UNIVERSITAT DE BARCELONA

SCHOOL OF ECONOMICS

ARE BIGGER CITIES BETTER FOR HOUSEHOLD´S WELL-BEING? THE CASE OF UNITED STATES

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2020

Are bigger cities better for household´s well-being? The case of United States.

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Abstract

The linkages between the city size and the economic growth has been widely investigated, however, little attention has been focused on the effects over deprivation in an urban context. This paper investigates the agglomeration effects over the Socioeconomic Well-being Index, a more complex measure of urban poverty constructed by the sum of two weighted sub-indexes. The empirical analysis follows an IV robust exercise performed for 130 principal cities in United States from 2006 and 2016. This study is the first of its kind by considering heterogenous agglomeration effects on deprivation across ethnicities. Our findings revealed that an increase in the size of city is associated with a positive and significant impact on the well-being of White households, although it is negative for Afro-Americans and Hispanics.

Keywords: Deprivation, Agglomeration, Urban Poverty, Ethnicities, Well-being.

JEL. I31, R10, R20.

Introduction

The analysis and study of urban poverty must be understood in the context of the economic changes and migratory flows of the last 25 years. Globalization has resulted in the introduction of high technologies in production processes, the loss of jobs in manufacturing, and the suburban location of new jobs, arising a new academic interest around the comprehension of urban poverty. Previously, there was a belief that urbanization was the solution to end poverty in developing countries, however, the modernization of the 20th century did not improve the situation (Wilson , 1987), this led to the idea that poverty now also existed in cities and it could be more acute than that found in the rural sector.

Urban poverty breaks with the logic of structural poverty as social class does not necessarily translate into standardized forms of land occupation or homogeneous conditions of access to urban habitat and services. Urban poverty, modifies the uses and practices of the city, creating a new problem in urban life: “despite of enjoying the benefits of living in the city, living conditions are seriously deteriorated by uncertainty with respect to livelihoods and housing quality " (Vilagrasa, 2000).

Urban areas enable higher production and exchange, deriving into positive agglomeration effects (Graham,2009). As a result, numerous investigations have concentrated its efforts on analyzing how density affects economic growth (Handerson, 2003; Frick & Rodriguez, 2016). Less attention has been taken on the effects over deprivation. On the light of this gap, of the first aim of the paper is to contribute to the spatial and urban economics literature by performing a robust empirical exercise to estimate the city size effects on deprivation in a developed country, such as the US, within an urban environment.

Previous literature (Wilson, 1987; Bewer, Goodman, & Leicester, 2006; Gonye, 2007) have analyzed deprivation as a function of income, nevertheless, they did not perform an overall evaluation by establishing minimum standards, and the introduction of other needs. Consequently, deprivation on this paper will be measured by a modification to the "Socioeconomic Well-being Index” of Reyes and Lopez (2016). The SWI was proposed as an alternative to the measurement of poverty and takes as base a multidimensional approach, allowing the construction of a broad index that not only includes income minimums, but also encompasses the deprivation of needs.

Another important novelty of this paper is to consider heterogeneous agglomeration effects on deprivation across diverse ethnicities, that to the best of our knowledge has not been previously analyzed by the literature. The analysis will be performed for 130 principal cities in United States; and ethnicity groups will be extended to consider the Hispanic population. Urban studies in America generally focus on making brief descriptive monographs that compare only the White versus Afro-American population (Small & Newman, 2001; Wratten, 1995). However, according to Aguilar (2016), the Hispanic population is the one with the highest growth projection: in 2016 it represented 17% of the total US population, situating this ethnic group as the first minority, above the Afro-Americans.

Results show that to the increase of city size correspond an increase in the well-being of the population, mostly driven by gains in income. Nonetheless, when considering specific ethnicities groups, findings show that benefits mostly arise only for the White ethnicity, while both Afro-American and (mainly) Hispanic are penalized in terms of benefits arising from agglomeration. Indeed, for these ethnicities returns to city size are generally negative. These results suggest evidence of segregation that make minorities not able to enjoy the gains from agglomeration in US cities.

The structure of the paper is organized in 3 sections. Section I, introduces the literature of reference. Section II, presents the empirical methodology, i.e. the definition of the Social Well-being Index as well as the estimation technique employed. Finally, Section III presents the descriptive statistics and results of the empirical analysis, while Section IV concludes.

Section I. Literature Review

1.1 Poverty

1.1.1 Concept

There is a wide debate on defining the concept of poverty as a more complex phenomenon, than merely absence of income or lack of money. Furthermore, its conceptualization has a significant impact on public policy. The main reference benchmarks conceptualize poverty as a situation of deprivation. Nonetheless, various definitions have been proposed.

On the first place, Townsend (1979) posits deprivation as a function of satisfiers: families are in a situation of poverty when they do not have the resources to access goods and services promoted by their belonging society. Second, due to the social nature of the human being, for Sen (1992) it is a function of *capabilities*: poverty is related with the inability to convert satisfiers into functional achievements. Finally, for Boltvinik (1992) it is a detailed function of coping with complex needs: a household is poor if it cannot satisfy both basic (satisfiers) and complex needs such as social interaction.

In general, poverty "[...] has no consensus in the bibliography, neither in conceptual terms nor in relation to the methodologies of its measurement." (Reyes & López, 2016). This is a relevant issue since the lack of consensus has lent itself to the existence of great subjectivity in the measurement (Townsend, 1979), with the related problems to determine poverty standards and strategies to eradicate it.

1.1.2 Absolut and Relative Poverty

To understand the concept of poverty in depth, it is necessary to approach it from the absolute and relative dimension. "The poor are those people whose consumption standards are below norms" (Sen, 1981, p. 9). However, these norms can be extremely minimalist. Rowntree (1901) considers poor people those with insufficient income to obtain at least the minimum basic goods that guarantee their physical efficiency, that is, subsistence wages. From this perspective as Giddens (2001) explained, if those needs are met by any means regardless of the way, then the poverty condition is overcome.

The main debate on absolute poverty is that "it does not consider the existence of social forms of satisfying needs, but only nominal satisfaction" (Calderón, 2016, p. 69). Consequently, recent studies focus on a relative dimension, incorporating acceptable conditions of well-being relative to the society as a whole.

More specifically, the establishment of thresholds of poverty are subject to the norms of what each society considers as acceptable: once identified, it is possible to verify whether they are satisfied or not, and to what extent. Julio Boltvinik (2005) identifies a main element within Townsend's relative definition: the poverty criteria as the lack of resources which excludes members of an

economy to participate in daily life activities. Hence, by knowing those activities, it is possible to establish minimum living standards.

To establish these minimums, it is essential to consider: 1) The diet, since the caloric requirement is not the same based on age and the work performed by a person, 2) The timing, needs are modified according to the century and even to the decade of a society, changes must be observed in the long term, as in the short term variations are technical rather than structural, 3) Territory, this last point refers to the rural and urban gaps.

Saith & Wazir (2009) and the Overseas Development Institute (2012) considered that *poverty* should be understood as a concept of very low minimums; *multidimensional poverty* introduces different characteristics that level up minimums standards; conversely, if the nature of the measurement posits the threshold on a high standard, then it is more suitable to use the concept of *Well-being*. Therefore, in Section II the methodology defines a well-being index and not a poverty indicator.

1.2 Urban Poverty

Ravallion (2017) argues that it is important to consider poverty variations among rural and urban areas, as their residents have different characteristics and needs, that makes it difficult to be analyzed it as a whole. According to the United Nations (2014) 54% of the world population resides in urban areas and this is expected to increase to 70% by 2050. As Judy Baker (2008) explains, the city represents a greater number of opportunities, particularly for people in poverty, who can find better job offers and the availability of services such as health and education with higher quality standards than in a rural environment.

Until a few decades ago, it was assumed that poverty in developing countries could be defused through urbanization (Wratten, 1995). This has caused that the proportion of poor living in urban areas increased rapidly (Ravallion, 2007). According to Amis (1995) urban poverty grew significantly in the 1970s and 1980s, mainly due to increasing food prices, decline of subsidies, and reduction of real wages.

Following Winchester (2008), although the urbanization process has improved some of the basic needs of the population, it hasn´t been capable to facilitate the eradication or substantial reduction

of poverty. Fan, Chen-Kang, & Mukherjee (2005) stated that urban poor face higher living costs, while, in the same vein, Amis (1995) and Wratten (1995) sustained that poverty is worse in cities, due to greater market dependence (World Bank, 2004). Under these circumstances, as Kessler and Di Virgilio (2008) express, a new academic and political interest raise over a new category of analysis, a new poverty that no longer belonged *to others*, **urban poverty** which is present even in the most important cities in the world.

Wratten (1995) points out that poverty in urban areas is more likely to develop several problems closely related to the city, these that can be grouped into four categories: 1) Environment and health risks: cities tend to have rapid industrial growth, as well as car congestion, which generates air, water and soil pollution; 2) Vulnerability derived from commercial exchange: people face a higher degree of commercialization of expensive products; 3) Social diversity and fragmentation: people who migrate to the city are not accompanied by their families, at least not in the short term; likewise there is a wide ethnic diversity in the urban context, which combined with more impersonal relationships, can create tension. 4) Vulnerability derived from State and police intervention, as De Soto (1992) explains: poor people generally perceive the State as a negative entity.

Different approaches can be found within urban poverty studies: they use a gender, territoriality, or multidimensional approach. In this investigation, the analysis will follow a multidimensional line; henceforth, the needs considered can be grouped into five categories: employment, income, housing, social security, and health.

Employment according to Amis (1995) is the most important variable related to urban poverty, as individual's subsistence depends on an effective salary or wage derived from its work. In the case of income, as reported by Townsend (1979) it is necessary to consider all sources of income and not just wage. On the other hand, Baker (2008) recognizes that regardless of the city, the urban poor face common deprivations affecting their health. Moreover, housing should contemplate particularities of construction materials, as well as the goods and services available at home (Calderon, 2015). In addition, this study analyzes the number of bedrooms and people living within the home, as overcrowding is a typical situation of poor households in urban areas (Baharaoglu & Kessides, 2002).

1.3 Agglomeration and Spillover effects

Based on empirical evidence, Ciccone and Hall (1993) indicate that high density areas share different advantages derived from spatial interactions such as spillover effects and pecuniary externalities. Mills and Mackinnon (1973) reinforce this idea by arguing that urban areas facilitate production and exchange, deriving into positive agglomeration effects, consequently, the rapid urbanization with its rising average city size is perceived as inevitable and beneficial for the economy (Graham,2009).

The New Economic Geography theory brought to table the idea of economic efficiency-related benefits of agglomeration, in the traditional NEG framework, centripetal forces, such as localized knowledge spill-overs, spatial sorting, pooled labor markets, and forward and backward linkages, make companies and people more productive if they concentrate in one area (Frick & Rodriguez, 2016).

Higher productivity might have both positive and negative effects on the population. On the one hand, higher productivity of bigger cities implies higher wages for workers (Henderson, 1974). For instance, De la Roca & Puga (2017) justify the existence of positive spatial externalities with three different explanations: First, there might be some static advantages associated with bigger cities. Secondly, workers who are inherently more productive may choose to locate in bigger cities. Thirdly, a key advantage of cities is that they facilitate experimentation and learning, providing workers with opportunities to accumulate more valuable knowledge. Other authors such as Martin and Ottaviano (2001), Fujita and Thisse (2003), and Handerson (2003) emphasizes the benefits of agglomeration and growing cities for economic growth. Similarly, urban economists as Duranton (2015) and Rosenthal & Stange (2004) stress the static and dynamic productivity gains from increased city size. Hence, intuitively we might consider that if city size has a positive impact on economic agents and variables, States should have an incentive to encourage cities to increase its magnitude.

On the other hand, it has been proved that people's productivity within a city does not rise *ad infinitum*, but follows an inverted U-shape function: productivity increases up to a certain threshold, after which congestion costs outweigh the benefits from agglomeration and decrease.

Williamson (1965) stressed that agglomeration only matters at early stages of development, when the infrastructure is limited. Those results concur with the theory of Krugman and Elizondo (1996) which indicates that agglomeration is more important to close economies as domestic transactions become more important the less a country trades with the rest of the world. Conclusively, Frick & Rodriguez (2016) showed that there is no universal positive relationship between the city size and economic growth. Despite the wealth of analysis, some important areas remain unstudied. Primary, most of the empirical research focuses in the effects on economic growth. This paper addresses the relationship with deprivation, thereby being more closely related to Obaco, Royuela, and Matano (2020).

Section II. Empirical Methodology

2.1 Data Source & Sample

This paper estimates and analyzes population´s well-being as well as city size effects on it in the United States of America, considering data for 130 Principal Cities[1] in 2006 and 2016. Information will be provided from the American Community Survey (ACS). According to the U.S Census Bureau (2009), this is a detailed source of demographic, social, economic, and housing information for the population of the United States of America. This survey is conducted on an annual basis, allowing a continuous flow of updated information for the states and communities in the country.

The ACS sample size is smaller than the one used for the Decennial Census. However, the U.S Census Bureau states that for areas with more than 65,000 inhabitants, there is a 95% reliability in annual data. For the empirical analysis we consider both males and females, aged over 18 who report positive values for total income. Moreover, households are clustered in five ethnic groups: White, Afro-American, Asian[2], Hispanic[3], and Other Ethnicities[4]

As stressed in the introduction, we are one of the few studies considering the Latino population, as it is now the largest minority in the country, which has captured researchers and public policy designer's attention. According to Fry (2008), the Hispanic population grew by 29% from 2001 to

[1] "A *Principal City* is any area with a population of 250,000 or more inhabitants. It includes the downtown area, as well as the surrounding densely settled area" (U.S. Census Bureau, 2009).
[2]This variable includes Chinese, Japanese, other Asians and Pacific Islanders.
[3] This variable includes the following sub-national groups: Mexicans, Puerto Ricans, Cubans, and other Latinos.
[4] This variable includes: Native Americans who identify with 2 or more races that are not specified.

2007, representing 15.1% of the total US population (Enchautegui, 1995). Within the ACS, Latinos are not considered to be a specific ethnicity, but respondents are asked if they have a Hispanic origin, in which someone is classified with ancestry, lineage, inheritance, or country of birth. Therefore, this work builds a new variable named Hispanic group, where the information required for its construction is extracted from the variable *race*, sub-classification *Other Races-Latino*.

Additional restrictions for the sample eliminate households with missing information in the variable of interest as well as observations below (above) the 1st (99th) percentile of household´s income distribution. Additionally, the cities that cannot be identified are dropped. Through these adjustments we will arrive to a final sample size constituted by over 298,000 observations in 2016 and 238,000 in 2006 that we use for our empirical analysis.

2.2 Empirical Analysis

2.2.1 Social Well-being Index

To build our main dependent variable, we use the Socioeconomic Well-Being Method (SWM) of Reyes and López (2016) that allows to identify living standards and population´s well-being. The method not only permits to estimate poverty but also social mobility and inequality. It has been used in studies of poverty, well-being and inequality for Mexico and Latin America (Reyes and López, 2016; Reyes, Teruel, and López, 2017; AUSJAL, 2017) as well as in works by the National Wage Commission (2015).

Through the SWM, it is possible to obtain the Socioeconomic Well-being Index (SWI) which is the result of the sum of two weighted sub-indexes: the first is the Unmet Needs Index (UNI) and the second is the Income Index (YI).[5] In order to define the index, we need to establish specific thresholds for each of the variables we take into account. The acceptable minimums are determined by the city´s average social conditions and current legal regulations. The SWM uses the method of distances proposed by Penna-Trapero (2009), and it is obtained by the normalized and adjusted

[5] To compute the income index, we will first deflate the variable income (expressed in terms of annual dollars) using the Consumer Price Index (base year 2009).

distance that each individual present in the variables with respect to the minimum threshold. The distance from the minimum acceptable value in each dimension is normalized by the standard deviation (most common measure of data dispersion) and adjusted by a factor explained below.

As for the first component of the index, the Unmet Needs Index is defined in Equation (1). It considers twenty-two variables described in Table A1 in the Appendix, which can be grouped in the following categories: housing, employment, social security, and health.

$$\boldsymbol{UNI_{ji}^{*} = \sum_{i=1}^{n} \left\{ \left(\frac{d_{ji}^{*}}{\sigma_i} \right) \left(1 - R_{i,i-1,i-2\ldots1}^{2} \right) \right\}} \qquad \boldsymbol{Eq.(1)}$$

Where:

$\boldsymbol{UNI_{ji}^{*}}$ is the sub index of Unmet Needs for household *j* in the values of each variable *i*.

$\boldsymbol{d_{ji}^{*} = (x_{ji} - \overline{x_i})}$ is the relative distance of each household *j* from the average value of each variable *i*.

$\boldsymbol{\sigma_i}$ is the standard deviation of each variable *i*.

$\boldsymbol{R_{i,i-1,i-2\ldots1}^{2}}$ is the coefficient of determination of X_i on X_{i-1}, $X_{i-2,}$ … X_1 representing the goodness of fit of the model to predict *Xi*. In other words, a linear regression of each UN variable must be performed on the others, to capture the level of determination of each variable by the others. As a consequence, $\boldsymbol{(1 - R_{i,i-1,i-2\ldots1}^{2})}$ is the adjustment factor that isolates the effects of each variable on the well-being. It reflects part of the variance of *Xi* not explained by the linear regression model. Subtracting the determination coefficient of the regression of each variable on the others implies isolating the effect of each variable in the construction of the UN sub-index.

The second component of the Socioeconomic Well-being index requires to estimate the Income Index (IY). Its construction uses the sum of different income sources described in Table A2 in the Appendix. The sub-index is defined as follow:

$$\boldsymbol{IY_j^{*} = \frac{d_j^{*}}{\sigma}} \qquad \boldsymbol{Eq.(2)}$$

Where:

$\boldsymbol{IY_j}$ is the Income sub-index for household *j*.

$\boldsymbol{d_j^{*} = (x_j - \bar{x})}$ is the distance of each household *j* with respect to the average income.

$\boldsymbol{\sigma}$ is the standard deviation of income.

Ultimately, the Social Well-being Index (SWI) is expressed as the sum of the two weighted sub-indexes, using Boltvinik´s (2010) weights, where it is assumed that income represents 50% of urban poverty participation.

$$\boldsymbol{SWI_{ji} = \sum_{i=1}^{n} (IY_j^* * w\_Y + UNI_{ji}^* * w\_UN)} \qquad \boldsymbol{Eq.(3)}$$

Where:

$\boldsymbol{SWI_{ji}}$ is the Social Well-being Index for household *j* in the values of each dimension *i*.

$\boldsymbol{IY_j^*}$ is the Income sub-index.

$\boldsymbol{w\_Y}$ is the weight of the income sub-index on the Well-being Index.

$\boldsymbol{UNI_{ji}^*}$ is the Unmet Needs sub-index.

$\boldsymbol{w\_UN}$ is the weight of the UN sub-index on the Well-being Index.

2.2.2 Instrumental Variable Estimation

In order to fulfill the objectives of this research, once the SWI is computed, we study how an increase in the size of the city affects population´s well-being. The analysis considers 130 cities in United States where complete information is available. We follow a one-step estimation strategy (Frick & Rodriguez, 2016; Matano & Naticchioni, 2012) where we perform an OLS estimation with the well-being index regressed on a set of household characteristics, dummy variables, and the city density[6]. In particular, the empirical model is given by the following equation:

$$\boldsymbol{SWI_{i,p,t} = \alpha + \beta_1 Log\_density_{pt} + \Sigma_{i=1}^{k} \beta_i X + \varphi_{ipt}} \qquad \boldsymbol{Eq.(4)}$$

Where:

$\boldsymbol{SWI_{i,p,t}}$ is the Socioeconomic Well-being Index of household *i*, in city *p*, at time *t.*

$\boldsymbol{Log\_density_{pt}}$ is the log of urban density (population per square mile) in city *p*, at time *t*.

$\boldsymbol{X}$ is a vector of household´s characteristics including: age, age squared, gender, ethnicity, education (years of schooling), occupation and industry dummies[7].

$\boldsymbol{\varphi_{ipt}}$ is the error term of household *i*, in city *p*, at period *t.*

[6] Results are very similar by a two-step strategy.
[7] Occupation is categorized into 26 categories, while industry into 13 categories.

However, the OLS estimation of this model might be biased. There are two possible sources of endogeneity. The first one is related to the spatial sorting of workers. To consider this endogeneity problem we should have the availability of longitudinal data that would allow to control for unobserved individual heterogeneity. However, in this specific case we do not have such information available, and therefore we try to alleviate this concern by introducing a detail set of individual observable characteristics as in Duranton (2016). Nonetheless, we claim to take the results with some caution since this source of endogeneity might be not entirely ruled out. Secondly, there might be a problem of endogeneity concerning simultaneity in location choice and wage offers (for the component related to income), or more in general with household well-being.

As a solution to the problem, we use an instrumental variable technique (Combes et al., 2008; Matano et al., 2020), relying on the use of historical value of population as instrument. We will employ city population in the 1980. The idea is that it is correlated with current density, but it should not be correlated with household Well-being today due to the strong changes in migration flows and city characteristics occurred from the 1980s until today (Wilson, 1987; Amis 1995).

Section III.

3.1 Descriptive Statistics

United States is an interesting case of study as it is a developed country with more than one hundred principal cities, the average city population ranged around 2.5 million inhabitants between 2006 and 2011. In the following years average population grew up to 3.1 million in 2016, the increase was mainly attributed to the biggest cities (percentile 90), with a positive variation of 3.9% in a period of ten years. The numbers are consistent in terms of density: Figure A1 in the Appendix shows that city size increased from a mean of approximately 17,000 inhabitants per square mile in 2006 to 20,000 in 2016. In terms of ethnicity composition, consistently with previous literature, statistics showed that Hispanic population is the largest minority in the sample, accounting for 25.3% of the total population in 2016, this confirms the argument to extend the ethnic groups considered on current American analyses.

Table 1 displays descriptive statistics of the Income Index, Unmet Needs Index, and the Socioeconomic Well-being Index for 2006 and 2016. Moreover, information is sub-organized for

the five ethnicities considered in this paper. The Well-being Index ranges from -8.12 to 12.78 in 2006, where households having a value < 0 are under deprivation as they are below the minimum threshold determined by the average household characteristics of each city in each year. The two other components follow the same reasoning.

It is possible to observe that overall, well-being improves in a decade for all of the ethnicities as the proportion of households under deprivation goes down from 47.57% in 2006 to 40.68% in 2016. However, in the case of the UNI, although the percentage of people deprived has decreased, the mean has also decreased across 10 years, hence the standard living has been worsened. As it was expected whites perceived the maximum values, nevertheless, it is important to mention that Hispanics went from a positive well-being average of 0.038 in 2006 to a negative average of -0.017 in 2016, meaning that conditions for this group have deteriorated. Likewise, although the proportion of Afro-American households under deprivation decreases 4.16%, their average well-being remains negative.

In both sub-indexes, Hispanics and Afro-Americans are the groups with the highest proportion of households under deprivation with respect to their own group. Although, it is important to distinguish that, while Afro-Americans are worse off in material deprivation with an average value of -0.34, Hispanics are poorer in terms of income with 80.18% of the households under deprivation and mean index of -0.21.

Deprivation in a lapse of 10 years, reflects an impoverishment for households in terms of Income, only 31.70% of them are capable to surpass the income threshold; conversely, UNI shows that less than 38% of the sample suffers deprivation. Clearly, statistics demonstrate that deprivation in cities is harder in terms of income than in housing, employment, health, and social security characteristics, henceforth, the role of cities do provide better material living conditions for inhabitants in these regions.

Table 1. Descriptive Statistics of the indexes

	Year 2006					Year 2016				
	Mean	**Std.Dev**	**Minimum**	**Maximum**	**Deprivation**	**Mean**	**Std.Dev**	**Minimum**	**Maximum**	**Deprivation**
Well-being Index	0.008	1.03	-8.12	12.78	47.57%	0.005	1.48	-7.93	11.34	40.68%
White	0.068	1.10	-8.12	12.78	46.04%	0.127	1.55	-7.80	11.34	35.73%
African American	-0.153	1.05	-7.47	7.52	52.99%	-0.254	1.55	-7.93	10.58	48.83%
Hispanic	0.038	0.88	-8.12	8.06	45.64%	-0.017	1.33	-7.75	10.69	42.91%
Asian	0.039	0.94	-6.74	8.84	46.82%	0.054	1.34	-7.69	7.68	40.76%
Other Race	-0.112	1.05	-7.87	6.70	51.10%	0.015	1.41	-7.93	6.91	37.80%
Income Index	0.000	1.00	-1.18	25.40	67.07%	0.000	1.00	-0.89	20.69	68.30%
White	0.243	1.28	-1.18	25.40	55.22%	0.231	1.27	-0.80	18.01	56.59%
African American	-0.184	0.61	-0.95	14.08	74.58%	-0.166	0.68	-0.89	20.69	75.45%
Hispanic	-0.248	0.55	-0.93	12.99	80.51%	-0.215	0.59	-0.87	18.98	80.18%
Asian	-0.068	0.87	-0.96	16.44	70.11%	-0.049	0.92	-0.87	14.09	71.11%
Other Race	-0.194	0.74	-0.77	11.45	76.02%	-0.167	0.80	-0.75	11.93	75.66%
Unmet Needs Index	0.016	1.74	-15.59	10.67	43.91%	0.010	2.65	-15.23	9.30	37.68%
White	-0.107	1.67	-15.59	9.17	47.22%	0.023	2.62	-14.97	7.43	35.39%
African American	-0.123	1.94	-14.28	10.67	46.47%	-0.341	2.93	-15.23	9.30	44.62%
Hispanic	0.323	1.64	-15.59	7.39	36.31%	0.181	2.54	-14.96	8.13	37.19%
Asian	0.146	1.63	-12.87	7.71	42.14%	0.157	2.39	-14.80	7.62	36.70%
Other Race	-0.031	1.92	-15.08	7.08	42.91%	0.197	2.63	-15.23	6.66	31.97%

Note: Households under deprivation have an index value < 0. Percentages of total deprivation are computed with respect to the total population of the cities. Percentages of deprivation for ethnicities are computed with respect to the population of its own group and not the total.

3.2 Results

3.2.1 Ordinary Least Square Regression

Results of equation (4) are displayed in Table 2. Columns (1) to (3) show the results for 2006, while columns (4) to (6) show the results for 2016. Moreover, columns (1) and (4) present the result for the total Socioeconomic Well-being Index, while columns (2) and (5) show the results for the Income Index component, and (3) and (6) for the Unmet Needs component.

In particular, it is possible to observe that gender is an important factor for well-being specially in 2006, where been female reduces by -0.12 points the index, despite of the fact that in 2016 it decreases to -0.04. Moreover, in both years the coefficient´s impact is larger in terms of income deprivation, consistently with Haynie and Gorman (1999) whom explained that the risk of been poor in USA is higher for women, as female workers frequently earned the lowest wages (Albelda and Carr, 2014; Levine and McPherran, 2013).

The age trend shows that elderly household members are associated with lower levels of well-being. Nonetheless the relation is positive for the Income Index: an explanation for this is that usually higher wages are associated with positions that required a certain level of seniority (Altonji and Shakotko, 1987). Moreover, as expected, education has a significant and positive effect for the well-being index.

Although the log of density has a positive effect on the Income Index, it has a significant and negative role for Well-being and material deprivation, which diverse to the hypothesis of this paper. In particular, coefficient estimates for well-being are -0.018 in 2006 and -0.057 in 2016, pointing out that at the increase of city size in America, population´s well-being is deteriorated.

Table 2. Ordinary Least Squares Regression

	OLS					
	Year 2006			Year 2016		
Variables	SWI	Income Index	UN Index	SWI	Income Index	UN Index
Log Density	-0.018***	0.013***	-0.049***	-0.057***	0.014***	-0.128***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.005)
Female dummy	-0.125***	-0.233***	-0.017**	-0.044***	-0.189***	0.100***
	(0.004)	(0.003)	(0.006)	(0.006)	(0.003)	(0.010)
Education	0.001**	0.050***	-0.048***	0.006***	0.040***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Age	-0.013***	0.004***	-0.030***	-0.028***	0.004***	-0.061***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
Age2	0.0001***	2.3E-05***	0.0002***	0.0002***	0.00002***	0.0004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.294***	-0.446***	1.033***	0.678***	-0.513***	1.868***
	(0.016)	(0.015)	(0.028)	(0.027)	(0.017)	(0.049)
Ethnicity dummies	Yes	Yes	Yes	Yes	Yes	Yes
Occupation dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	238,841	238,841	238,841	298,177	298,177	298,177
R-squared	0.126	0.330	0.086	0.123	0.292	0.085

Note: Robust Standard errors in parentheses, ***p<.01, **p<.05, *p<.1. All specifications include a constant term.

Abbreviations: OLS, ordinary least squares; SWI, social well-being index; UN, unmet needs.

3.2.2 Instrumental Variables Regression

As stressed in the empirical methodology section, we have to address the likely endogeneity of the relationship analyzed by performing an IV estimation since OLS estimates might be biased. Table 3 reports the instrumental variable estimates of our model, for the SWI in 2006 and 2016, as well as for its components. First of all, it is possible to check that the instrument, city population in 1980, is not weak for any of the specifications since the first step F-value is well above the threshold of 10 in order for the instrument to be not weak.

IV results show that endogeneity strongly matters, since coefficient estimates significantly change in the IV estimations. In particular, the impact of density on household's well-being is now positive and significant: coefficient estimates are 0.015 in 2006 and 0.025 in 2016. Also, while in 2006 the impact is similar with respect to each of the two components, in 2016 it increases and has a stronger influence for the Income index. Hence, once having taken into account the endogeneity of the analyzed relationship, cities turn out to improve general household well-being, and in particular improve the chances to get higher income, with respect to meet needs.

Table 3. Instrumental Variables Regression.

	IV					
	Year 2006			Year 2016		
Variables	**SWI**	**Income Index**	**UN Index**	**SWI**	**Income Index**	**UN Index**
Log Density	0.015***	0.017***	0.014***	0.025***	0.030***	0.019***
	(0.002)	(0.002)	(0.004)	(0.003)	(0.002)	(0.006)
Female dummy	-0.124***	-0.233***	-0.016**	-0.043***	-0.189***	0.102***
	(0.004)	(0.003)	(0.006)	(0.006)	(0.003)	(0.010)
Education	0.0001**	0.050***	-0.050***	0.004***	0.040***	-0.031***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Age	-0.013***	0.004***	-0.030***	-0.028***	0.004***	-0.061***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
Age2	9.4E-05***	2.3E-05***	0.0001***	0.0002***	1.9E-05***	1.5E-05***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Constant	-0.002***	-0.476***	0.471***	-0.079***	-0.666***	0.508***
	(0.020)	(0.017)	(0.034)	(0.033)	(0.020)	(0.061)
Ethnicity dummies	Yes	Yes	Yes	Yes	Yes	Yes
Occupation dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	238,841	238,841	238,841	298,177	298,177	298,177
R-squared	0.125	0.330	0.084	0.120	0.292	0.082
Weak identification test (F value)	5.70E+05	5.70E+05	5.70E+05	3.90E+05	3.90E+05	3.90E+05

Note: Robust Standard errors in parentheses, ***p<.01, **p<.05, *p<.1. All specifications include a constant term. IV instrument is city population in 1980. Abbreviations: IV, instrumental variables; SWI, social well-being index; UN, unmet needs.

Next, we repeat the IV estimations by specific ethnic groups. The idea is to test heterogeneity in the return of well-being with respect to city size. Hence, IV estimates are performed separately for the three main ethnic groups in America (White, Afro-Americans, and Hispanic). Table 4 shows results for the Socioeconomic Well-being Index, while Table A3 and A4 in the Appendix for its two components, respectively.

Results demonstrated that an increase in the density of the city significantly improves the well-being in 2006 for whites (0.039), while it impoverishes the situation of Afro-Americans (-0-005) and Hispanics (-0.013). This condition became even more serious 10 years later, as coefficients for the two minorities double the negative impact. Despite of the fact that Table A3 shows a significant and positive effect on income for both Afro-Americans and Whites, its undeniable that the effect its larger for White households (0.066). Moreover, it is negative for Hispanics (-0.009). Furthermore, parameters in Table A4 provide evidence that in terms of deprivation by needs, the impact is negative for the two minorities and becomes higher in 2016. Findings suggest that agglomeration effects on households' well-being are heterogeneous and provide benefits for only the White ethnicity, while both Afro-Americans and, mostly Hispanic households, do not seem to be able to reach the benefits from agglomeration externalities. This might be due to form of segregation for these ethnic groups (Enchautegui, 1995) which still stands in the US.

Table 4. IV Socioeconomic Well-being Index by ethnicity

	IV SWI					
	Year 2006			Year 2016		
Variables	White	African American	Hispanic	White	African American	Hispanic
Log Density	0.039***	-0.005*	-0.013***	0.032***	-0.014**	-0.024***
	(0.003)	(0.005)	(0.004)	(0.005)	(0.008)	(0.007)
Female Dummy	-0.230***	-0.041***	-0.054***	-0.159***	-0.155***	0.014
	(0.006)	(0.008)	(0.006)	(0.009)	(0.013)	(0.010)
Educ	0.006***	0.016***	-0.015***	0.011***	0.035***	0.005*
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Age	0.0004	-0.034***	-0.019***	-0.011***	-0.064***	-0.031***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Age2	-3.9E-05***	0.0003***	0.0001***	5.42E-05***	0.0006***	0.0002***
	(7.96E-06)	(1.24E-05)	(9.82E-06)	(1.36E-05)	(1.8E-05)	(1.58E-05)
Constant	-0.274***	0.068***	0.326***	-0.273***	0.133***	0.455***
	(0.031)	(0.045)	(0.036)	(0.051)	(0.080)	(0.066)
Occupation dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	125,417	45,558	57,752	125,386	59,393	73,980
R-squared	0.16	0.10	0.10	0.14	0.13	0.10
Weak identification test (F value)	2.40E+05	1.20E+05	1.70E+05	1.80E+05	9.10E+04	1.10E+05

Note: Robust Standard errors in parentheses, ***p<.01, **p<.05, *p<.1. All specifications include a constant term. IV instrument is city population in 1980. Abbreviations: IV, instrumental variables; SWI, social well-being index.

Section IV.

4. Conclusions

This work analyses the relationship between the size of the city and its effects on the household´s well-being for 130 principal cities in United States from 2006 and 2016, as well as the heterogenous agglomeration effects across ethnicities. To establish the linkages between those two variables we have built an overall of indicator of Socioeconomic Well-being, that embodies a multidimensional approach of deprivation: it is composed by an Income Index that covers all sources of income at the household level, and an Unmet Needs Index that consider employment, health, social security, and housing characteristics..

After having taken into account endogeneity and sorting along observable individual characteristics, findings have shown the following. First of all, an increase in cities' density has a positive effect on the well-being of American households, with higher impact in terms of Income compared to Unmet Needs. Also, this positive and significant effects are larger a decade after 2006.

Secondly, the analysis by ethnicities indicate significant heterogeneity in the uncovered impacts. In particular, general results are valid only for White households. Findings for Afro-Americans show penalization in terms of Unmet Needs, while those for Hispanic households' concern penalization with respect to both Income and Needs. Hence, these results seem to point out evidence of segregation along ethnic groups that cause minorities not being able to reach the benefits entailed by agglomeration externalities. Nonetheless, it must be taken into account that part of this penalization might be due to sorting into unobservable characteristics that we could not rule out in this empirical analysis.

On the light of these evidence, one of the attempts of this paper is to provide useful information for public policy designers, as deprivations varies among ethnicities, programs should be more focalized to the type of deprivation that most afflict each group. Furthermore, governments must be cautious when encouraging cities to increase its size as it might impoverish certain groups.

The analysis opens several avenues for future research. In order to better understand how city size affects well-being, it would be ideal to re-estimate the minimum thresholds based on the expertise

of other areas (i.e. architects, lawyers). Furthermore, the SWI should extend the analysis to food deprivation. Secondly, the availability of longitudinal data would allow to address more properly the relationship analyzed, by shedding light on the role of sorting into unobservable characteristics. Finally, the relationship might be analyzed considering city congestion, i.e. whether there exist decreasing returns to well-being after a certain threshold of city size is reached.

References

Aguilar, R. (2016) La primera Minoria de Estados Unidos. Retrieved from: https://www.cronista.com/ripe/La-primera-minoria-de-Estados-Unidos-20161020-0054.html

Albelda, R. & Carr, M. (2014). Double Trouble: US Low-Wage and Low-Income Workers, 1979-2011. *Journal of Feminist Economics*.

Amis, P. (1995). Making sense of urban poverty. *Environment and Urbanization*, *7*(1), 145-158.

Baharoglu, D., & Kessides, C. (2001). Urban poverty. *Poverty Reduction Strategy Paper (PRSP) Sourcebook*.

Boltvinik, J. (1992). El método de medición integrada de la pobreza. Una propuesta para su desarrollo. *Comercio Exterior*, *42*(4), 354-365.

Boltvinik, J. (2005). Ampliar la mirada: Un nuevo enfoque de la pobreza y el florecimiento humano (tesis doctoral). *Guadalajara: Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS)-Occidente*.

Brewer, M., Goodman, A., & Leicester, A. (2006). Household spending in Britain: what can it teach us about poverty?. *The Policy Press*

Calderón, M. (2015) Normas Sociales y Umbrales de Pobreza. *Acta Sociológica*, 70, 73-98.

Calderón, M. (2016) En busca del umbral de pobreza. Estructura social de las normas de satisfación mínima de las necesidades humanas (tesis doctoral). Ciudad de México. El *Colegio de México (COLMEX).*

Centro de Noticias ONU. (2014). Más de la mitad de la población vive en áreas urbanas y seguirá creciendo. junio 26,2018. Retrieved from: http://www.un.org/es/development/desa/news/population/world-urbanization-prospects-2014.html

Ciccone, A., & Hall, R. (1996). Productivity and the Density of Economic Activity. *The American Economic Review*, *86*(1), 54-70. Retrieved June 16, 2020, from www.jstor.org/stable/2118255

Combes, P. P., Duranton, G., & Gobillon, L. (2008). Spatial wage disparities: Sorting matters. *Journal of Urban Economics*, 63(1), 723–742.

De Soto, Hernando (1992). Combating urban poverty in Latin America: the Peruvian case. *Ministry of Foreign Affairs*, The Hague, pages 31–38.

Duranton, G. 2015. Growing through Cities in Developing Countries. *World Bank Research Observer* 30 (1):39-73.

Elizondo, R., & Krugman, P. (1992) Trade Policy and the Third World Metropolis. NBER Working Papers 4238, *National Bureau of Economic Research, Inc*.

Enchautegui, M. E. (1995). Policy Implications of Latino Poverty.

Fan, S., Chen-Kang, C., & Mukherjee, A. (2005). Rural and urban dynamics and poverty: Evidence from China and India. Washington, DC, USA: IFPRI.

Fry, R. (2008) Latino Settlement in the New Century. Washington, DC: *Pew Hispanic Center*.

Fujita, Masahisa & Thisse, Jacques-Francois. (2003). Does Geographical Agglomeration Foster Economic Growth? And Who Gains and Loses from It?. *The Japanese Economic Review*. 54. 121-145. 10.1111/1468-5876.00250.

Haynie, D. & Gorman, B. (1999). A Gendered Context of Opportunity: Determinants of Poderte across Urban and Rural Labor Markets. *Sociological Society.*

Henderson, J. (1974). The Sizes and Types of Cities. *The American Economic Review, 64*(4), 640-656. Retrieved, from: www.jstor.org/stable/1813316

Henderson, V. The Urbanization Process and Economic Growth: The So-What Question. *Journal of Economic Growth* 8**,** 47–71 (2003). https://doi.org/10.1023/A:1022860800744

Jorge De La Roca, Diego Puga, Learning by Working in Big Cities, *The Review of Economic Studies*, Volume 84, Issue 1, January 2017, Pages 106–142, https://doi.org/10.1093/restud/rdw031

Judy, B. (2008). Urban Poverty: A Global View. *Washington, DC: The World Bank.*

Kessler, G., & Di Virgilio, M. M. (2008). La nueva pobreza urbana: dinámica global, regional y argentina en las últimas dos décadas. *Revista de la CEPAL*.

Levine, R. & McPherran, C. (2013). Low-Income Women's Employment Experiences and Their Financial, Personal, and Family Well-Being. *Journal of Family Phycology.*

Martin, P. and Ottaviano, G.I.P. (2001), Growth and Agglomeration. International Economic Review, 42: 947-968. doi:10.1111/1468-2354.00141

Matano A, Obaco M, Royuela V. What drives the spatial wage premium in formal and informal labor markets? The case of Ecuador. *J Regional Sci*. 2020;1–25. https://doi.org/10.1111/jors.12486

Matano, A., & Naticchioni, P. (2012). Wage distribution and the spatial sorting of workers. *Journal of Economic Geography*, 12(2), 379–408.

McGregor, A. Coulthard, S. & Camfield, L. (2015) Measuring what matters: the role of well-being methods in development policy and practice. Working Paper. *Overseas Development Institute*.

Melo, P., Graham, D. J,. & Noland, R. B. (2009) A meta-analysis of estimates of urban agglomeration economies. *Regional Science and Urban Economics*, Elsevier, vol. 39(3), pages 332-342.

Mills, E., & MacKinnon, J. (1973). Notes on the New Urban Economics. *The Bell Journal of Economics and Management Science, 4*(2), 593-601. doi:10.2307/3003054

Observatorio de Salarios (2015). *Informe 2015 del Observaotrio de Salarios. Medición de la pobreza y niveles de vida*. Puebla: *Universidad Iberoamericana Puebla*

Oliver E. Williamson, A. (1965) Dynamic Theory of Interfirm Behavior, *The Quarterly Journal of Economics*, Volume 79, pp. 579–607, https://doi.org/10.2307/1880653

Pena-Trapero, B. (2009) La Medición del Bienestar Social: Una revisión Crítica. *Universidad de Alcalá, Estudios de Economía Aplicada* (Vol.27-1, pp.299-324)

Ravallion, M. (2017). Poverty comparisons. *Routledge*.

Reyes, M., & López, M. (2016). El Método de Bienestar Socioeconómico (MBS) como alternativa para la medición multidimensional de la pobreza: una visión desde los salarios. *Acta Sociológica, 70*, 245-270.

Reyes, M., Teruel, G. and López, M. (2017), Measuring True Income Inequality in Mexico. Latin American Policy, 8: 127–148. doi:10.1111/lamp.12111

Rosenthal, S. S., & Strange, W. C. (2004). Evidence on the nature and sources of agglomeration economies. In J. V. Henderson & J.-F. Thisse (Eds.), *Handbook of regional and urban economics* (Vol. 4, pp. 2119–2171). Amsterdam: Elsevier- North-Holland.

Rowntree, B. S. (1901). Poverty: A study of town life. *Macmillan.*

Saith, A, & Wazir, R. (2009). From Poverty to Wellbeing: Alternative Approaches to the Recognition of Child Deprivation in India. *Unicef and Institute of Human Development*. Retrieved from http://hdl.handle.net/1765/18422

Sen, A. (1981). Poverty and famines: an essay on entitlement and deprivation. *Oxford University Press*.

Sen, A. (1992). Sobre conceptos y medidas de pobreza. *Comercio exterior*, *42*(4), 310-322.

Sen, A., & Foster, J. E. (1973). On economic inequality. *Oxford University Press.*

Small, M. L., & Newman, K. (2001). Urban poverty after the truly disadvantaged: The rediscovery of the family, the neighborhood, and culture. *Annual Review of sociology*, *27*(1), 23-45.

Susanne A. Frick, Andrés Rodríguez-Pose, Average city size and economic growth, *Cambridge Journal of Regions, Economy and Society*, Volume 9, Issue 2, July 2016, Pages 301–318, https://doi.org/10.1093/cjres/rsw013

The World Bank. (2004). The urban poor in Latin America. *Report Nº 30465. Finance, Private Sector and Infrastructure Management Unit, Latin America and the Caribbean Region*.

Townsend, P. (1979). Poverty in the United Kingdom: a survey of household resources and standards of living. *Univ of California Press.*

U.S. Census Bureau. (2009) A Compass for Understanding and Using American Community Survey Data: What General Data Users Need to Know. *U.S. Washington, DC: Government Printing Office*.

Vilagrasa, J. (2000). Los debates sobre pobreza urbana y segregación social en Estados Unidos. *Scripta Nova: revista electrónica de geografía y ciencias sociales*, *4*.

Wilson, W. J. (1987). The Truly Disadvantaged: the Inner City, the Underclass and Public Policy. *University of Chicago Press.*

Winchester, L. (2008). La dimensión económica de la pobreza y precariedad urbana en las ciudades latinoamericanas: Implicaciones para las políticas del hábitat. *EURE (Santiago)*, *34*(103), 27-47.

Wratten, E. (1995). Conceptualizing urban poverty. *Environment and urbanization*, *7*(1), 11-38.

Appendix

Table A1. Variables for Sub-index UNI

Variable	Category	Description	Availability
Tenure	Housing	This variable establishes whether the home is owned or rented.	2006, 2016
Kitchen	Housing	This variable determines if the house has all the kitchen facilities.	2006, 2016
Fridge	Housing	Establish if the house has fridge.	2016
Sink	Housing	The variable establishes whether the house has a sink.	2016
Stove	Housing	The variable establishes whether the house has a stove.	2016
Bedrooms	Housing	Number of rooms in the house	2006, 2016.
Sewage	Housing	This variable establishes if the house has a complete pipe installation.	2006, 2016.
Shower	Housing	This variable establishes whether the house has a shower.	2016
Piped water	Housing	This variable explains if there is drinkable water in the home.	2016
Telephone	Housing	If the house has a telephone.	2006, 2016
Internet	Housing	If there is an internet connection.	2016
Computer	Housing	If there is at least one computer equipment (PC, laptop) at home.	2016
Smartphone	Housing	If the individual has a Smartphone.	2016
Tablet	Housing	If there is at least one tablet in the house.	2016
Vehicles	Housing	Reports the number of cars, suvs, and trucks with a ton capacity or less that are kept in the home for use by household members.	2006, 2016
Overcrowding	Housing	Sets the number of people who use a bedroom.	2006, 2016
Private Health Coverage	Health insurance	Indicates whether people had private health insurance coverage. The U.S Census Bureau classifies as private coverage. 1. Insurance provided by the employer or by the union. 2. Plans purchased by individuals from private insurance companies. 3. Other military health services.	2016
Public Health Coverage	Health insurance	Indicates whether people had public health insurance coverage. The U.S Census Bureau classifies as public coverage: 1. Medicare 2. Medicaid 3. Insurance from the Department of Veterans Affairs.	2016
Employment Status	Employment	Indicates if the respondent is part of the Economically Active Population, and if he is currently unemployed or working.	2006,2016.
Retirement income	Social security	Establishes if the individual receives any retirement, disability or survival pension.	2006, 2016.
Social security income	Social security	Determines if the individual receives any social security pension.	2006, 2016.
Welfare income	Social security	Indicates if the respondent receives any public assistance program, usually referred to as "welfare".	2006, 2016.

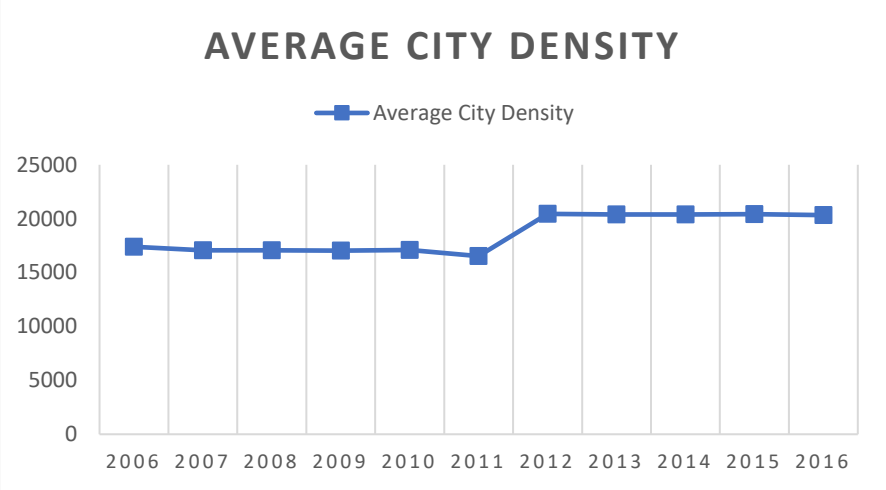
Note: information provided by IPUMS 2020

Table A2. Variables for Sub-index IY

Variable	Category	Description	Universe
Income from employment	Income	This includes wages, salaries, commissions, cash bonuses, tips, and other monetary income received from an employer.	2006, 2016
Investment Income	Income	Contains income from assets, hedge funds, interest, dividends, royalties, and rents.	2006, 2016
Other Income	Income	Includes income that was not classified in any of the subcategories above.	2006, 2016

Note: information provided by IPUMS 2020

Figure A1. Average city density 2006-2016



Note: information provided by IPUMS 2020

Table A3. IV Income Index by ethnicity

	IV Income Index					
	Year 2006			Year 2016		
Variables	White	African American	Hispanic	White	African American	Hispanic
Log Density	0.039***	0.004**	-0.006***	0.066***	0.007**	-0.009***
	(0.004)	(0.002)	(0.002)	(0.004)	(0.003)	(0.003)
Female Dummy	-0.364***	-0.071***	-0.123***	-0.297***	-0.054***	-0.106***
	(0.006)	(0.004)	(0.004)	(0.007)	(0.005)	(0.004)
Educ	0.065***	0.040***	0.025***	0.050***	0.032***	0.024***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Age	0.007***	0.002***	0.003***	0.010***	0.001***	0.002***
	(0.001)	(0.0004)	(0.0003)	(0.001)	(0.0005)	(0.0003)
Age2	-1.08E-06	2.88E-05***	1.52E-05***	-2.5E-05***	4.17E-05***	2.61E-05***
	(6.11E-06)	(4.43E-06)	(3.89E-06)	(6.88E-06)	(5.61E-06)	(4.39E-06)
Constant	-0.689***	-0.639***	-0.410***	-1.061***	-0.668***	-0.401***
	(0.034)	(0.020)	(0.019)	(0.039)	(0.029)	(0.025)
Occupation dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	125,417	45,558	57,752	125,386	59,393	73,980
R-squared	0.30	0.37	0.38	0.27	0.26	0.32
Weak identification test (F value)	2.40E+05	1.40E+05	1.70E+05	1.80E+05	9.10E+04	1.10E+05

Note: Robust Standard errors in parentheses, ***p<.01, **p<.05, *p<.1. All specifications include a constant term. IV instrument is city population in 1980.
Abbreviations: IV, instrumental variables.

Table A4. IV Unmet Needs Index by ethnicity

	IV Unmet Needs Index					
	Year 2006			Year 2016		
Variables	**White**	**African American**	**Hispanic**	**White**	**African American**	**Hispanic**
Log Density	0.039***	-0.014*	-0.021***	0.002***	-0.035***	-0.038***
	(0.005)	(0.009)	(0.007)	(0.009)	(0.016)	(0.013)
Female Dummy	-0.096***	0.153***	0.016***	-0.003***	0.365***	0.135***
	(0.009)	(0.015)	(0.012)	(0.015)	(0.025)	(0.020)
Educ	0.005***	0.001***	-0.055***	0.029***	0.038***	-0.035***
	(0.002)	(0.004)	(0.003)	(0.004)	(0.006)	(0.004)
Age	-0.008***	-0.070***	-0.040***	-0.031***	-0.129***	-0.063***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Age2	-7.6E-05***	0.001***	0.0003***	0.0001***	0.001***	0.0004***
	(1.4E-05)	2.37E-05	(1.89E-05)	(2.51E-05)	(3.46E-05)	(3.08E-05)
Constant	0.140***	0.775***	1.063***	0.516***	0.933***	1.311***
	(0.049)	(0.086)	(0.068)	(0.090)	(0.153)	(0.127)
Occupation dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	125,417	45,558	57,752	125,386	59,393	73,980
R-squared	0.10	0.10	0.10	0.10	0.11	0.10
Weak identification test (F value)	2.40E+05	1.40E+05	1.70E+05	1.80E+05	9.10E+04	1.10E+05

Note: Robust Standard errors in parentheses, ***p<.01, **p<.05, *p<.1. All specifications include a constant term. IV instrument is city population in 1980.
Abbreviations: UNI, Unmet Needs Index.