0.00019)	(0.00004)	(0.00003)
	[0.00179]	[0.01892]	[-0.00278]	[0.03205]	[0.01474]	[-0.00174]	[-0.01263]	[-0.00019]
Park land	-0.05853	0.06744	0.0355	0.09672	-0.29304	-0.24755	-0.04342	0.11386
	(0.06188)	(0.08747)	(0.05634)	(0.04957)	(0.17875)	(0.09367)	(0.07314)	(0.12855)
	[-0.00992]	[0.01205]	[0.00821]	[0.01950]	[-0.03171]	[-0.02833]	[-0.00711]	[0.02018]

Table A3 (Continued)

	Pooled		Black		Hispanic		White	
	Female	Male	Female	Male	Female	Male	Female	Male
	-0.00004	-0.00011	-0.00022	-0.00036	0.00036	0.00027	-0.00013	0.00004
Com space	(0.00013)	(0.00016)	(0.00016)	(0.00013)	(0.00021)	(0.00023)	(0.00016)	(0.00016)
	[-0.00398]	[-0.01290]	[-0.02903]	[-0.04764]	[0.03658]	[0.02705]	[-0.01329]	[0.00452]
	-0.05094	-0.13441	0.00028	0.12048	-0.59956	0.08599	-0.14917	-0.10702
Com vacant land	(0.09819)	(0.10475)	(0.1306)	(0.14522)	(0.35878)	(0.19008)	(0.1026)	(0.13255)
	[-0.00511]	[-0.01460]	[0.00003]	[0.01357]	[-0.04490]	[0.00716]	[-0.01444]	[-0.01163]
	-0.00076	-0.00074	-0.00034	-0.00027	-0.00031	-0.00030	-0.00090	-0.00075
Ind space	(0.00022)	(0.00021)	(0.00016)	(0.00014)	(0.00019)	(0.00018)	(0.00027)	(0.00017)
	[-0.07212]	[-0.07611]	[-0.03935]	[-0.03216]	[-0.03141]	[-0.03165]	[-0.07448]	[-0.07406]
	-0.04271	-0.04467	-0.01934	-0.01680	-0.37345	-0.04303	-0.08772	-0.07462
Ind vacant land	(0.00486)	(0.00433)	(0.00283)	(0.00421)	(0.12261)	(0.20144)	(0.08995)	(0.07416)
	[-0.02775]	[-0.03237]	[-0.02012]	[-0.01825]	[-0.03031]	[-0.00367]	[-0.01329]	[-0.01270]
	-0.07459	0.03592	-0.36292	-0.23895	0.33307	0.04086	-0.38431	0.28427
SF vacant land	(0.12623)	(0.20441)	(0.14357)	(0.10688)	(0.12691)	(0.21861)	(0.08611)	(0.24402)
	[-0.00484]	[0.00251]	[-0.03485]	[-0.02300]	[0.02530]	[0.00305]	[-0.02442]	[0.02057]

Note: Numbers in parentheses and brackets are the robust standard error and the beta coefficient, respectively.

Table A4: Predicting the Teenage Birth Rates of Poor Youth: Variables from the Opportunity Atlas

	Pooled Female	Black Female	Hispanic Female	White Female
Poverty rate 1990	0.19874	0.15653	0.28828	0.18158
	(0.02355)	(0.05266)	(0.05863)	(0.03367)
	[0.16090]	[0.13468]	[0.18455]	[0.12408]
	{0.01979}	{0.01901}	{0.02651}	{0.01373}
Employment rate 2000	0.06374	-0.00706	0.05546	0.05017
	(0.01388)	(0.03896)	(0.03567)	(0.01595)
	[0.06126]	[-0.00531]	[0.03974]	[0.05256]
	{0.00753}	{-0.06075}	{0.00571}	{0.00581}
Jobs within 5 mi 2015	-0.00010	-0.00006	-0.00013	-0.00013
	(0.00002))	(0.00004)	(0.00004)	(0.00003)
	[-0.06260]	[-0.03181]	[-0.07982]	[-0.08129]
	{-0.00770}	{-0.00449}	{-0.01146}	{-0.00899}
Avg job growth 2004–2013	-0.01995	-0.01151	0.01347	-0.04192
	(0.01813)	(0.04412)	(0.03869)	(0.02172)
	[-0.01123]	[-0.00555]	[0.00604]	[-0.02550]
	{-0.00138}	{-0.00078}	{0.00087}	{-0.00282}
HH mean income 2000	-0.00036	-0.00117	-0.00051	-0.00019
	(0.00009)	(0.00029)	(0.00024)	(0.0001)
	[-0.09177]	[-0.19197]	[-0.10573]	[-0.05359]
	{-0.01129}	{-0.02710}	{-0.01519}	{-0.00593}
3rd grade math score 2013	-0.01877	-0.04609	-0.02823	-0.01271
	(0.00386)	(0.01117)	(0.01135)	(0.00422)
	[-0.04936]	[-0.09607]	[-0.05698]	[-0.03746]
	{-0.00607}	{-0.01356}	{-0.00818}	{-0.00414}

Table A4 (Continued)

	Pooled Female	Black Female	Hispanic Female	White Female
Share college grad 2000	-0.22450 (0.01754) [-0.25879] {-0.03183}	-0.16889 (0.04404 [-0.09164] {-0.01294}	-0.27551 (-0.04759) [-0.25822] {-0.03709}	-0.27878 (0.02041) [-0.35446] {-0.03921}
Single parent share 1990	0.04892 (0.01764) [0.05515] {0.00678}	0.11504 (0.03871) [0.13376] {0.01888}	0.03951 (0.04277) [0.03389] {0.00487}	0.01404 (0.02104) [0.01402] {0.00155}
Census return rate 2010	-0.00087 (0.00025) [-0.04749] {-0.00581}	0.00166 (0.00059) [0.07291] {0.01029}	-0.00148 (0.00059) [-0.06177] {-0.00888}	-0.00084 (0.00032) [-0.04863] {-0.00538}
Black share 2000	0.18581 (0.00893) [0.33022] {0.04062}	0.01953 (0.01656) [0.03691] {0.00521}	-0.01110 (0.01916) [-0.01495] {-0.00215}	0.05134 (0.01493) [0.07571] {0.00837}
Hispanic share 2000	-0.02922 (0.00776) [-0.04952] {-0.00609}	-0.00662 (0.02543) [-0.00732] {-0.00103}	-0.08869 (0.01375) [-0.15462] {-0.02221}	-0.03401 (0.01219) [-0.05726] {-0.00633}
Population density 2000	-0.00824 (0.00114) [-0.10490] {-0.01290}	-0.02446 (0.00372) [-0.21278] {-0.03004}	-0.00827 (0.00149) [-0.10793] {-0.01550}	-0.06652 (0.00193) [-0.07940] {-0.00878}

Note: The dependent variable is the fraction of female youth birthing a baby as a teenager. Numbers in (), [ ], and {} are the robust standard error, the beta coefficient, and the change in the birth rate from moving the value of the predictor from the 25th to the 75th percentile of its distribution, respectively. All models include the land use variables.