Communities, Culture, and Capabilities:
Preliminary results of a four-city study

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Since its inception in 1994, the University of Pennsylvania's Social Impact of the Arts Project (SIAP) has worked to develop methods and data to study how the arts and culture influence urban neighborhoods. Over the years, SIAP has documented the relationship between the arts and culture and a variety of social benefits, including child welfare outcomes, reductions in neighborhood conflict, and community economic development.[1]

Beginning in 2009, SIAP engaged the capabilities approach as one possible way to link its findings to a broader understanding of social wellbeing. Instead of looking at the relationship between the arts and other factors willy-nilly, the capabilities approach (CA) provided a conceptual grounding for these results in the idea of social wellbeing. This engagement was hastened by the publication of the Sen/Stiglitz report, which proposed the most fully articulated system for operationalizing wellbeing.[2]

However, SIAP's engagement with CA was hampered in a number of ways. First, SIAP's primary approach to the study of arts and society is based on the use of *ecological data* focused on urban neighborhoods (typically a few city blocks aggregated into a *census block group)*, whereas most empirical work on CA has focused on national-level data. Second, although much of the theoretical work on CA focuses on the role of governmental, non-governmental, and informal networks in furthering or blocking opportunities, the empirical data have focused on the role of government and the private economy at the national level in achieving wellbeing. After all, although one's informal social networks might play a critical role, say, in assuring that someone with a chronic condition achieves a healthy lifestyle, it would be difficult to measure this effect at the national level.

These two weaknesses are related. To understand how a neighborhood improves the life-chances of its residents, one needs to simultaneously examine multiple dimensions and multiple levels. Certainly, the structure of welfare programs plays a role in the ability of a young mother to be and do, so too do resources in her neighborhood and her informal social networks. As Robert Sampson's study of Chicago reminds us, we can best document and understand these social processes through a prolonged and intensive involvement with quantitative and qualitative data at both the neighborhood and citywide levels.[3]

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[1] For information on SIAP's past work, consult http://www.sp2.upenn.edu/SIAP.

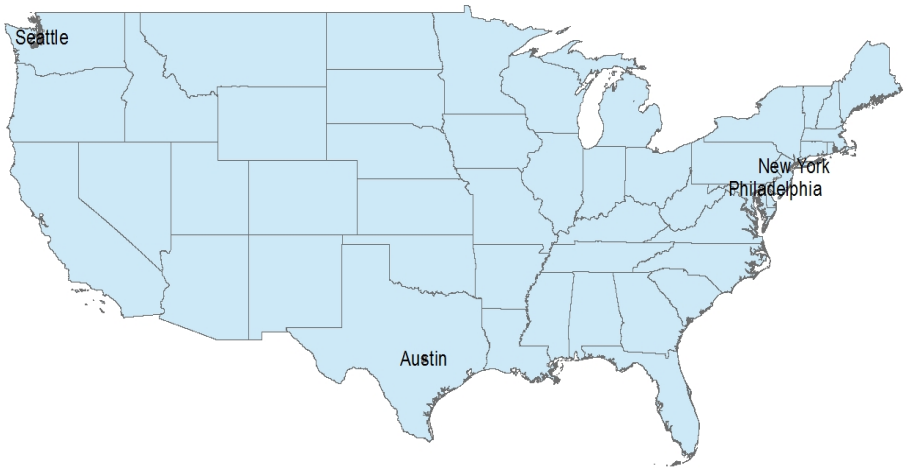
[2] Stiglitz, Joseph E., Amartya Sen, and Jean-Paul Fitoussi. "Report by the commission on the measurement of economic performance and social progress." (Paris: Commission on the Measurement of Economic Performance and Social Progress, 2010).

[3] Robert J Sampson, *Great American City: Chicago and the Enduring Neighborhood Effect* (University of Chicago Press, 2012).

In 2011, therefore, SIAP (in collaboration with The Reinvestment Fund (TRF), a community development financial institution) resolved to take the Sen/Stiglitz framework as its starting point and to develop multiple sub-indexes of wellbeing at a small urban geography for the city of Philadelphia. Working with undergraduate urban studies and graduate social work students over two years, the research team developed a set of sub-indexes at the census tract level for the city. The results of this effort were reported in two working papers, with Ira Goldstein, president of TRF's Policy Solutions unit.[4]

As we were conducting the initial research project, some of its flaws became apparent. First, the choice of census tracts was not optimal. Many of the factors we wished to measure varied considerably within a tract. As a result, the use of tracts obscured some of the variation in social conditions across the city. At the same time, the reliance on a single city raised questions about the generalizability of findings to other cities.

Based on these concerns, the research team resolved to expand the project, first, by calculating our sub-indexes at the block group level rather than census tract and, second, by expanding the number of cities studied. Currently, we are collecting data on four cities: Philadelphia (PA), New York (NY), Seattle (WA), and Austin (TX). Because the data gathering for the three new cities is not complete, this paper restricts itself to the revision of the data on Philadelphia.



We use these new data on Philadelphia to investigate the ways in which two capabilities—economic wellbeing and social connection—influence four others—social stress, personal health, school effectiveness, and security. Using multivariate analysis, we conclude that these four capabilities are influenced both by material standards of living and by the social connections fostered by cultural engagement.

[4] Stern, M.J. and Ira Goldstein. "Culture as a dimension of social wellbeing: Development of a neighborhood-based wellbeing index for Philadelphia" (2013); Stern, M.J. , S. C. Seifert, and I. Goldstein, "The geography of culture and social wellbeing: Patterns of advantage and disadvantage in Philadelphia neighborhoods "(2013). http://www.sp2.upenn.edu/siap/completed_projects/cultureblocks.html

The paper first discusses our conceptual framework and data and methods. It then examines how economic wellbeing and social connection influence other dimensions of wellbeing in Philadelphia. It concludes with a discussion of the implications of the findings for understanding the potential and the limits of social connections for addressing social inequality.

The findings reported here should be taken as preliminary. We've recently completed our first estimates of several sub-indexes, and as we refine the underlying data, some are likely to change.

CONCEPTUAL FRAMEWORK

As we've noted, the empirical work on the capabilities approach has paid relatively little attention to informal the contribution of informal social networks to wellbeing. Yet, there is a long tradition of studying the role of *social networks* in the survival strategies of the poor in the United States. This scholarship dates back at least to the early 20th century and was formally explicated in Bakke's work during the Great Depression of the 1930s.[5] In the United States, Carol Stack revived this stream of scholarship in the 1970s with her ethnographic study of low-income families and their friends and family.[6] In more recent times, Kathryn Edin and Robert Sampson and his associates have documented the role of kin, neighborhood, and non-geographic networks in these strategies.[7]

Our study uses ecological data, which limit our ability to examine individuals and families. We can, however, estimate the impact of neighborhood effects on our measures of social wellbeing.

This study engages as well the *social capital* literature that has flourished since the 1990s.[8] This literature focuses on how social networks are an asset that members of society can translate into other benefits, for example, finding an apartment or a job. Bourdieu's argument about the ability to *convert* one form of capital into another, although rarely acknowledged, informs much of this literature.[9]

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[5] Bakke, E. W. *Citizens without work: A study of the effects of unemployment upon the workers' social relations and practices (*Hamden, CT: Archon Books, 1968). Originally published in 1940. See O'Connor, Alice. *Poverty knowledge: Social science, social policy, and the poor in twentieth-century US history*. (Princeton: Princeton University Press, 2009) on the intellectual history of poverty in the US.

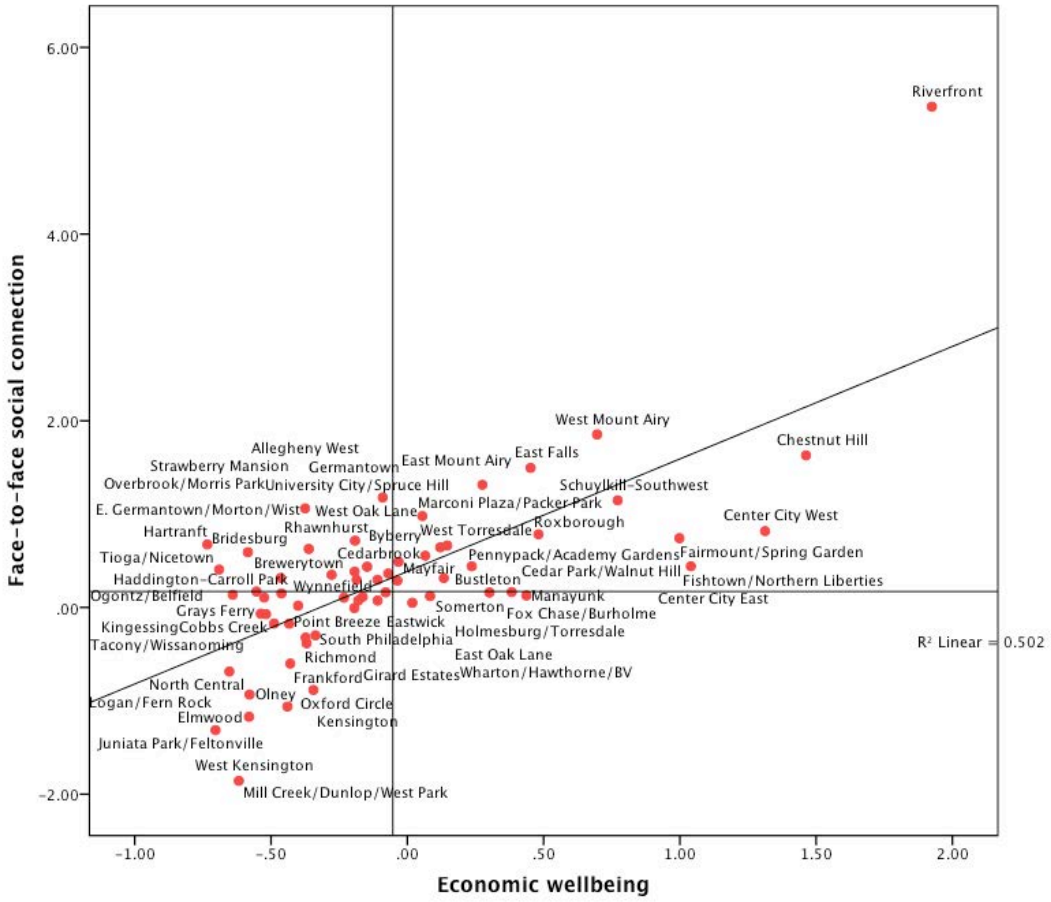
[6] Carol B. Stack. *All our kin: Strategies for survival in a black community* (New York:Basic Books, 1975).

[7] Edin, Kathryn, and Maria Kefalas. *Promises I can keep: Why poor women put motherhood before marriage* (Berkley and Los Angeles: University of California Press, 2011); Sampson, *Great American city.*

[8] Coleman, James S. "Social capital in the creation of human capital." *American journal of sociology* (1988): S95-S120; Putnam, Robert D. *Bowling alone: The collapse and revival of American community* (New York: Simon and Schuster, 2000); Putnam, Robert D., Robert Leonardi, and Raffaella Y. Nanetti. *Making democracy work: Civic traditions in modern Italy (*Princeton: Princeton University Press, 1994).

[9] On Bourdieu's use of the term, see Portes, Alejandro. "Social capital: Its origins and applications in modern sociology." *Annual Review Sociology* 24 (1998): 1-24; Bourdieu, P. The forms of capital. In J.

In the present study, we focus on how economic wellbeing is converted into cultural capital and how both economic wellbeing and cultural assets influence four other aspects of wellbeing. Obviously, economic wellbeing—high income, a college degree, a steady job—represent the most important asset an individual or community is likely to enjoy. However, social networks—measured by our three *social connection* sub-indexes—represent an alternative form of asset. Well-off communities very often enjoy higher levels of social connections as well. In the following scatterplot, for example, we find a strong relationship between economic wellbeing and face-to-face social connection. Yet the relationship is not absolute. Although most neighborhoods with strong social connections are also economically strong, there are a number of low-income neighborhoods that have higher scores on one or more measures of social connection.



Richardson (Ed.) *Handbook of Theory and Research for the Sociology of Education* (New York, Greenwood, 1986), 241-258

The social capital literature suggests that these neighborhoods—those with lower economic wellbeing but stronger social connections—would demonstrate better results on a variety of other social outcomes.

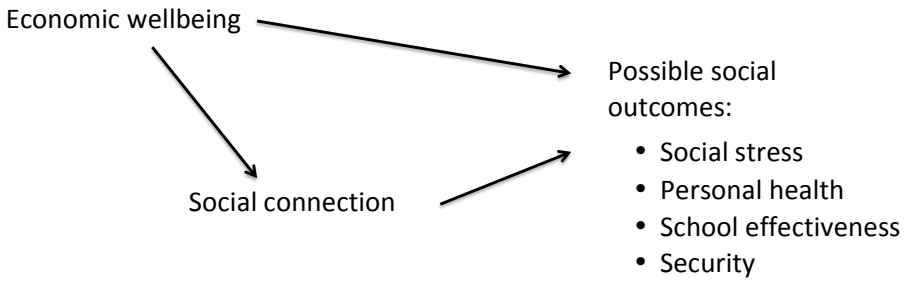
The relationship of economic wellbeing and social capital is marked by a contradiction. Although high-income neighborhoods are more likely to have stronger social capital, it is in low-income neighborhoods that social capital has the strongest impact on wellbeing. Consider two explanations of this phenomenon. First, economic inducements tend to be stronger than social capital in influencing behavior. The opportunities open to a middle-class teenager—a college education, material possessions, social status—provide ample inducement, for example, to avoid pregnancy. In contrast, a low-income teen—facing limited prospects for economic or personal fulfillment—is more likely to see motherhood as desirable.[10] Second, the lower levels of social capital in poor neighborhoods mean its distribution is less uniform. In virtually any middle-class neighborhood, a teenager is likely to receive strong messages from her social networks that pregnancy is a bad idea. In low-income neighborhoods, the data suggest, the anti-pregnancy message may be stronger or weaker depending on the level of social connection. In other words, although low-income neighborhoods are less likely to have strong social connections, they play a more decisive role when present.

In addition to the economic wellbeing sub-index, we've calculated three sub-indexes of social connection for Philadelphia: institutional connection, face-to-face connection, and cultural assets. In this paper we focus on the how cultural assets may influence other forms of social wellbeing.

The paper, then, focuses on two conversions. First, economic wellbeing is associated with higher levels of cultural assets. Residents of well-off neighborhoods enjoy more cultural institutions and higher levels of cultural participation. Yet, the relationship is not absolute. We find that some low-income neighborhoods, too, enjoy a relatively high level of cultural assets. It is precisely in these sections of the city that we find better social outcomes. Social stress, personal health, school effectiveness, and security all represent capabilities to which stronger social connection can make a contribution. The following diagram presents this simple model. [11]

[10] See Edin and Kefalas, *Promises I can keep,* for a discussion of this point.

[11] Saegert, Susan, and Gary Winkel. "Crime, social capital, and community participation." *American Journal of Community Psychology* 34, no. 3-4 (2004): 219-233; Lederman, Daniel, Norman Loayza, and Ana Maria Menendez. "Violent Crime: Does Social Capital Matter?*." *Economic Development and Cultural Change* 50, no. 3 (2002): 509-539.



DATA AND METHODS

Here we provide a brief overview of our methodology and point to several alterations that we have introduced over the past year. The appendix to the paper explains how our sub-indexes of wellbeing were derived, as do our 2013 working papers on the project.[12]

The starting point for the research project was the 2009 Sen/Stiglitz report, which proposed eight dimensions of wellbeing:

- Material standard of living: income and inequality;
- Health: mortality, morbidity, and access;
- Education: attainment, achievement, and access to quality;
- Personal activity: working conditions, leisure, and housing;
- Political voice: voting and participation;
- Social connection: institutional structure and face-to-face relations;
- Environment: threats and assets; and
- Insecurity: physical security and crime.

In our 2012-13 work, we made several alterations to this framework. We added housing as a separate dimension (Sen and Stiglitz included it as part of personal activity). We discovered that elements of three dimensions—material standard of living, educational attainment, and work—were so highly correlated at the census tract level that they needed be collapsed into a single *economic wellbeing* sub-index. By contrast, we discovered that the social connection sub-index should, in fact, be broken into three parts—institutional connection, face-to-face connection, and cultural assets. Finally, we found that the health dimension also contained too many divergent elements and broke

[12] Stern, M.J. and Ira Goldstein, "Culture as a dimension of social wellbeing: Development of a neighborhood-based wellbeing index for Philadelphia." (2013); Stern, Mark J., Susan C. Seifert, and Ira Goldstein, "The geography of culture and social wellbeing: Patterns of advantage and disadvantage in Philadelphia neighborhoods." (2013).
http://www.sp2.upenn.edu/siap/completed_projects/cultureblocks.html

it into three sub-indexes—morbidity/personal health[13] (overall health status, chronic conditions, obesity); health access (lack of regular care, use of emergency rooms); and social stress (teen pregnancy, lack of prenatal care, reports of child abuse, and homicide deaths).

This framework (elaborated in the 2013 papers) remained generally intact for the current revision. The one significant change had to do with diversity. In 2013 we used the Gini coefficient as our single measure of economic diversity. In the current analysis, however, we supplemented this with a measure of how much a block group's distribution of household income diverged from the national profile. We also felt that a weakness of the earlier sub-index was the absence of data on ethnic composition. Here we have included a measure of ethnic diversity—that is, the percent of the population not a member of the largest ethnic group. As a result, we have substituted the revised *economic and ethnic diversity* sub-index for our earlier one.

The most significant challenge to the shift from census tracts to block groups as our basic unit of analysis had to do with the variation in levels of measurement of our data sources. Most census data are reported at the block group level, but some critical variables—such as the Gini coefficient and the percent of residents eligible to vote (age by citizenship status)—are not. In other cases, we have been able to access data only at the tract level or had too few cases to make our block group estimates stable. In these cases, we've used several GIS smoothing procedures (buffers, interpolation) to generate more stable block group estimates. This fall, we plan to assess whether the methods used have biased our findings.

The Appendix presents a detailed description of the thirteen sub-indexes of social wellbeing (listed below) and their constituent variables as well as the types of adjustments made to generate block group estimates. Also included in the Appendix are maps of the individual sub-indexes for the city of Philadelphia.

[13] In previous analyses, we have called this dimension *morbidity* (so its value increased as a block group became sicker. In the rest of this paper, we characterize it as personal health and have transformed it so that higher values are associated with better health.

Dimensions of social wellbeing, Philadelphia sub-indexes, 2014

Dimension	Sub-indexes	Description
Economic wellbeing		Material standard of living: income, educational attainment, labor force participation
Economic and ethnic diversity		Gini coefficient (measure of inequality), household income diversity, ethnic diversity (percent of residents not members of largest ethnic group)
School effectiveness		Current school proficiency scores, dropout rate, private school attendance
Housing burden		Overcrowding, housing financial stress, distance from work
Social connection		
	Institutional	Nonprofit organizations, geographic mobility
	Face-to-face connection	Trust, belonging, participation
	Cultural asset index	Nonprofit and for-profit cultural providers, resident artists, cultural participants
Security		High personal and property crime rates, Human Relations Commission complaints
Health		
	Personal health	Diabetes, hypertension, overall health condition, obesity
	Insurance, access	Low insurance rates, delayed care due to cost, use of ER
	Social stress	High teen pregnancy, lack of prenatal care, high homicide, reports of child abuse & neglect
Environment		Parks, trees, grass, underground streams (inverse), heat vulnerability
Political voice		Percent of eligible population casting ballots in 2010 and 2012

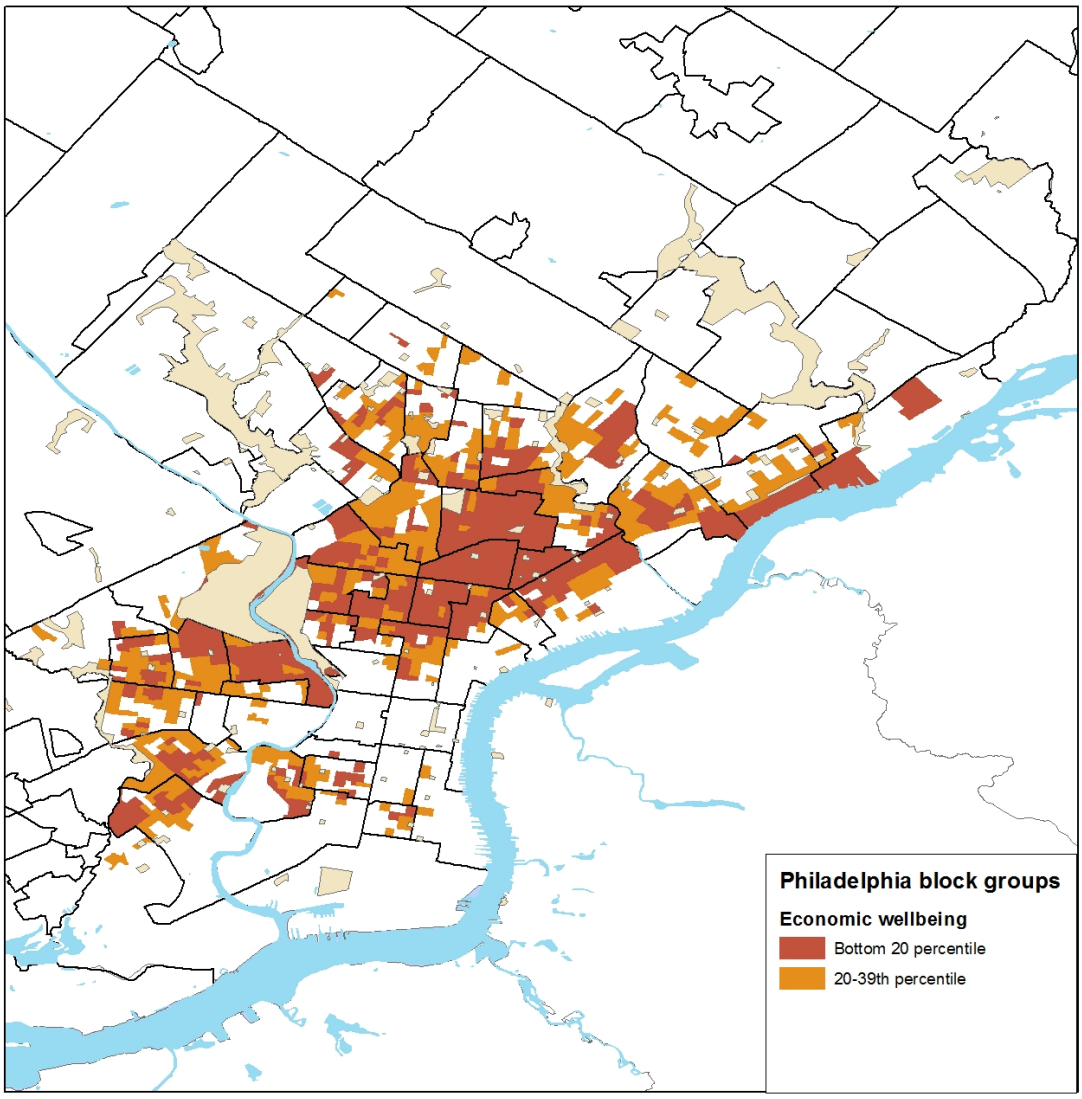
Although we have estimated all thirteen sub-indexes for Philadelphia, in this paper we focus on six of these. We use two—economic wellbeing and the cultural asset index (CAI)—as *independent variables,* and test the extent to which they influence four *dependent variables*—social stress, personal health, school effectiveness, and security.

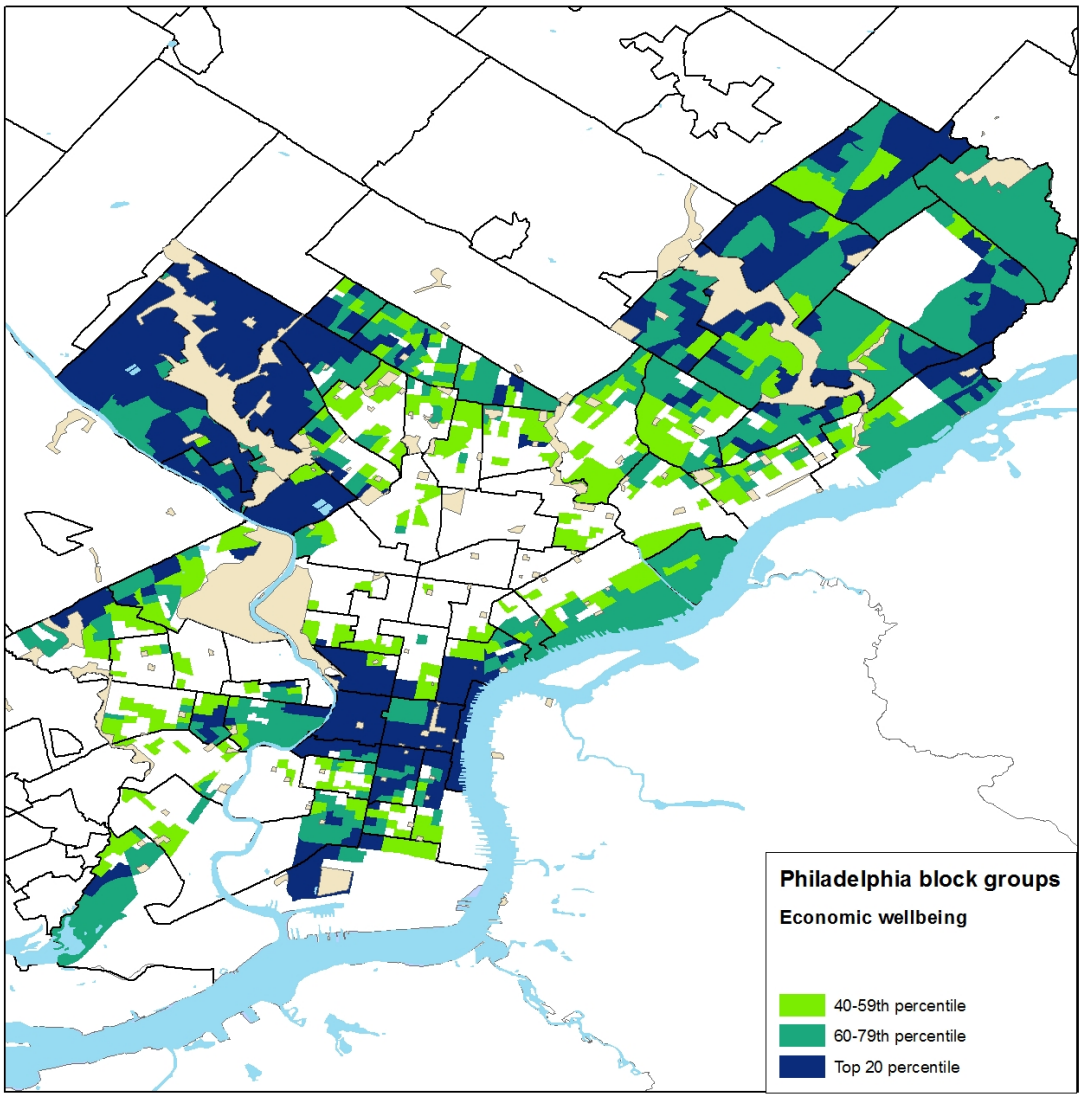
As noted, we've estimated three measures of social connection as dimensions of social wellbeing. In this paper, we focus on one of those, the Cultural Asset Index (CAI). This index includes estimates of the concentration of nonprofit arts and cultural organizations, commercial cultural enterprises, and resident artists in each of the city's block groups. The CAI includes as well, a measure of *cultural participation* derived from the Greater Philadelphia Cultural Alliance's cultural list cooperative. This dataset includes information on the cultural participation of several hundred thousand households in the city. This index was originally developed as part of SIAP's contribution to the CultureBlocks project funded by the National Endowment for the Arts and ArtPlace America. For three of the four measures, we calculated both a *buffer estimate* (number within one-quarter mile of the block group) and a *point estimate* (number within a block group). We converted the 2010-12 index from 2000 to 2010 census block group boundaries for the current analysis.

In addition to presenting descriptive statistics on the four social outcomes, we use ordinary least-square regression to measure the extent to which economic wellbeing and CAI "predict" their value. We report several findings from the regression analysis. The adjusted R-square tells us the overall strength of the model in predicting values of the dependent variable and is expressed as either a proportion (with a value between 0 and 1) or a percentage. Several statistics are reported on individual independent variables. The *zero-order correlation coefficient* reports the strength of the relationship between the dependent and one of the independent variables without regard for their relationship to other variables in the analysis. The *partial correlation coefficient* and the *beta or beta-weight* estimate the strength of the relationship "correcting" for any correlation between the independent variables. Finally, each beta-weight is associated with a particular level of statistical significance.[14] We also pay attention to the *direction* of the beta-weight to determine the relationship is direct (the dependent variable goes up as the independent variable increases) or inverse (the dependent variable goes down as the independent variable increases).

As we noted above, previous research gives us reason to expect the relationship of social connection to our social outcomes to be influenced by the economic wellbeing of a block group, that is, that social connection is a stronger influence on social outcomes in low-income sections of the city. Therefore, we perform separate analyses on block groups that are in the bottom 40 percent of the economic wellbeing sub-index and those in the top 60 percent. (See maps below.)

[14] Statistical significance measures the likelihood that the coefficient is actually zero, that is, that there is no relationship between the independent and dependent variables. Ideally, this significance level would be quite low (below .05) so that we are reasonably confident that the beta-weight is not zero, i.e., that there is a relationship.


Philadelphia block groups
Economic wellbeing
Bottom 20 percentile
20-39th percentile


Philadelphia block groups
Economic wellbeing
40-59th percentile
60-79th percentile
Top 20 percentile

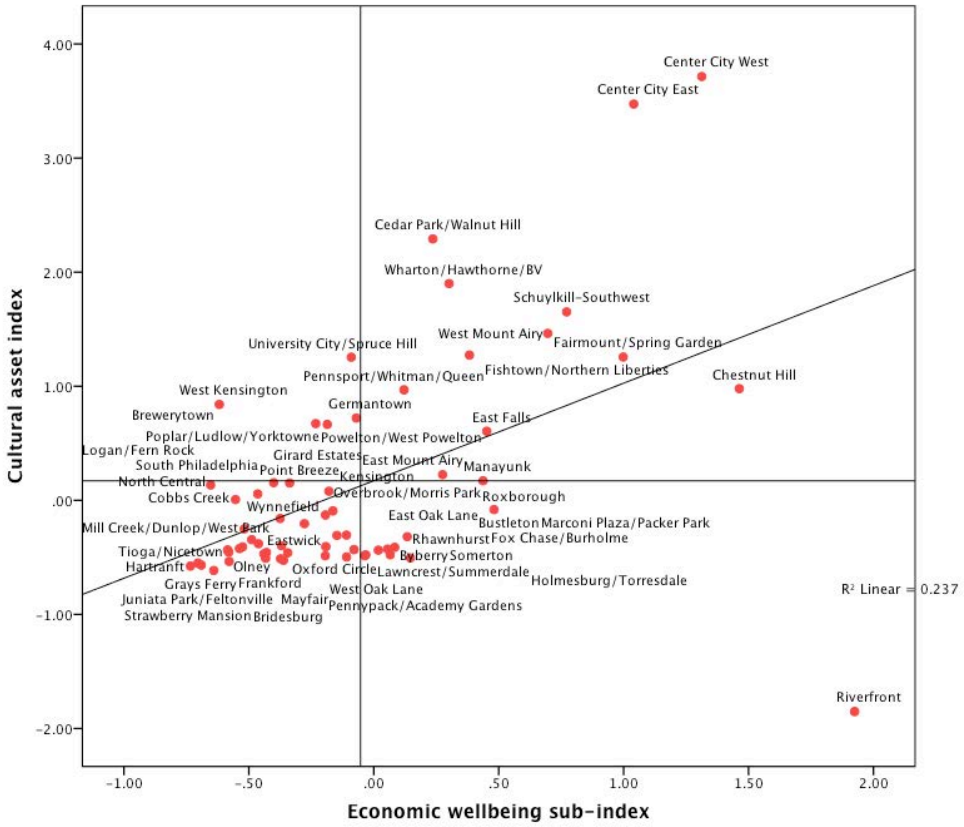
As a result, in this paper, we present the results from eight separate regression analyses:

Analysis	Dependent variable	Independent variables	Data analyzed
1	Social stress	Economic wellbeing & CAI	Lowest 40% economic wellbeing
2	Social stress	Economic wellbeing & CAI	Highest 60% economic wellbeing
3	Personal health	Economic wellbeing & CAI	Lowest 40% economic wellbeing
4	Personal health	Economic wellbeing & CAI	Highest 60% economic wellbeing
5	School effectiveness	Economic wellbeing & CAI	Lowest 40% economic wellbeing
6	School effectiveness	Economic wellbeing & CAI	Highest 60% economic wellbeing
7	Security	Economic wellbeing & CAI	Lowest 40% economic wellbeing
8	Security	Economic wellbeing & CAI	Highest 60% economic wellbeing

FINDINGS

Economic wellbeing, social connection, and social outcomes in Philadelphia neighborhoods

The data analysis focuses on the role of two of our sub-indexes—economic wellbeing and cultural asset index (CA) in predicting four other sub-indexes. We are required to use multivariate analysis because these two variables are correlated with one another. The following scatterplot shows the relationship between the two variables at the neighborhood level. Most neighborhoods concentrate in the upper right and lower left quadrants indicating that a majority of them are either well-off neighborhoods with many cultural assets and worse-off neighborhoods with fewer assets. The purpose of the analysis is to study the unique relationship of cultural assets to our social outcomes, controlling for the influence of economic standing.



The following table examines the uncorrected correlation coefficients for our two independent variables and the four dependent variables for the city's block groups. It shows the strong relationship between economic wellbeing and CAI and their relationship to the four dependent variables. Generally, economic wellbeing is a stronger influence on each of the four, but both economic wellbeing and CAI operate in the same direction. They are both *negatively* correlated with social stress (which is

desirable because it means that as they increase in value, social stress declines. They are both *positively* correlated with personal health, school effectiveness, and security.

	Economic wellbeing	Cultural Asset Index
Cultural asset index	0.599	
Social stress	-0.748	-0.385
Personal health	0.609	0.472
School effectiveness factor	0.522	0.146
Security	0.522	0.182

As noted, previous scholarship suggests that social connections will operate differently among higher and lower economic status block groups. Not surprisingly, low-economic wellbeing neighborhoods do worse on these social outcomes than better-off neighborhoods. The following table shows the gap on each of the four social outcomes on which this analysis focuses. (All four variables are presented in standardized form with a mean of zero and a standard deviation of 1). As the table shows, upper income neighborhoods (top 60 percent) have a wide lead over low-income neighborhoods (bottom 40 percent), ranging from 0.9 standard deviations for personal health to 1.3 standard deviations for social stress. These differences are all statistically significant. The following analyses focus on the role of economic wellbeing and our cultural asset index in predicting these social outcomes in both the advantaged and the poorest sections of Philadelphia.

		Social stress factor	Personal health factor	School effectiveness factor	Security factor
Mean	Top 60 percent	-0.529	0.358	0.380	0.411
	Bottom 40 percent	0.809	-0.552	-0.558	-0.620
	Total	0.007	-0.006	0.002	0.001
	Total	1,315	1,317	1,310	1,317

Social stress

Our measure of social stress follows the conceptual framework proposed by Gross and McDermott using an earlier set of data.[15] The index includes data on birth outcomes, homicide rates, and confirmed reports of child abuse and neglect. Among low-income block groups (bottom 40 percent), the regression analysis explains 19 percent of variance in social stress with economic wellbeing having a beta of .34 and the CAI having a beta weight of .22. Both of these influences are statistically significant. Both economic

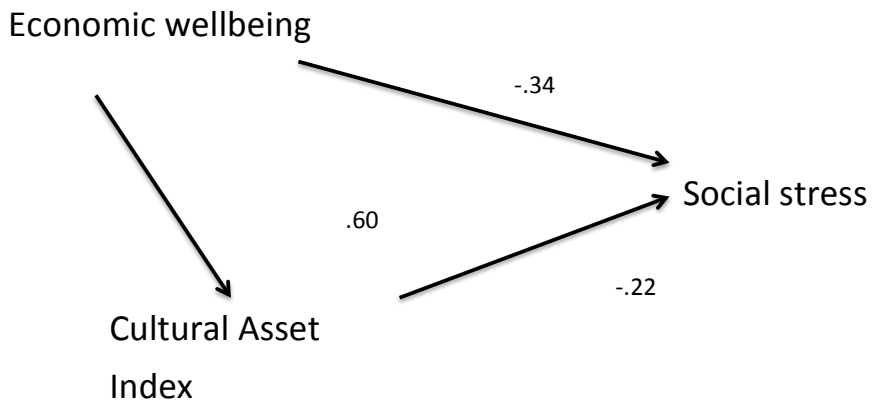
[15] Gross, Kennen S. and Paul A. McDermott. Use of city-archival data to inform dimensional structure of neighborhoods. *Journal of Urban Health—Bulletin of the New York Academy of Medicine* 86 (2): 161-182. 2009.

wellbeing and the social connection variable were associated with lower rates of social stress.

In contrast, among middle and upper-income block groups (top 60 percent), social connection was a weak contributor to lower social stress. Economic wellbeing had a strong correlation with social stress in these neighborhoods with a beta weight of -.64, while the CAI's weight was .14. Because its beta weight was positive (high cultural assets = more social stress), we are confident that culture does not reduce social stress in better-off sections of Philadelphia as it does in lower-income neighborhoods.

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations	
		B	Std. Error	Beta			Zero-order	Partial
Top 60 percent	(Constant)	-0.530	0.025		-21.378	0.000		
	Economic wellbeing	-0.821	0.050	-0.640	-16.561	0.000	-0.547	-0.509
	Cultural asset index	0.098	0.026	0.144	3.737	0.000	-0.266	0.132
Bottom 40 percent	(Constant)	-0.133	0.092		-1.445	0.149		
	Economic wellbeing	-0.615	0.071	-0.344	-8.615	0.000	-0.384	-0.352
	Cultural asset index	-0.450	0.084	-0.215	-5.370	0.000	-0.278	-0.228

We can display these results for the bottom 40 percent of block groups graphically in this way. Economic wellbeing influences both the CAI and social stress and CAI has a statistically significant effect on stress as well:



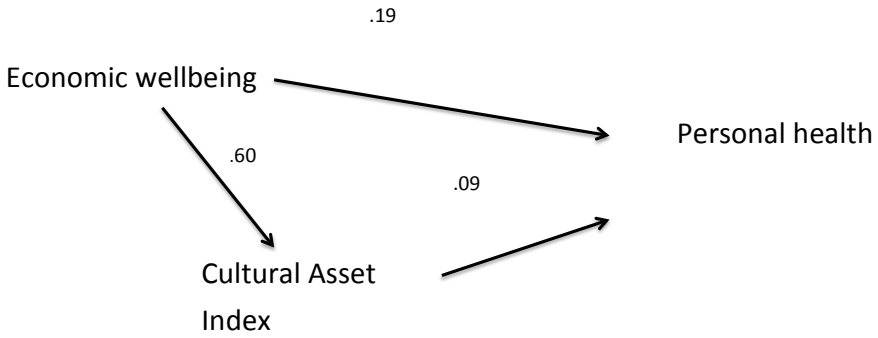
Personal health

As with social stress, among lower-income block groups, both economic standing and the CAI had contributed to improvements in personal health. The relationship was not as strong as with social stress with an R-square of only 5 percent. Economic wellbeing's beta weight was -.19, while that of the CAI was -.09. The cultural asset association was significant at the .03 level.

On this measure, the directions of relationships were the same for high- and low-income block groups. Among the top 60 percent of block groups, economic wellbeing had a beta weight of .42 while that of the CAI was .22. Both were statistically significant. The R-square among higher income block groups was .34.

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations	
		B	Std. Error	Beta			Zero-order	Partial
Top 60 percent	(Constant)	0.303	0.027		11.314	0.000		
	Economic wellbeing	0.599	0.054	0.422	11.178	0.000	0.560	0.370
	Cultural asset index	0.163	0.028	0.216	5.740	0.000	0.487	0.200
Bottom 40 percent	(Constant)	0.134	0.136		0.989	0.323		
	Economic wellbeing	0.469	0.105	0.193	4.470	0.000	0.210	0.192
	Cultural asset index	0.261	0.123	0.092	2.123	0.034	0.127	0.092

The findings for the poorest 40 percent of block groups can be presented graphically:



School effectiveness

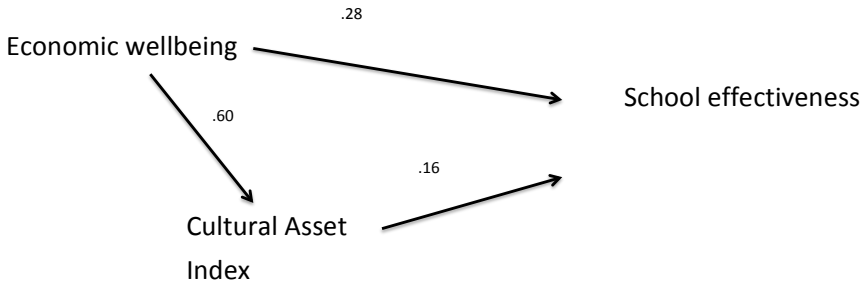
Our school effectiveness measure includes data on math and verbal test scores for elementary schools, the percent of older teens who have dropped out of school, and the proportion of children in private schools. As with the social stress measure, we find that our two independent variables influence school effectiveness in different ways in higher and lower-income neighborhoods. Among the bottom 40 percent of block groups, the two variables explain 12 percent of the variance in school effectiveness;

while among the higher income sections of the city, the R-square is .16. However, there are sharp differences in the direction of effects. In low-income neighborhoods, the two factors reinforce one another in improving school effectiveness. The beta-weight for economic wellbeing is .28 and that of the CAI is .16. Both are statistically significant at less that the .001 level.

Among better-off sections of Philadelphia, the two variables work against one another. Economic wellbeing is positively related to school effectiveness while the CAI is negatively related.

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations	
		B	Std. Error	Beta			Zero-order	Partial
Top 60 percent	(Constant)	0.431	0.034		12.659	0.000		
	Economic wellbeing	0.843	0.068	0.531	12.397	0.000	0.300	0.406
	Cultural asset index	-0.302	0.036	-0.358	-8.374	0.000	-0.016	-0.287
Bottom 40 percent	(Constant)	0.233	0.102		2.278	0.023		
	Economic wellbeing	0.522	0.079	0.275	6.601	0.000	0.305	0.277
	Cultural asset index	0.359	0.093	0.161	3.860	0.000	0.212	0.166

Again, the findings for the bottom 40 percent of block groups can be presented graphically:



Security

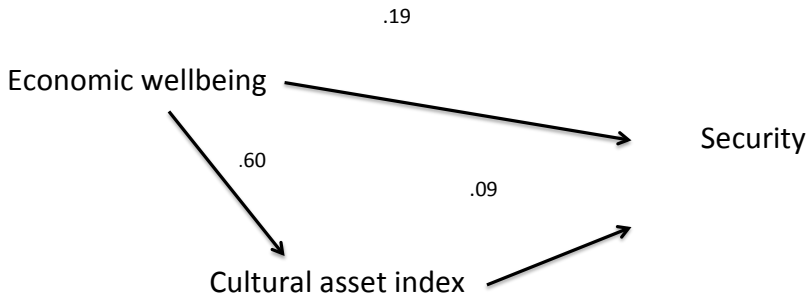
Our last analysis focuses on our index of security, associated with high crime rates and high rates of neighborhood disputes. Here, as with the case of personal health, our two variables explain more of the variance among high-income block groups than among those at the lower-end of the economic wellbeing index (15 versus 5 percent). As with social stress and school effectiveness, however, we find the two factors reinforcing each other among low-income block groups and working at cross-purposes in higher income neighborhoods. Among block groups in the bottom 40 percent, the two beta weights

are .19 and .09 for economic wellbeing and CAI. Both are statistically significant at the .03 level.

Among higher income sections of the city, the two beta-weights are .51 for economic wellbeing, but -.31 for the CAI. Again, correcting for economic wellbeing, higher cultural assets was associated with lower security.

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations	
		B	Std. Error	Beta			Zero-order	Partial
Top 60 percent	(Constant)	0.439	0.024		18.293	0.000		
	Economic wellbeing	0.567	0.048	0.506	11.811	0.000	0.308	0.388
	Cultural asset index	-0.183	0.025	-0.308	-7.188	0.000	0.017	-0.248
Bottom 40 percent	(Constant)	0.223	0.167		1.332	0.183		
	Economic wellbeing	0.573	0.129	0.192	4.439	0.000	0.209	0.190
	Cultural asset index	0.328	0.152	0.094	2.166	0.031	0.129	0.094

Again, these findings for the poorest 40 percent of block groups can be presented graphically:



The analysis of the relationship between economic wellbeing and CAI and the four variables—social stress, personal health, school effectiveness, and security—produces some fairly consistent results. Among low-income block groups, we found that economic wellbeing and CAI were significantly associated with improvement on all four measures. In contrast, for three of the four measures, we found that the CAI did not have the same impact in high-income block groups; only personal health was improved for both low- and high-income neighborhoods.

Discussion

This paper seeks to address a tension between capabilities theories and their empirical application. At its core, the capabilities approach attempts to address the role of all

aspects of social organization—informal and formal, governmental and nongovernmental, personal and impersonal—on people's ability to be and to do. Yet, most of the quantitative studies of the CA have relied on national measures of the formal economy and state policy to estimate differences in capabilities.

By changing the level of measurement to the neighborhood level, this paper argues that we can use a more comprehensive measure of capabilities. In particular, we have examined the role of economic wellbeing and social connection to a set of social outcomes. The study finds that among low-income neighborhoods in Philadelphia, both have a consistent impact on measures of health, educational, and security capabilities.

Over the past two decades, a debate has raged over the role of social connection and networks on wellbeing. For some on the right, social capital provides an alternative to state action or, in a more extreme form, may actually undermine the ability of a community to deal with its own challenges.[16] In reaction to these claims, many on the left remain skeptical about social capital's efficacy.

This paper argues that this "all or nothing" approach to social connection should be give way to a focus on the extent to which economic wellbeing and social connection can influence different types social challenges. The following table summarizes our findings for low-income block groups in Philadelphia. It leads to several conclusions. First, economic wellbeing consistently has a stronger influence than social connection on these outcomes. Second, in all four dimensions of wellbeing, social capital makes a significant difference, independent of economic standing. Finally, social capital has a stronger effect on social stress and school effectiveness than on personal health and security in low-income Philadelphia neighborhoods.

	Social stress	Personal health	School effectiveness	Security
Economic wellbeing	-0.344	0.193	0.275	0.192
Cultural asset index	-0.215	0.092	0.161	0.094

Our analysis also supports the idea that social capital, although it tends to be weaker in low-income than in higher-income neighborhoods, has a more decisive influence in low economic wellbeing neighborhoods. As previous literature suggests, among communities with limited economic resources, other types of capital play a significant role. In reducing teen pregnancy or the onset of diabetes, in working to make schools more effective or to reduce crime, social connection plays a more visible role in these low-income communities. It cannot negate the impact of economic inequality, but it seems to mitigate that impact.

This paper reports on a project very much in midstream. In the coming months, we will be testing these findings in three other cities and refining our measures of different

[16] McKnight, John. *The careless society: Community and its counterfeits* (New York: Basic Books, 1995).

capabilities. However, at this point, the findings endorse the importance of taking a multi-dimensional approach to the study of social wellbeing and the importance of social connection in Philadelphia's most challenged neighborhoods.

Communities, Culture, and Capabilities: Preliminary results of a four-city study

APPENDIX
Estimating a neighborhood-based index of social wellbeing

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August 2014

DRAFT—DO NOT QUOTE OR CITE WITHOUT AUTHORS' PERMISSION

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This appendix provides a detailed discussion of the thirteen sub-indexes of social wellbeing presented in the paper, including description of their constituent variables and the types of adjustments made to generate block group estimates from census tract data.

Only three of our sub-indexes—economic wellbeing, economic and ethnic diversity, and housing burden—are based solely on census data. We have therefore been able to estimate these for the four cities in our study: Philadelphia, Pennsylvania; New York, New York; Austin, Texas; and Seattle, Washington.

The remaining ten sub-indexes require collection of a variety of non-census data and have therefore been calculated only for Philadelphia. These include: three measures of social connection (institutional connection, face-to-face connection, and the cultural asset index): three measures of health (morbidity, lack of access, and social stress); school effectiveness; insecurity; environment; and political voice.

Estimating social wellbeing indicators across four cities

Economic wellbeing index

As mentioned in the text, we discovered that the correlations between three of the Sen/Stiglitz dimensions—material standard of living, work activity, and educational attainment—were so strong that we could not treat them as separate dimensions. Instead we combined them into a single measure of *economic wellbeing* that examines three different aspects of economic standing—income, labor force participation (including unemployment), and educational attainment.

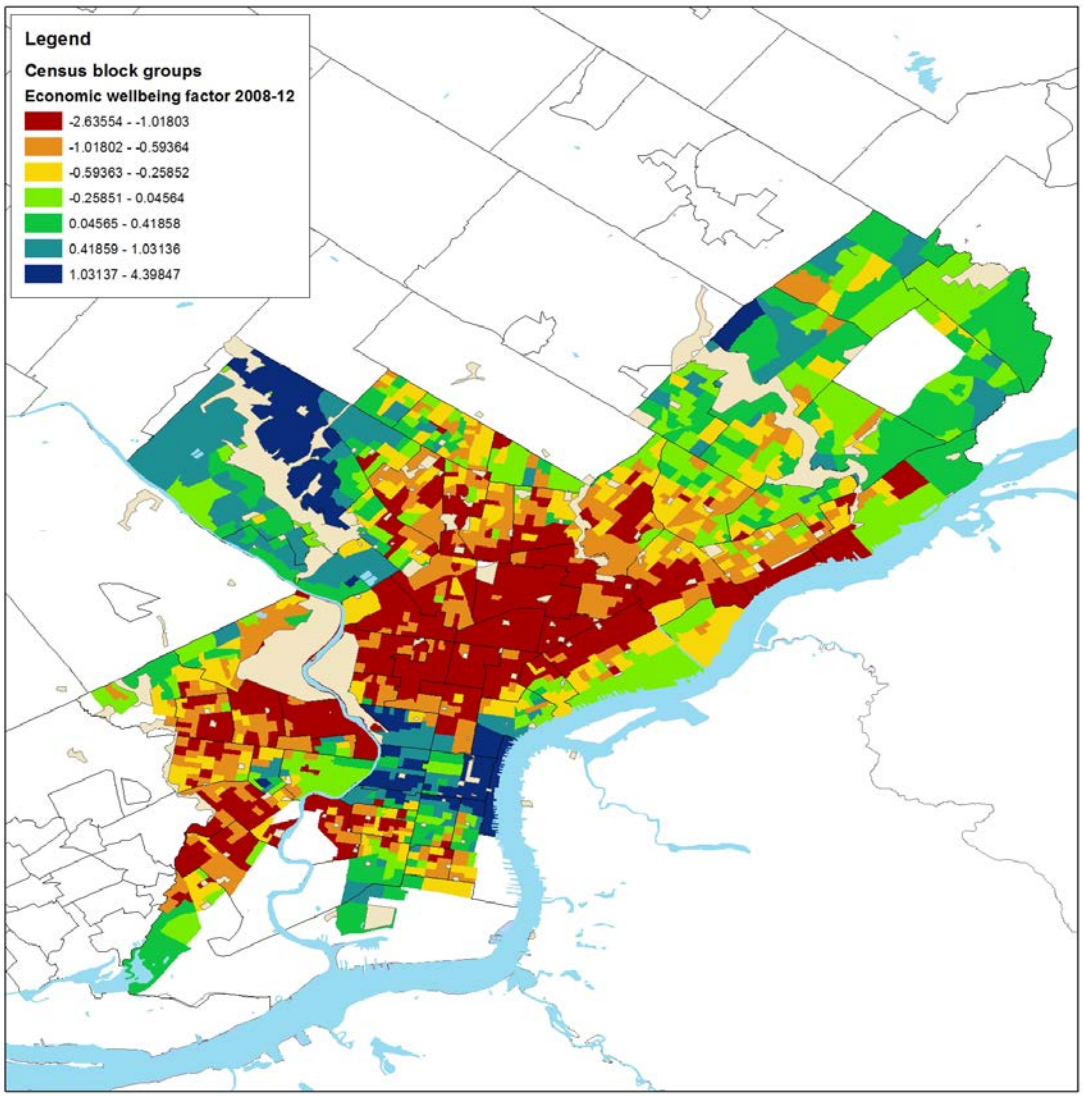
We used two different approaches to estimation. In one analysis, we calculated separate indexes for each city. In the second, we calculated an index for all cities in the same analysis. The first analysis focuses on differences across each city but ignores differences between the cities. The second analysis allows us to examine both intra- and inter-city differences.

In this paper we use only the same index for all four cities. As the maps make clear, among these four cities, Philadelphia is very much the least advantaged while both Austin and Seattle score much higher. Having said that, we still find substantial differences within each city.

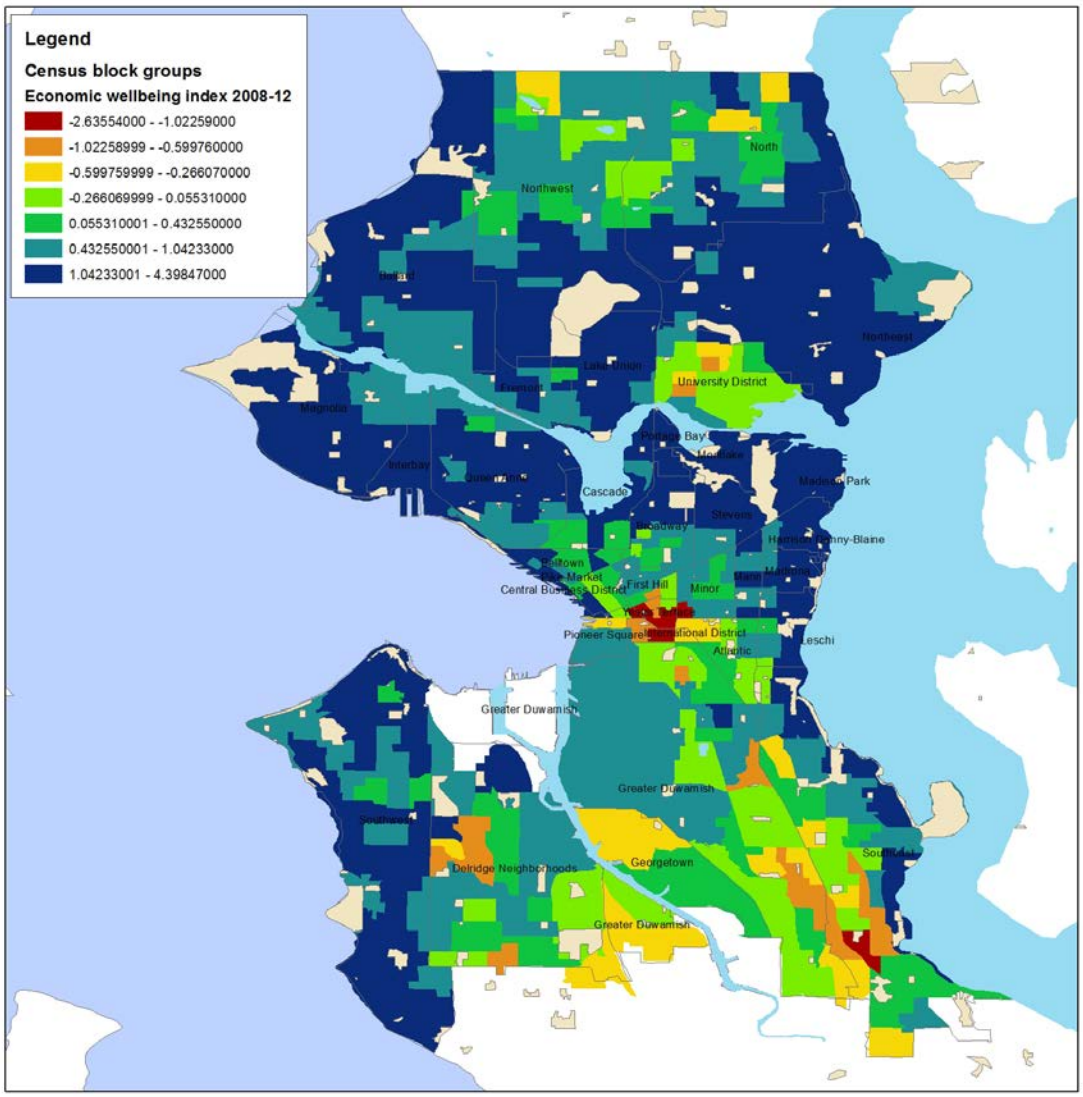
Nine variables were included in the calculation of the economic wellbeing index. As the following table suggests, the index does an excellent job of tracking educational attainment and income, while its correlation with labor force participation and unemployment rates is a bit less robust. Because the 2008-12 data include five years of high unemployment, it may be that this divergence is a temporary phenomenon.

Variables	**Factor loading**
Percent with BA or more	0.873
Percent with less than HS graduate	-0.763
Percent in labor force	0.530
Median household income	0.892
Percent of households with interest, dividend, or rental income	0.813
Per capita income	0.864
Poverty rate	-0.733
Unemployment rate	-0.529
Median family income	0.891

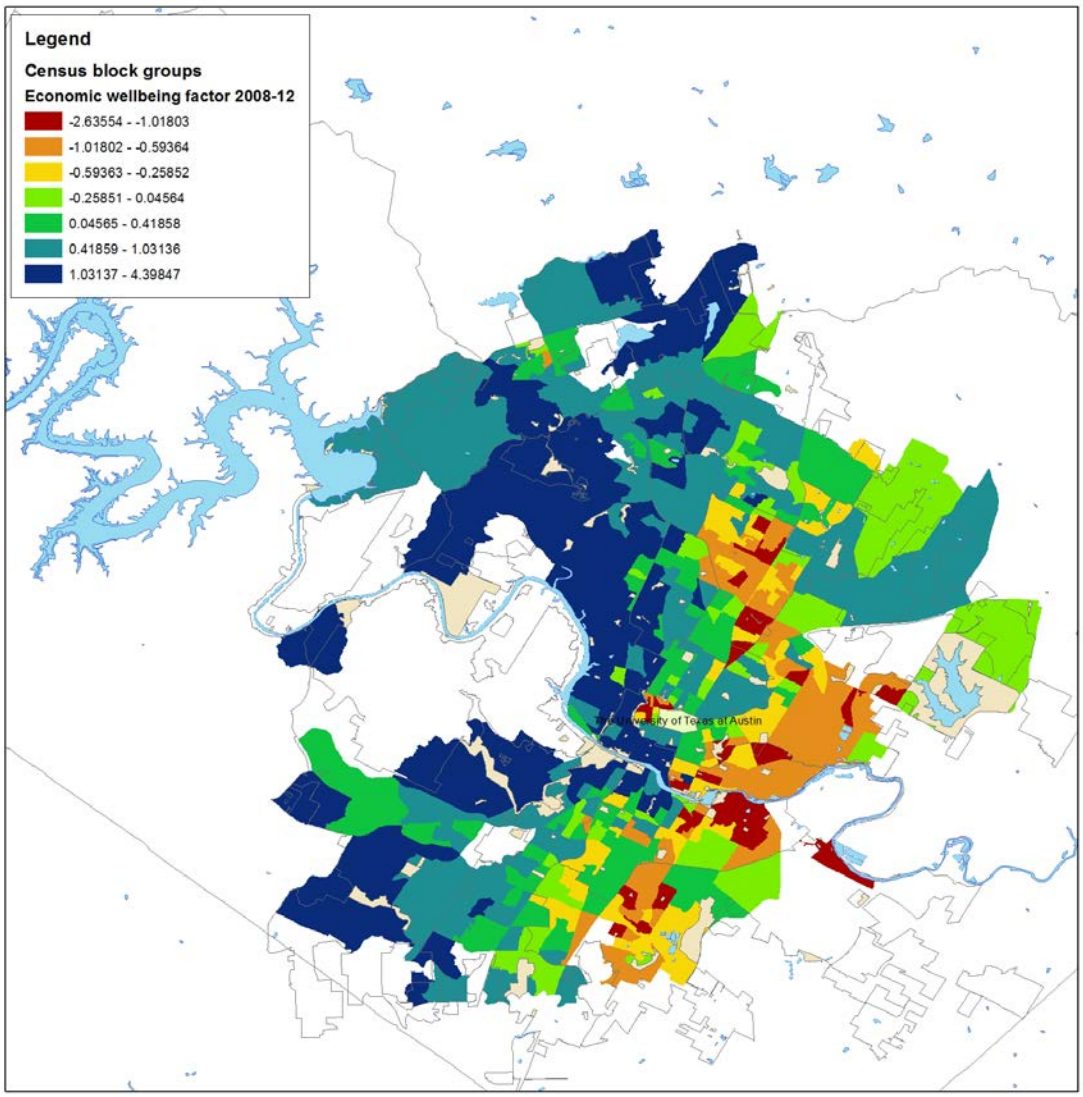
In each of the following maps, the lower scores—coded as brown—represent parts of the cities with lower incomes, lower labor force participation, higher unemployment, and lower educational attainment. Block groups coded in navy blue represent more privileged parts of the city.



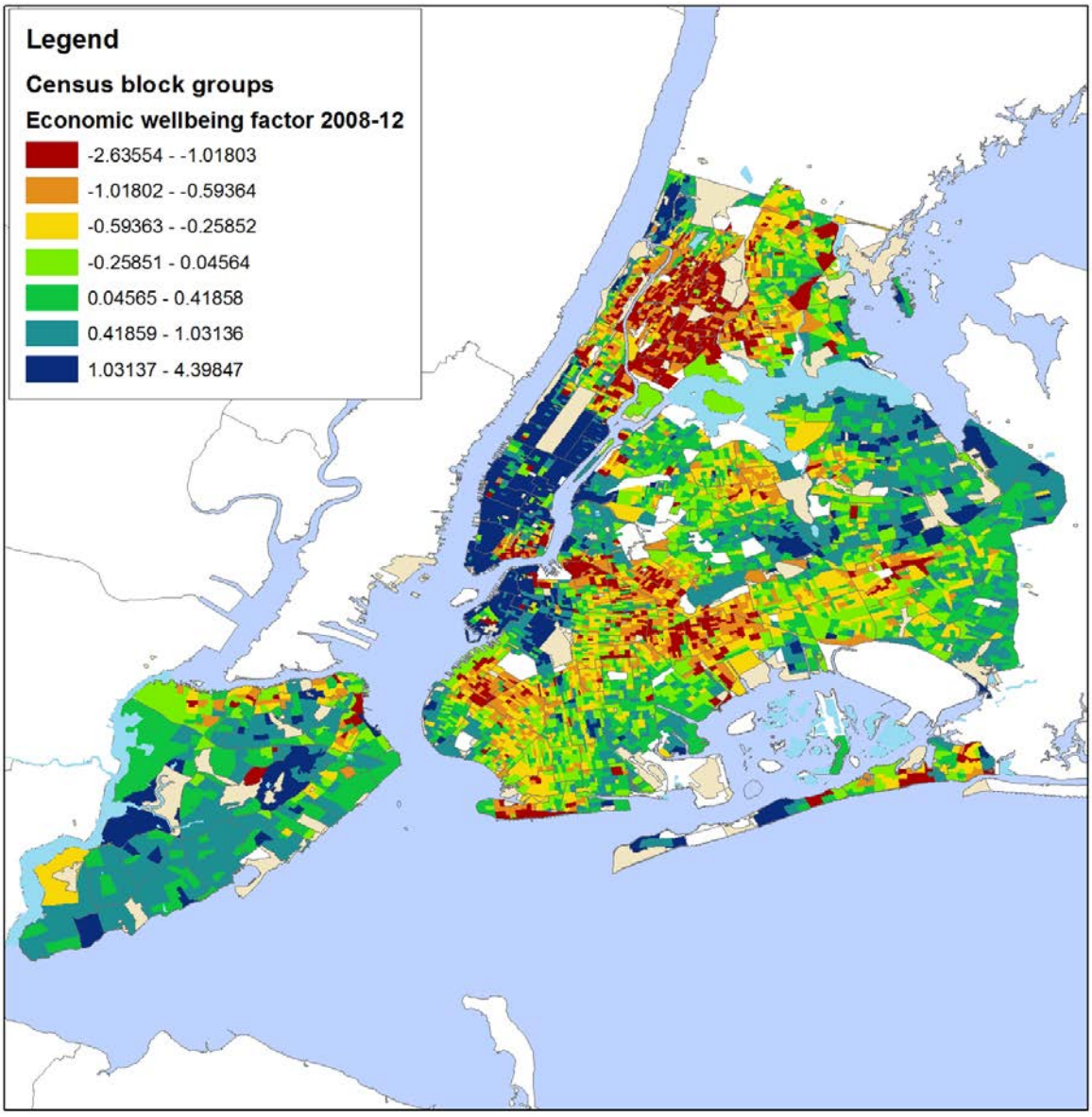
Economic wellbeing index, Philadelphia, 2008-12



Economic wellbeing index, Seattle, 2008-12



Economic wellbeing index, Austin, 2008-12



Economic wellbeing index, New York City, 2008-12

Economic and ethnic diversity index

Measuring economic diversity

As part of our original social wellbeing index in 2013, we used the Gini coefficient as our measure of "economic diversity." In some ways, we backed into this. Originally, we had included the Gini coefficient as part of our analysis of material wellbeing, but it stood out as its own factor. Of course, the Gini coefficient's primary use is as a measure of economic *inequality*, but we realized that for a small geography, this identified places where there were both rich and poor people, that is, economic diversity.

The Gini coefficient's primary focus on dollars, however, limited its use as a measure of diversity. Ultimately, the coefficient is a measure of dollars and who holds them. A few very rich people in a block group will increase the coefficient, even if most of the people in the neighborhood earn about the same. Because we're more interested in the diversity of people, rather than the concentration of dollars, we needed to rethink the measure. [1]

We decided to use the census data on the number of households within a block group earning a specified income in 2008-12. The grouped household income variable includes 16 categories, ranging from households earning under $10,000 to those earning $200,000 or more. For the entire nation, the smallest stratum ($45-50K) represented 4.2 percent of households while the largest ($75-100K) represented 12.3 percent.

Household Income (In 2012 Inflation Adjusted Dollars) American Community Survey, United States, 2008-12		
Households:	115,226,802	
Less than $10,000	8,272,970	7.2%
$10,000 to $14,999	6,260,673	5.4%
$15,000 to $19,999	6,139,302	5.3%
$20,000 to $24,999	6,169,899	5.4%
$25,000 to $29,999	6,004,724	5.2%
$30,000 to $34,999	5,935,053	5.2%
$35,000 to $39,999	5,469,262	4.8%
$40,000 to $44,999	5,507,464	4.8%
$45,000 to $49,999	4,802,620	4.2%
$50,000 to $59,999	9,307,672	8.1%
$60,000 to $74,999	11,622,280	10.1%
$75,000 to $99,999	14,110,448	12.3%
$100,000 to $124,999	9,236,956	8.0%
$125,000 to $149,999	5,531,631	4.8%
$150,000 to $199,999	5,510,639	4.8%
$200,000 or More	5,345,209	4.6%

[1] The issue here mirrors the mean/median difference. That is, a few very rich people moving into a neighborhood would cause the mean income to jump, but would have practically no effect on the median income, that is, the income of people in the 50th percentile.

Our approach to estimating income diversity is conceptually quite simple. We define an area (in this case, a block group) as income diverse if its household income profile is close to that of the entire United States, that is, if it has the same number of low, middle, and high income households as the nation as a whole. To the extent the income profile of the area diverges from that of the nation by having either too many or too few in each income strata, it is less diverse. An area can have low diversity for a variety of reasons. It might be homogeneous with most families in one stratum or it might be polarized with many rich and poor people but few in the middle.

In operational terms, therefore, for any income stratum we calculated the difference between the percent of households in that stratum in the block group and the percent for the entire nation. Because both under- and over-representation of a stratum indicates less diversity, we took the absolute value of the difference. So if in a particular block group, 10 percent of households had income of $200,000 or more, we would subtract 10 from the national figure (4.6 percent) and then take the absolute value, resulting in 5.4 percent. We then sum the differences across all strata and divide by the number of strata.

Originally, we calculated this figure for all 16 of the income strata, but in reviewing the results, we decided that this was too many. With so many strata, over-representation in say the 20-25K and under-representation in the 25-30K would contribute to the index even though these differences are rather trivial. Therefore, for the final index, we regrouped the census data into six groups: Under $20,000, $20,000-34,999, $35,000-59,999, $60,000-99,999, $100,000-149,999, and $150,000 and over. The absolute value of the differences were then summed and divided by 6. The resulting figure increases as the profile of a block group diverges form that of the nation and can be interpreted as the average divergence of a stratum. Note that although this is a measure of diversity, the higher the value, the less diverse the neighborhood.

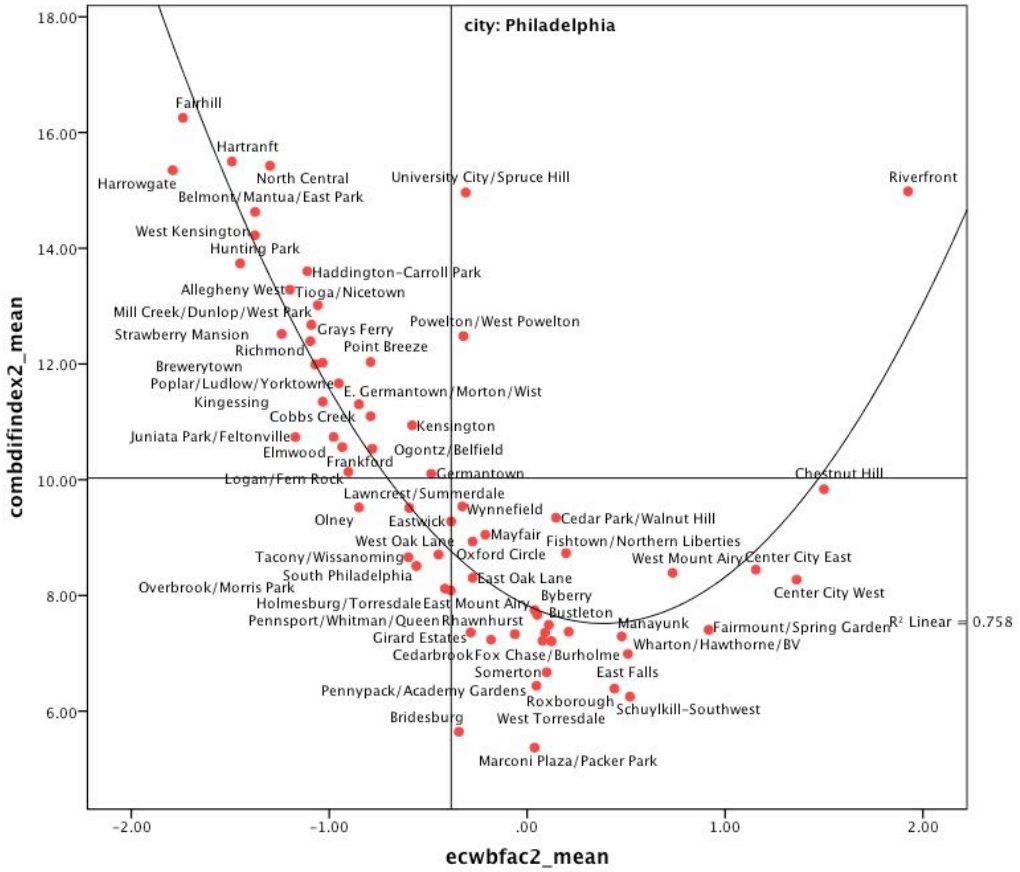
Descriptives

Statistic

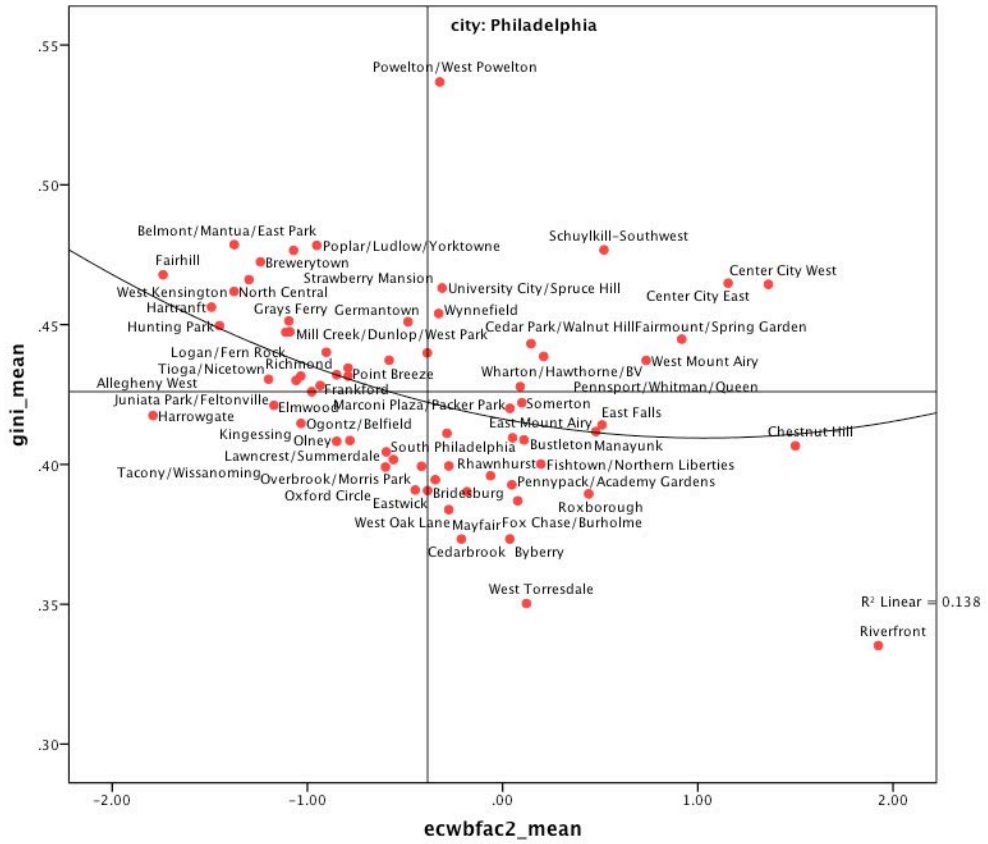
			City			
			36 New York City	42 Philadelphia	48 Austin	53 Seattle
Income diversity	Mean		8.8825	10.0825	9.0711	8.6228
	95% Confidence Interval for Mean	Lower Bound	8.7872	9.8646	8.6991	8.2999
		Upper Bound	8.9778	10.3004	9.4431	8.9458
	5% Trimmed Mean		8.6649	9.9407	8.7539	8.4180
	Median		8.2478	9.6583	8.4811	8.0771
	Variance		14.659	16.368	17.095	12.828
	Std. Deviation		3.82870	4.04571	4.13459	3.58163
	Minimum		1.04	1.77	1.81	1.81
	Maximum		30.20	27.37	27.37	22.97
	Range		29.16	25.60	25.55	21.16
	Interquartile Range		4.91	5.82	4.47	4.67
	Skewness		.958	.526	1.261	.893
	Kurtosis		1.401	.076	2.241	.824

The table above compares income diversity among the four cities in our study. Again, the lower the number, the more diverse is the block group. On average, Philadelphia is the least income diverse city with an average difference of 10 percent from the national income profile. Seattle, with an average difference of 8.6, is the most diverse. New York and Austin are slightly less diverse than Seattle but quite a bit more so than Philadelphia. However, the distribution of block groups with long upward "tails" is more skewed in these cities. Although all four cities have a positively skewed distribution (the mean is greater than the median), Philadelphia's distribution is the least skewed.

Our measure of income diversity has a strong, non-linear relationship with economic wellbeing. Low- and high-income neighborhoods tend to have low economic diversity, while middle-income neighborhoods are most likely to reflect the distribution of households in the nation as a whole. This contrasts somewhat with the Gini coefficient, as shown in the two scatterplots below. While the Gini coefficient too has a quadratic relationship to economic wellbeing, the relationship is not as strong.



Income diversity by economic wellbeing factor, Philadelphia neighborhoods



Gini coefficient by economic wellbeing factor, Philadelphia neighborhoods

Measuring ethnic diversity

In the past, we have used a categorical variable to classify block groups as *diverse*. In that system, a block group was defined as diverse if no single ethnic group (non-Hispanic white, black, Asian Pacific Islander, or Latino) made up more than 80 percent of the population. This system worked well in Philadelphia, where homogeneous block groups were either black or white (with a few Latino areas).

To define a diversity index for the four cities, we decided that an interval level measure of ethnic diversity was desirable. Specifically, we used a measure of the proportion of the population that is *not* a member of the largest group in the area. For example, if the largest ethnic group in a block group were non-Hispanic blacks, then this variable would be equal to the proportion of the population that is not black. In a homogeneous block group, this number is quite small, while in a diverse block group it will get larger. This allows us to be more sensitive to areas that are nominally "diverse" but in which one group makes up 60 or 70 percent of the population.[2]

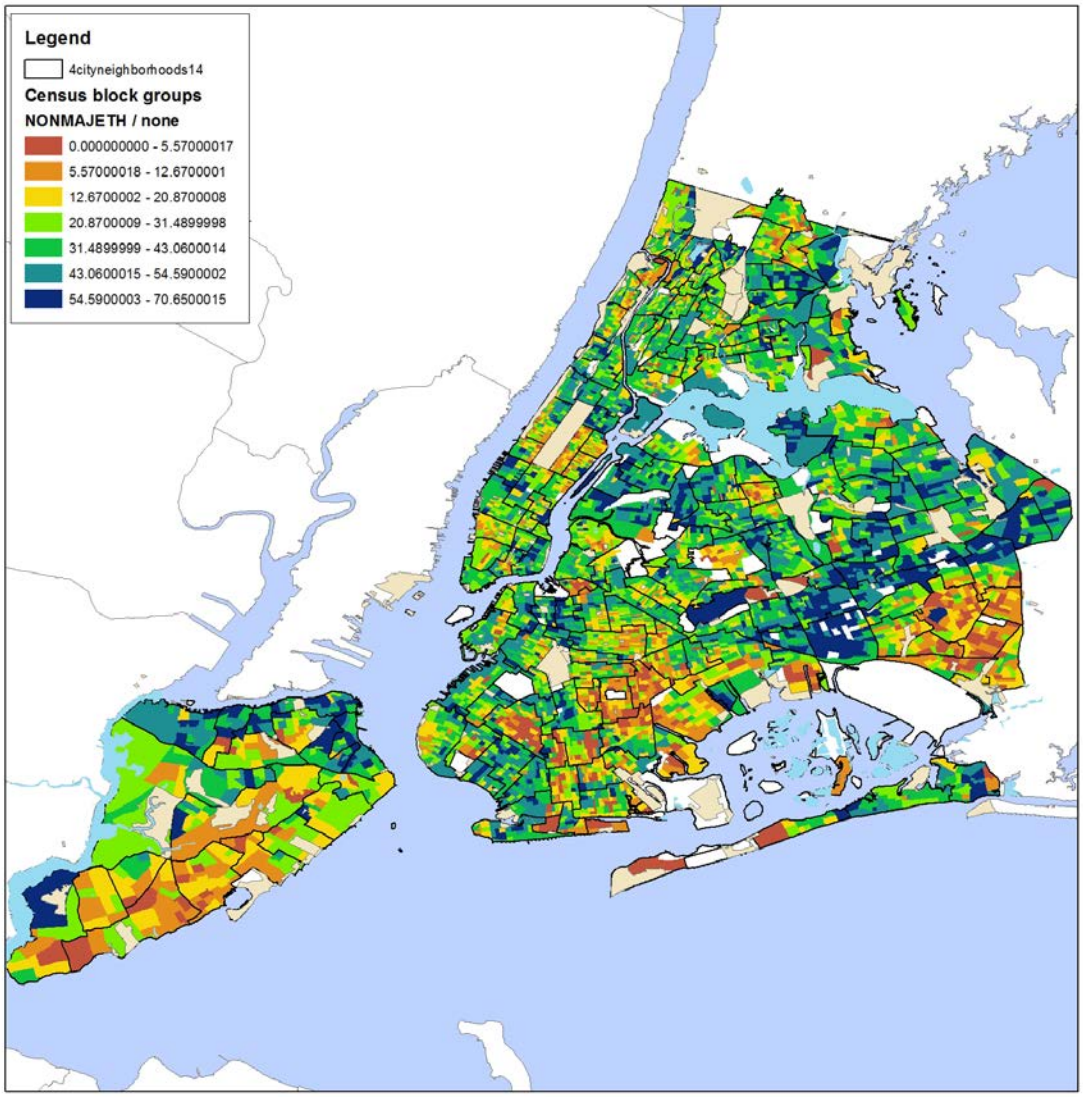
[2] In our next round of research, we will incorporate the Herfindahl index for ethnic homogeneity that has been used by other authors. However, our preliminary analysis indicates that "non-major percentage" and Herfindahl have a correlation coefficient of .96 across the four cities, so we don't expect this to

The following table examines the "non-major percentage" by the older ethnic composition variable. In New York City, for example, in predominantly white block groups, other groups make up about 11 percent of the population. In contrast, in diverse block groups, the non-major percentage is 40 percent. Philadelphia stands out because of the low non-major percentages, particularly in African American block groups.

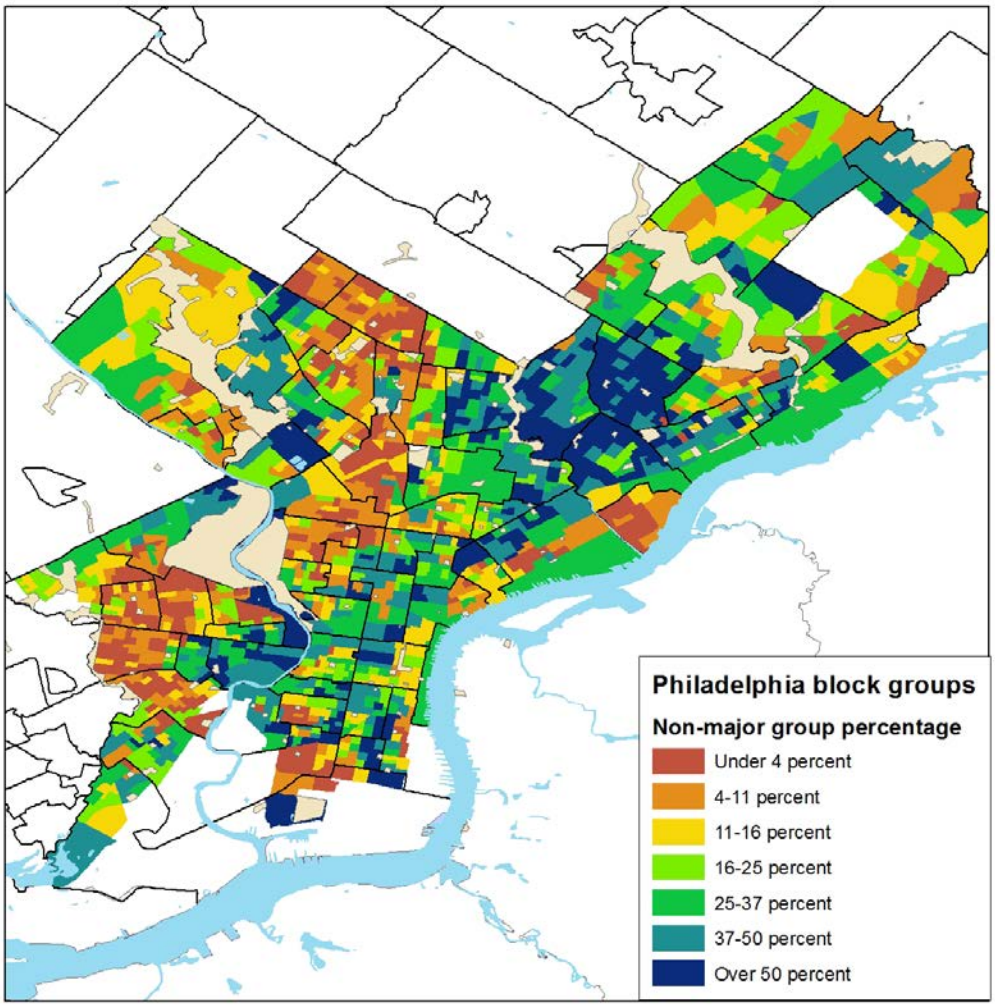
	New York	Philadelphia	Austin	Seattle
Average non-majority percent				
White	11.0	10.0	13.9	12.8
Black	10.4	6.6		
Hispanic	12.5	12.5	13.2	
API	11.3			
Diverse	40.3	40.5	39.9	38.0
All block groups	32.2	24.3	33.7	28.6
Number of block groups				
White	850	220	88	177
Black	559	414		
Hispanic	283	29	27	
API	33			
Diverse	4500	666	365	299
All block groups	6225	1329	480	476

change any conclusions in this paper. In addition, the "non-major" measure has the benefit of increasing with diversity, while the Herfindahl index declines with diversity.

The map of New York City below shows the predominance of diverse neighborhoods in the city. While sections of Queens and Brooklyn that are predominantly African American and the upper East and West Sides of Manhattan stand out as relatively homogeneous, the vast majority of the city (4500 of 6225 block groups) are ethnically diverse with non-majority percentages over 40 percent.



As shown on the map of Philadelphia below, African American neighborhoods in North and West Philadelphia tend to have the city's lowest non-major ethnicity rates while neighborhoods in lower Northeast Philadelphia have the highest rates.



Economic and ethnic diversity factor

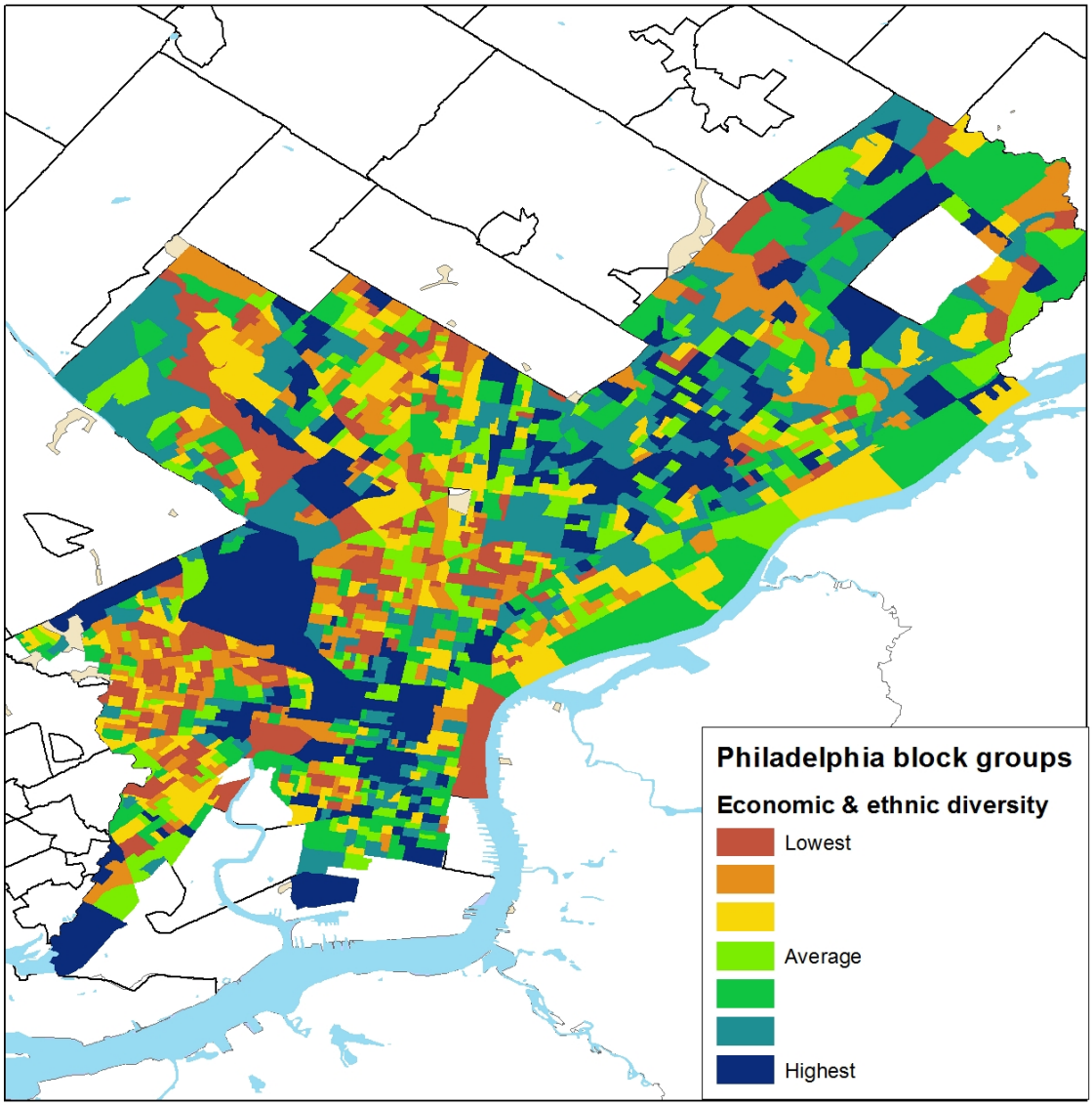
We have combined three measures—the Gini coefficient, the income diversity index, and the ethnic diversity index—to create a measure of economic and ethnic diversity. Each of the variables picks up a different element of diversity. The Gini coefficient measures where income is most unequally distributed *within* a block group, that is, where the gap between rich and poor residents is greatest. The economic diversity measure focuses on how closely the distribution of household income diverges from the national distribution. Finally, ethnic diversity measures the predominance of non-majority groups within a block group.

Because each measure focuses on a different type of diversity, the correlations between the three are not particularly strong.

	Income diversity	**Gini**	**Ethnic diversity**
Income diversity	1.000	-0.118	-0.147
Gini coefficient	-0.118	1.000	0.080
Ethnic diversity	-0.147	0.080	1.000

A single factor emerges from the analysis, which explains 41 percent of the variance in the three variables. The factor loads relatively strong on three variables with absolute values of factor loadings between .58 and .70.

Variables	Factor loading
Income diversity	-0.699
Gini coefficient	0.576
Ethnic diversity (% not member of largest ethnic group)	0.641

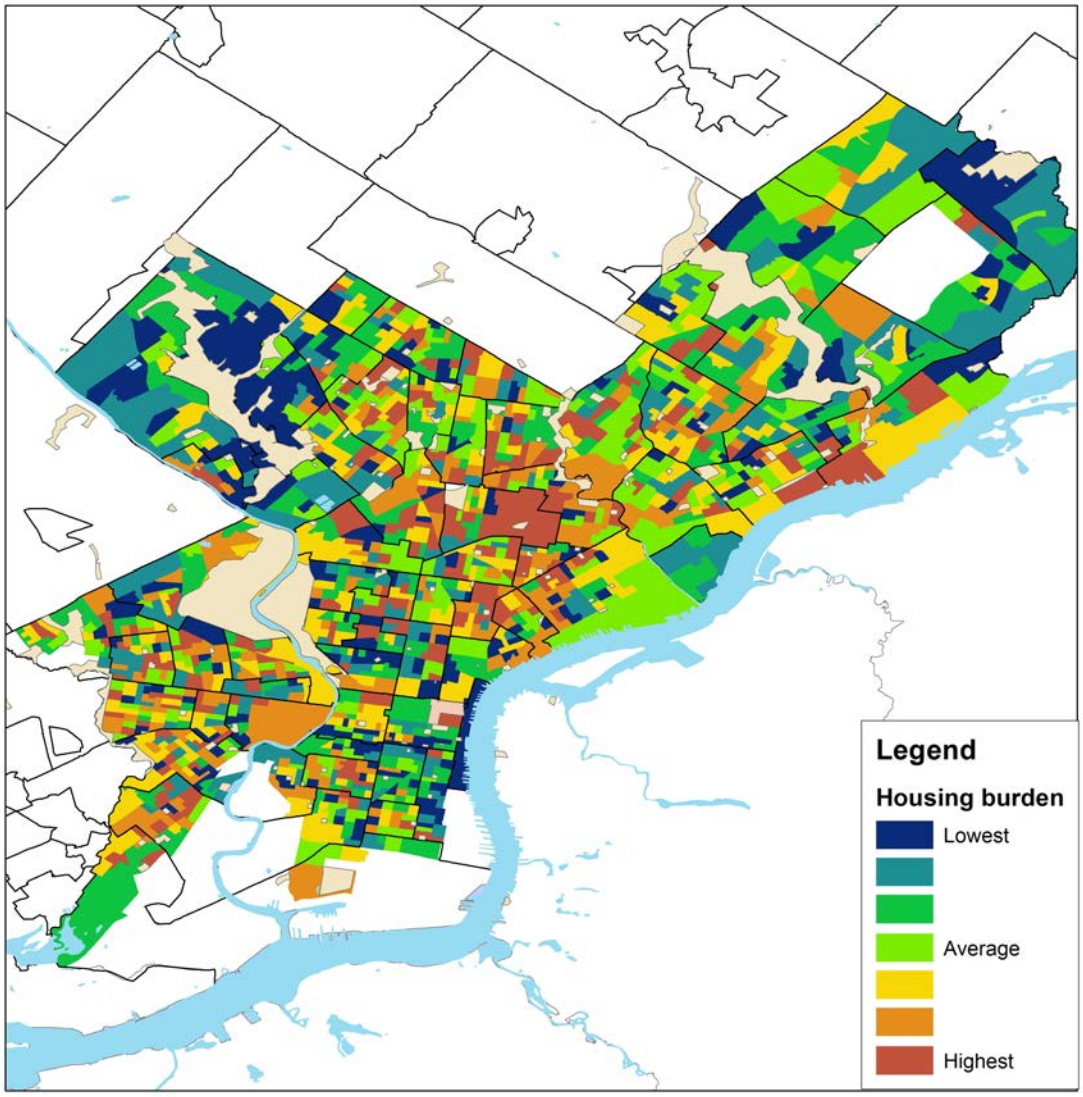


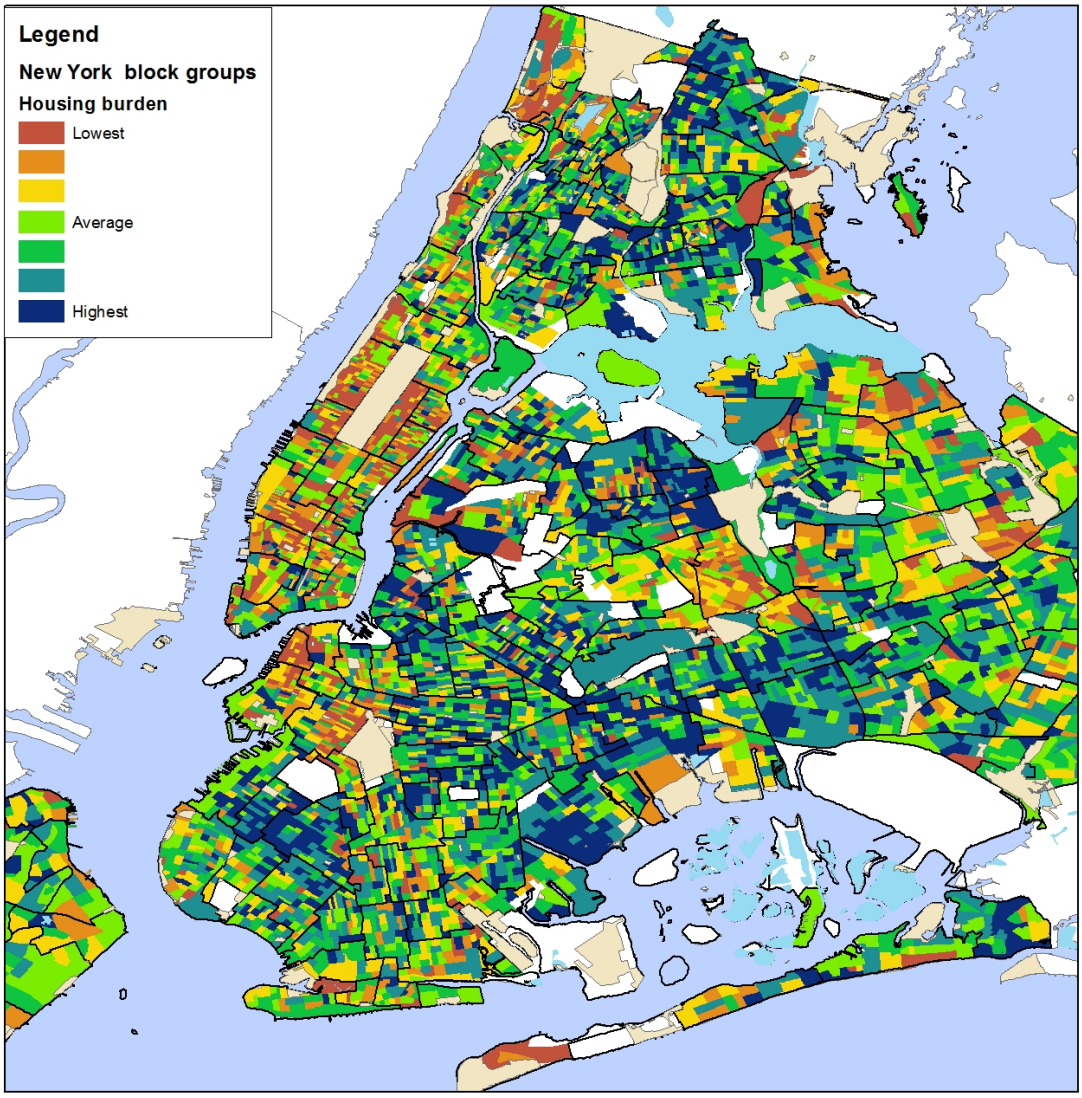
Housing burden index

We revised the housing factor in several ways. First, because our purpose is to create an index for multiple cities, we decided to focus on census variables that would be available consistently in all cities. Second, although the link between income and housing is strong, we tried to focus on elements of housing that were more specific to the challenges of the housing market. Specifically, we focused on three features: overcrowding, cost burden, and travel-to-work time. The resulting factor was most correlated with cost burden, with smaller loadings for the other two features.

Variables	**Factor loading**
Homeownership: Percent owner occupied	-0.281
Overcrowding: 1.5 -2.0 persons per room	0.271
Overcrowding: Over 2.0 persons per room	0.243
Cost burden: Median owner cost burden percentage with mortgage	0.790
Cost burden: Median owner cost burden percentage without mortgage	0.519
Cost burden: Housing burden over 30%	0.857
Cost burden: Housing burden over 50%	0.844
Inconvenience: Travel time to work over 60 minutes	0.377

The housing burden sub-index varies greatly across the four cities. Austin and Seattle had the lowest burdens, and Philadelphia neighborhoods too had relatively low housing burdens. In contrast, New York City was dominated by high housing burden neighborhoods, as shown on the map below.


Legend
Housing burden
Lowest
Average
Highest


Legend
New York block groups
Housing burden
Lowest
Average
Highest

Estimating social wellbeing indicators for Philadelphia

Ten sub-indexes have been calculated only for Philadelphia. These include: three measures of social connection (institutional connection, face-to-face connection, and the cultural asset index): three measures of health (morbidity, lack of access, and social stress); school effectiveness; insecurity; environment; and political voice.

Social connection indexes

SIAP has a long-time interest in measures of social connection. Our core measure of cultural engagement—the Cultural Asset Index (CAI)—is focused on several measures of engagement, including the number of nonprofit cultural organizations and the cultural participation rate. In constructing our sub-indexes for Philadelphia, we were able to draw on several census variables as well as the IRS master file of exempt nonprofit organizations and the Public Health Management Corporation's (PHMC) Community Health Survey. Since the 1990s, PHMC has conducted a biennial survey of Southeast Pennsylvania households. It includes questions about respondent's health status, health-related behaviors, access to and use of health services, and (since 2004) respondent's "social capital" (including level of community participation and perceptions of trust and belonging).

The PHMC survey includes approximately 4,300 respondents for the city of Philadelphia for each year. In order to increase the accuracy of our estimates for census tracts, we combined data from the 2008, 2010,and 2012 surveys, giving us approximately thirteen thousand cases. The surveys identify the census tract of each respondent. We calculated tract averages for relevant variables and then used spline interpolation to make block group estimates.

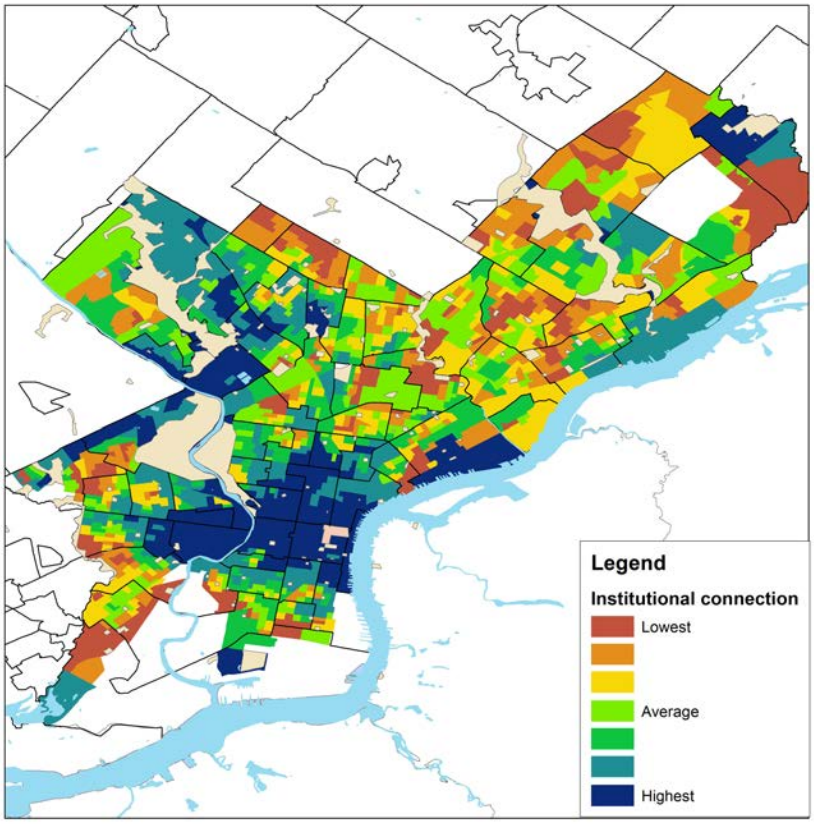
Non-arts indexes of social connection

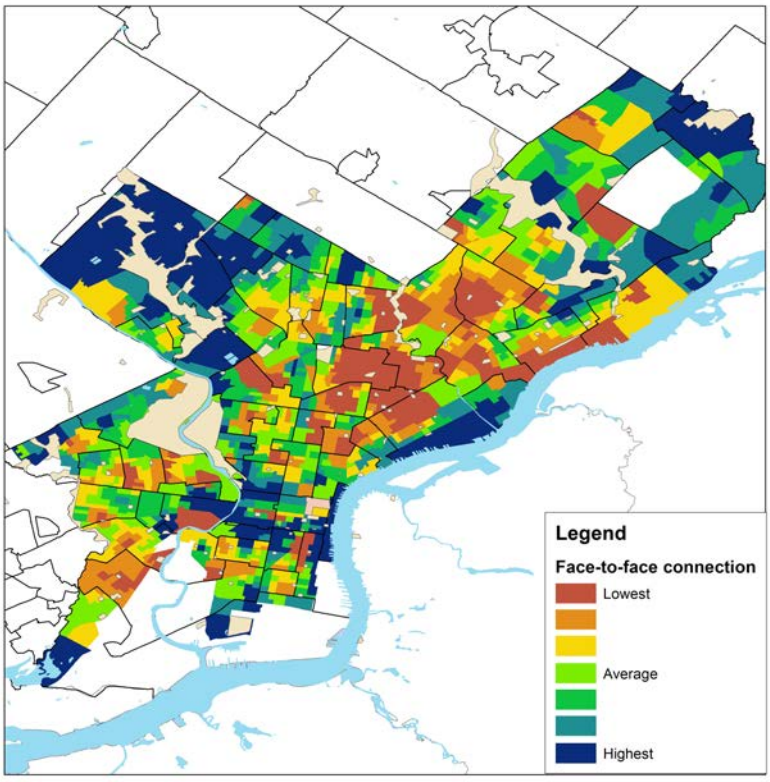
The analysis of social connection produced two factors that together explained 48 percent of the variance in 14 variables. The first factor—which we characterize as *institutional connection*—loaded heavily on measures of concentration of nonprofits, including neighborhood improvement organizations, recreational organizations, and youth-focused groups. In addition, this factor had high loadings for measures of neighborhood instability, like percent of population that lived outside of Pennsylvania a year earlier and low concentration of homeowners.

The second factor—which we call *face-to-face connection*—loaded on measures of social capital, including neighbors' willingness to work or help one another, participation in local groups, and measures of trust and belonging. (Note that the higher score represents lower trust or sense of belonging.)

Following the social connection component variable matrix below are two Philadelphia maps that compare block group findings on institutional connection and face-to-face connection.

Variables	Institutional connection Factor loading	Face-to-face connection Factor loading
Number of community groups		0.760
Any community engagement		0.729
Neighbors work together		-0.666
Perception of belonging in neighborhood		-0.780
Trust neighbors		-0.772
Have worked with neighbors to improve neighborhood		0.466
Special interest organizations within 1/4 mile	0.915	
Neighborhood improvement organizations within 1/4 mile	0.914	
Volunteer organizations within 1/4 mile	0.795	
Recreation within 1/4 mile	0.872	
Youth groups within 1/4 mile	0.852	
Religious groups within 1/4 mile	0.678	
Professional & labor groups within 1/4 mile	0.914	
Social & fraternal organizations within 1/4 mile	0.660	
Percent living in same house one year ago	-0.546	
Percent moved from another state or abroad	0.610	0.227
Owner occupied housing.	-0.403	


Legend
Institutional connection
Lowest
Average
Highest


Legend
Face-to-face connection
Lowest
Average
Highest

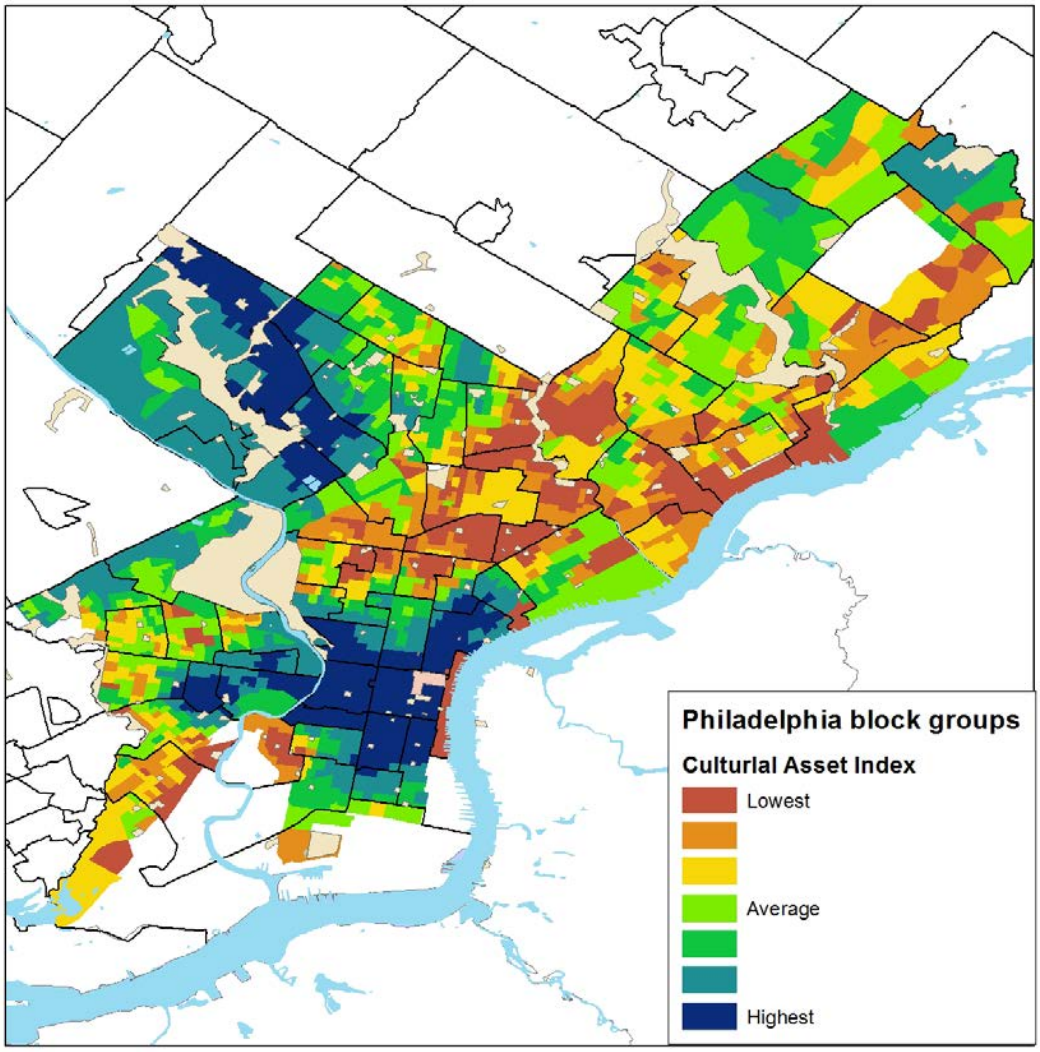
Arts indexes of social connection

The Cultural Asset Index (CAI) includes SIAP's data on nonprofit cultural organizations, commercial cultural enterprises, and resident artists based in the city of Philadelphia. It also includes a measure of *cultural participation* derived from the Greater Philadelphia Cultural Alliance's cultural list cooperative. Philadelphia's Cultural Asset Index was originally developed as part of SIAP's contribution to the CultureBlocks project funded by the National Endowment for the Arts and ArtPlace America.

For three of these four measures, we calculated both a *buffer estimate* (number within one-quarter mile of the block group) and a *point estimate* (number within a block group). For the current analysis, we then converted the 2010-12 index from 2000 to 2010 census block group boundaries.

Variables	**Factor loading**
Cultural participants 2010	0.692
Resident artist 2011 points	0.803
Resident artist with 1/4 mi 2011	0.888
Commercial arts points 2011	0.662
Commercial arts within 1/4 mi 2011	0.825
All nonprofits within 1/4 mi 2010-12	0.877
All nonprofits points 2010-12	0.782

Philadelphia's Cultural Asset Index is strongest in Center City and its surrounding neighborhoods as well as in Northwest Philadelphia. As discussed in the text, this leads to a strong correlaton between the CAI and the economic wellbeing index. In some analyses, we therefore computed a corrected CAI using the residual of a regression analysis with the CAI as our dependent variable and economic wellbeing (quadratic transformation) as the independent variable.



Health indexes

The health dimension of our index represents perhaps the most complex set of indicators. First, it is the one domain for which the census has virtually no information. So we have relied on two local sources of data: the Philadelphia Health Department's vital statistics and the PHMC community health surveys. Second, the different elements of health are related to one another but not closely enough to justify reducing them to a single dimension. As a result, we have produced three sub-indexes of health for Philadelphia: morbidity (concentration of bad health), health access (measures of insurance and provider access), and social stress.

Morbidity/personal health[3]

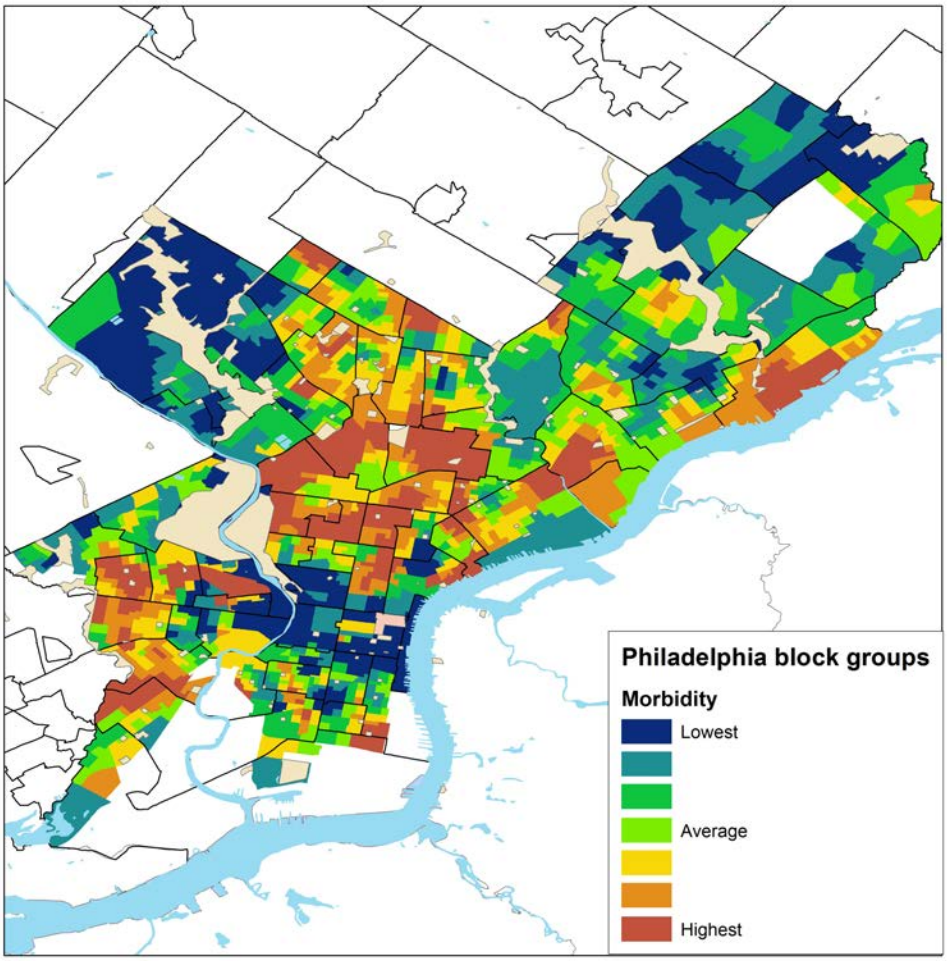
The PHMC community health survey provides a number of measures of the current health of respondents. Our analysis focused on six measures: proportion of

[3] To avoid confusion, we inverted this factor in the paper and called in "personal health."

respondents who reported a chronic condition, diabetes, hypertension, or obesity; proportion of respondents who ever smoked; and body mass index. The principal component analysis explained 50 percent of the variance in the variables. The factor loaded heavily on all variables except whether the respondent had ever smoked.

Variables	**Factor loading**
Percent diabetes	0.608
Percent ever smoked	0.247
Percent high blood pressure	0.677
Percent obese	0.757
Body mass index	0.812
Poor or fair health	0.810
Average health status	0.848

The map below suggests a significant association of morbidity with economic wellbeing across Philadelphia. Morbidity was also associated with the concentration of African Americans in a neighborhood, with even middle-income black neighborhoods having higher morbidity scores. The low-income neighborhoods in North and West Philadelphia exhibit the highest levels of morbidity, while residents of Center City and the Northwest are less likely to suffer bad health.



Health access

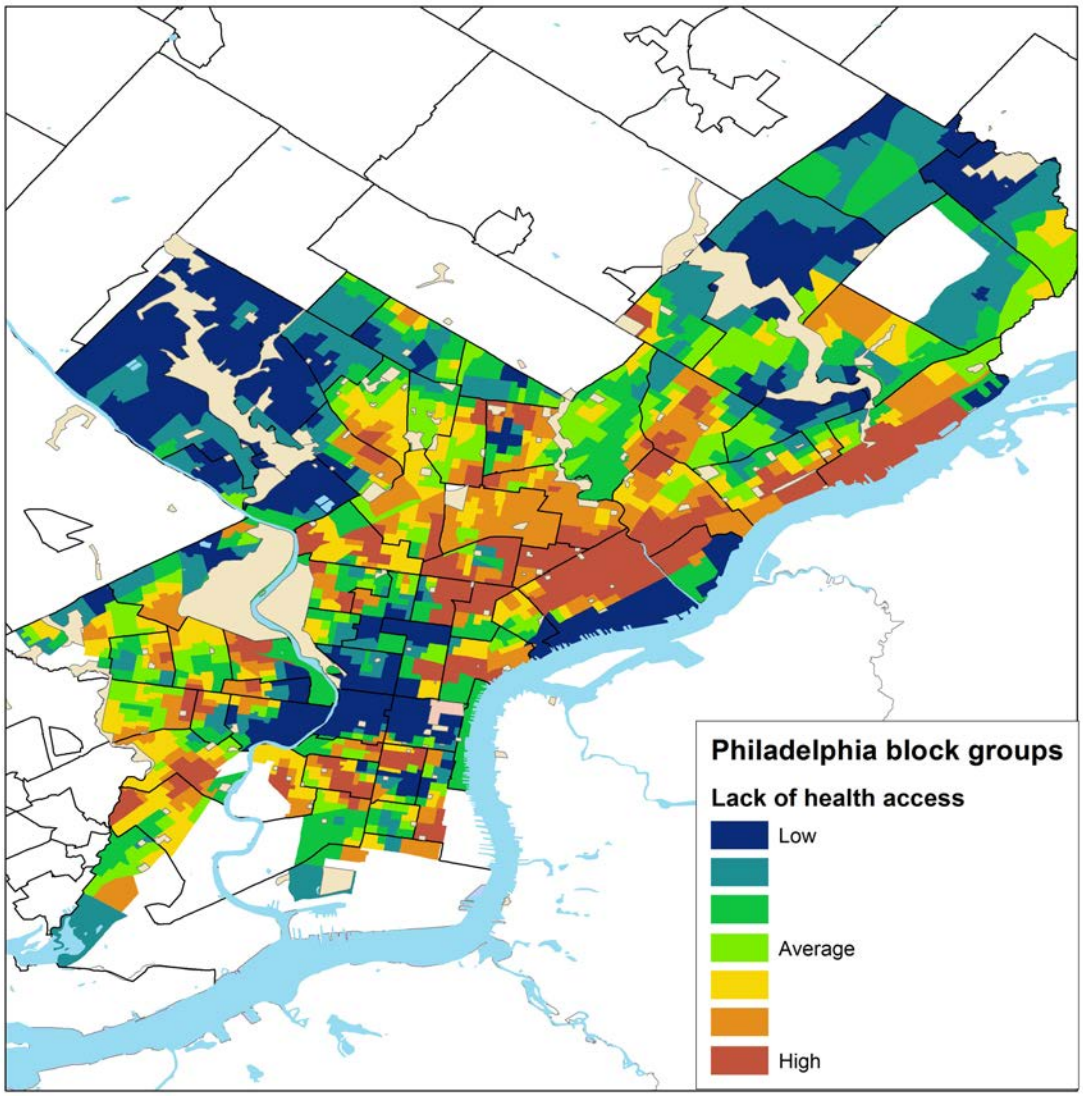
The PHMC survey provides a number of measures of access to health care, including whether the respondent has health insurance, whether he or she did not seek care or fill a prescription because of the cost, and several indicators of emergency room utilization. Our factor analysis included five variables, and the single factor explained 51 percent of the variance in the five variables. The factor has strong negative loadings on the cost and ER measures and a positive loading on insurance.[4]

Variables	Factor loading
Delayed care because of cost	0.740
Didn't fill prescription because of cost	0.739
Number of times used ER	0.734

[4] The original factor loaded positively on the bad health indicators. We inverted the scores so that a positive score indicates high levels of insurance and low levels of cost-induced behaviors and use of ER.

Have health insurance	-0.632
Ever used ER in past year	0.778

The Philadelphia map of health access below shows better access in much of Center City and Northwest Philadelphia. Neighborhoods around Center City, however, have much spottier indicators of health access, perhaps because of the large number of young adults who don't have health insurance or avoid going to the doctor. Our data predate the implementation of the Affordable Care Act, so this phenomenon may change over the next few years.



Social stress

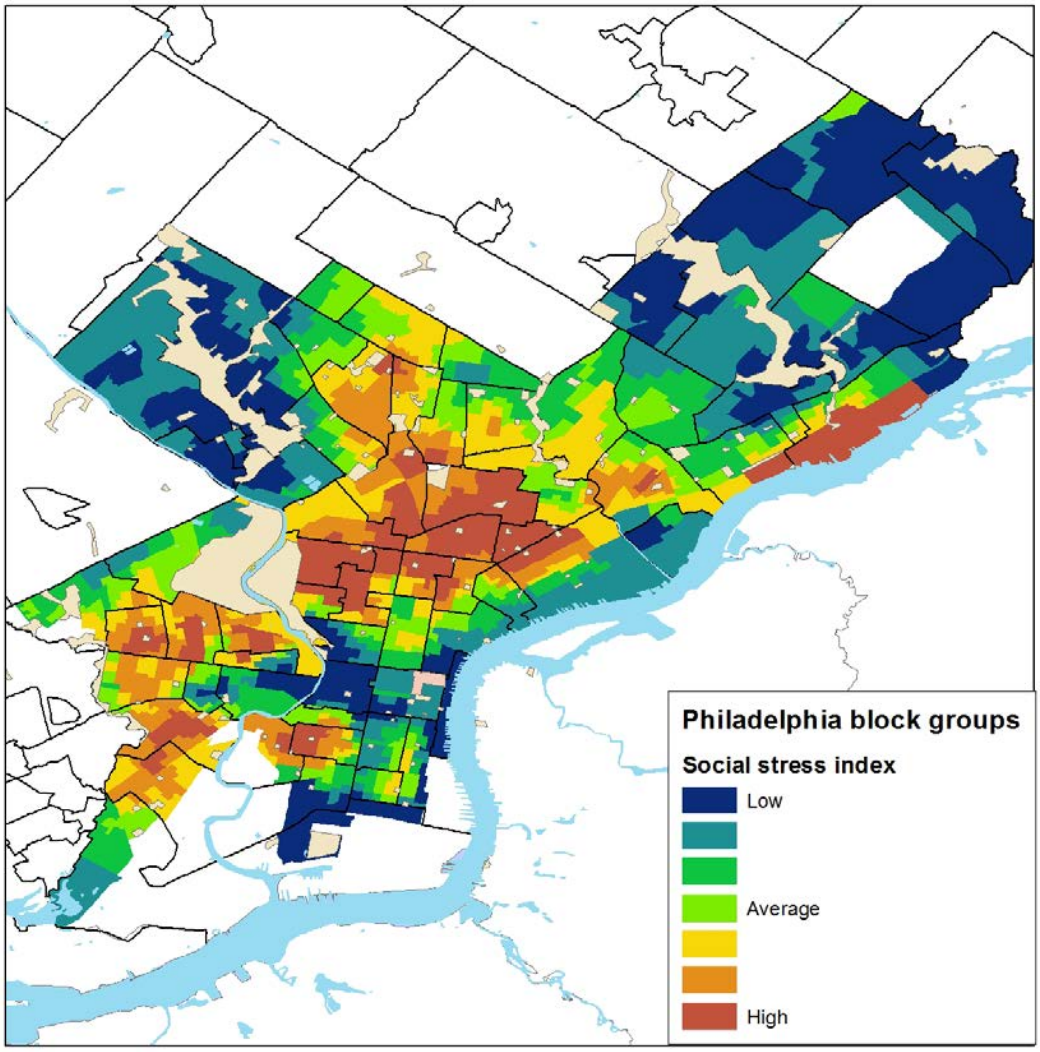
Five behavioral variables in our health database were very closely associated. Three are associated with pregnancy—teen birthrate, likelihood that a prospective mother would receive prenatal care, and proportion of low birthweight babies in a population. The fourth behavior—homicide death rate—was also highly correlated with the birth-related indicators.[5] The City of Philadelphia also provided us with data on reports of child abuse and neglect for 2008-2012.

This factor shares many features with the *social stress index* proposed by Kennen Gross and Paul McDermott based on an earlier set of data.[6] Our social stress factor is notable in a number of ways, as shown on the map and table below. First, as we might expect, it is more closely related to very poor neighborhoods in Philadelphia. Moreover, it is more strongly related to the other health factors to emerge from the analysis.

Variables	**Factor loading**
Fertility rate, women 10-17	0.842
Fertility rate, women 15-19	0.787
First trimester prenatal care	-0.922
Late or no prenatal care	0.922
Low birth weight rate	0.788
Very low birth weight rate	0.647
Homicide death rate	0.793
Confirmed cases of abuse and neglect rate 2008-12	0.859

[5] The data on births and homicide death is based on city data processed by PHMC as part of its Community Health Data Base. The University of Pennsylvania Library System provided us with the data. PHMC data were at the tract level. We used spline interpolation to estimate a continuous measure of these variables and then calculated block group estimates of each.

[6] Gross, Kennen S. and Paul A. McDermott. "Use of City-Archival Data to Inform Dimensional Structure of Neighborhoods." *Journal of Urban Health—Bulletin of the New York Academy of Medicine* 86 (2): 161-182. 2009.


Philadelphia block groups
Social stress index
Low
Average
High

School effectiveness

Measuring the current effectiveness of public schools presents a number of methodological and conceptual problems. At the individual level, we might see school quality as measured by the "inputs" of the educational process (like teachers, other staff, books, or facilities) and "outputs" (like test scores). As we shift to the neighborhood level, however, measurement grows more complicated. Are we interested primarily in the specific educational opportunities that children enjoy in their neighborhood or are we interested in the "neighborhood effect" that all residents might enjoy by having a good local school?

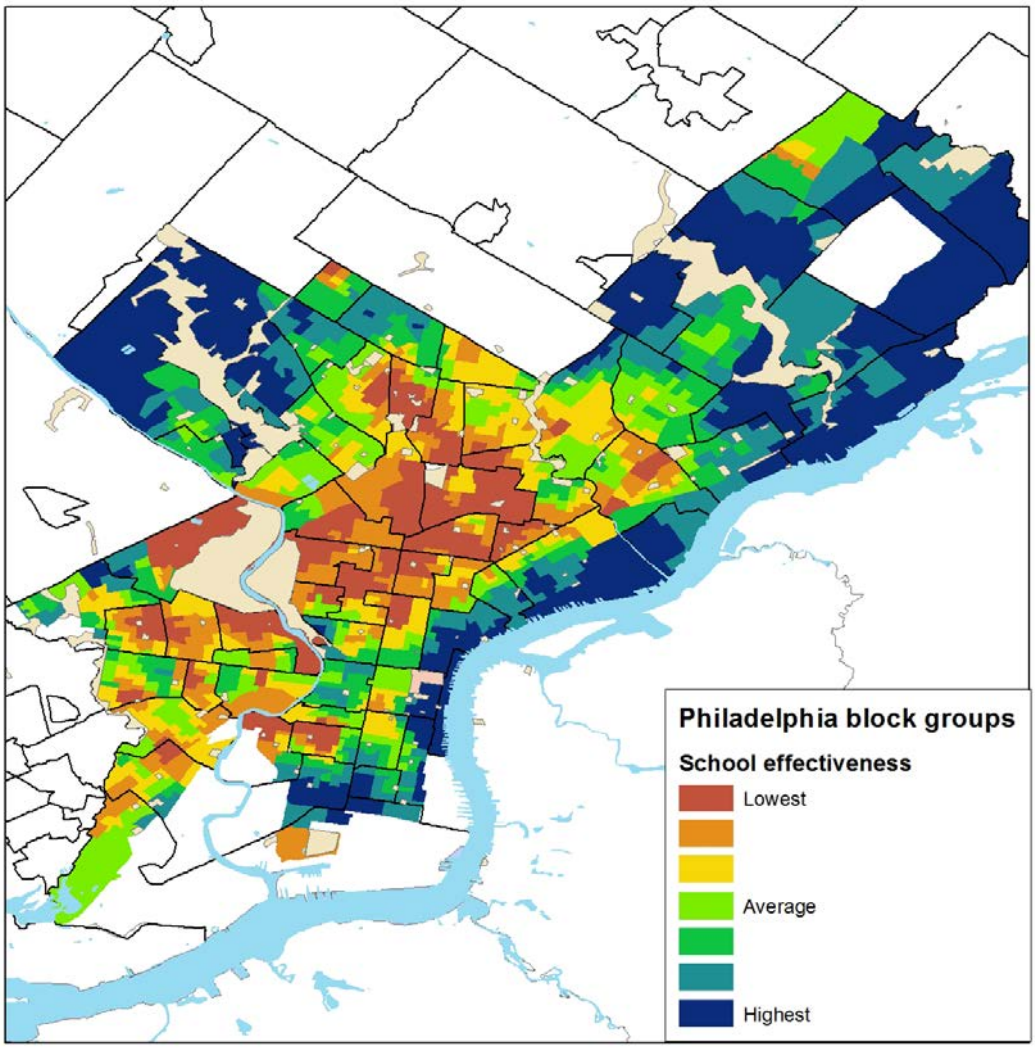
These conceptual issues are complicated by data limitations. We have data from the census on school attendance, so we can identify sections of the city with a high proportion of private school attendees and early school-leavers (dropouts). But the data on student achievement is more open to interpretation. The most comprehensive data are associated with standardized scores on state-mandated tests, but use of test scores is complicated by patterns of school attendance. First, Philadelphia has had a historically high rate of private school attendance, and that rate has increased in recent decades. Second, although the city still has neighborhood schools, a large proportion of students attend a school outside their neighborhood. This is especially the case for high school.

Ideally, we'd like to be able to aggregate test scores in two ways: for the area in which the school is located and for the area in which the student lives. The first figure would measure the *neighborhood effect of a school*, that is, how having a good school in your neighborhood functions as an externality. The second figure would allow us to aggregate the individual benefits of an effective education. Unfortunately, our available data on average school scores provide information only on the first of these measures.

For our sub-index, we used point data on elementary school test scores to interpolate scores for Philadelphia's block groups. We combined these estimates for math and verbal test scores and student/teacher ratios with census data on private school attendance and dropout rates. The resulting analysis produced a single factor that explained 42 percent of the variance in all of the variables. The data on private schools and test scores loaded heavily on the factor, but the fit with dropout rates and student/teacher ratios was weaker.

Variables	Factor loading
Drop-out rate 2008-12	-0.307
Private school attendance (K-8 grades)	0.643
Private school attendance (high school)	0.667
Math proficiency	0.841
Reading proficiency	0.866
Student/teach ratio	0.342

The spatial distribution of the factor, shown on the map below, suggests a correlation between the school effectiveness factor and economic wellbeing. Again, sections of West and North Philadelphia had the lowest scores on this sub-index, while Center City and the Northeast and Northwest had higher scores.



Insecurity index[7]

The Sen/Stiglitz commission proposed that nations gather data on two dimensions of insecurity: protection against the vicissitudes of life and personal security. Obviously social protection, like unemployment or disability insurance, do not vary across the city of Philadelphia. Our analysis, therefore, focuses on personal security. In particular, we used two types of data: reported crimes, serious personal and serious property incidents; and incidents of interpersonal disputes—either intergroup conflicts or neighbor disputes—based on complaints to the Philadelphia Human Relations Commission (PHRC).

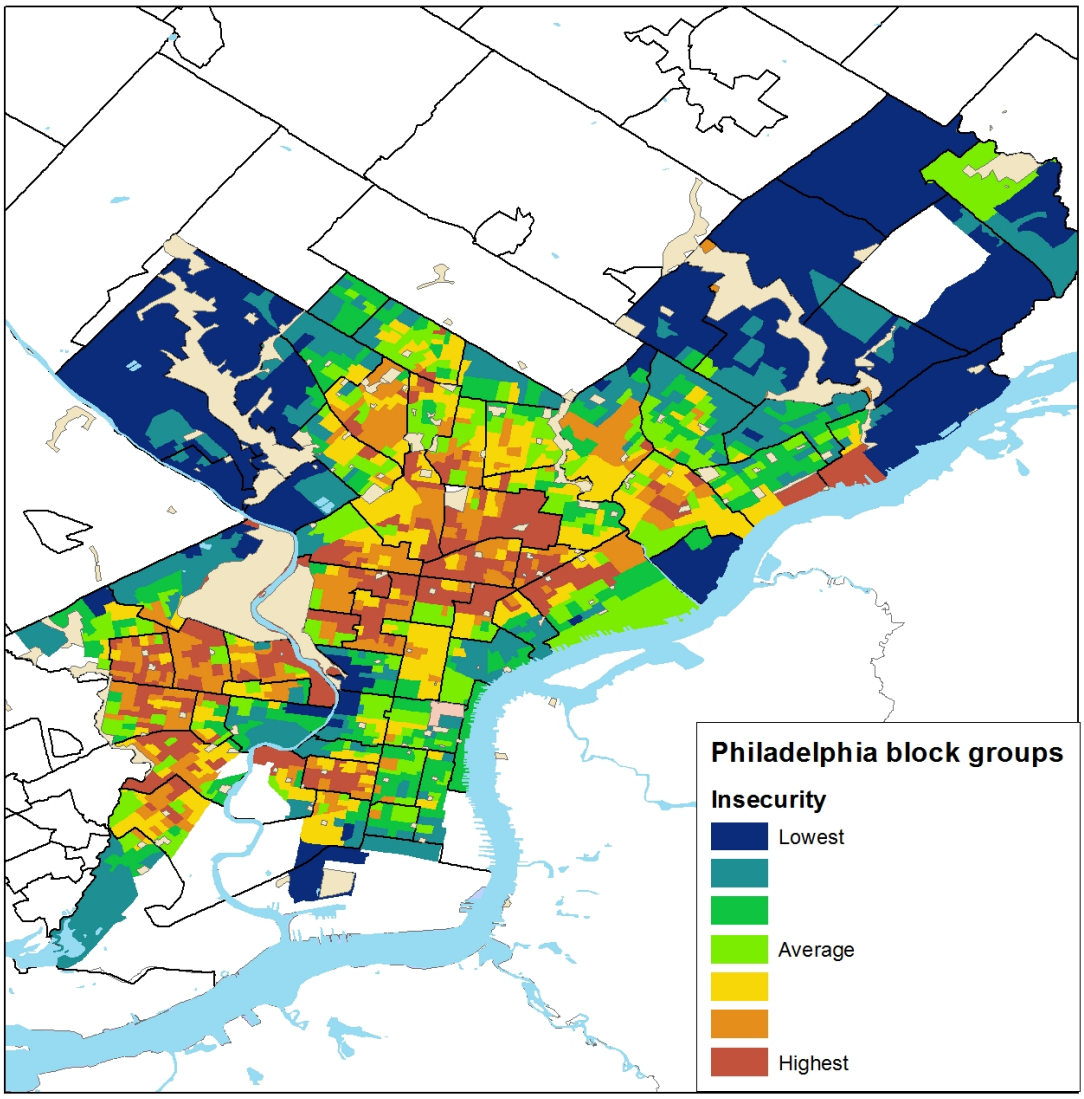
Variables	Factor loading
Aggravated Assault Firearm per 1000	0.778
Aggravated Assault No Firearm per 1000	0.903
Burglary Non-Residential per 1000	0.802
Burglary Residential per 1000	0.881
Homicide - Criminal per 1000	0.724
Homicide - Gross Negligence per 1000	0.674
Motor Vehicle Theft per 1000	0.916
Rape per 1000	0.919
Recovered Stolen Motor Vehicle per 1000	0.900
Robbery Firearm per 1000	0.874
Robbery No Firearm per 1000	0.876
Theft from Vehicle per 1000	0.696
Thefts per 1000	0.660
Intergroup per 1000	0.455
Neighborhood dispute per 1000	0.763

The insecurity factor analysis primary source of data was the Philadelphia Police Department's Part One Crime Incidents available through the Open Data Philly website. (http://www.opendataphilly.org/opendata/resource/215/philadelphia-police-part-one-crime-incidents/) We used data for 2008-12 for the following crimes: aggravated assault with firearm, aggravated assault without firearm, burglary non-residential, burglary residential, homicide—criminal, homicide—gross negligence, motor vehicle theft, rape, recovered stolen vehicle, theft from vehicle, and other thefts. In addition, from the PHRC data, we calculated rates for reported intergroup incidents and neighborhood

[7] To avoid confusion, we inverted this factor in the paper and called it the security factor.

disputes. The positive values for each variable indicate that the higher the score, the more insecure the block group.[8]

As shown on the map below, crime rates in Philadelphia neighborhoods are correlated to some extent with race and socio-economic status. However, although low-income sections of North Philadelphia certainly have high crime rates, areas in and around Center City with higher socio-economic status also record high rates of crime.



[8] The factor analysis of insecurity produced two factors. The first factor accounts for 64 percent of the variance of all of the included variables and the second 17 percent. The second factor loaded most heavily on thefts and intergroup conflicts and contrasted these phenomena to most crime categories (which received negative factor loadings). We decided to use the first, more representative factor.

Environment index

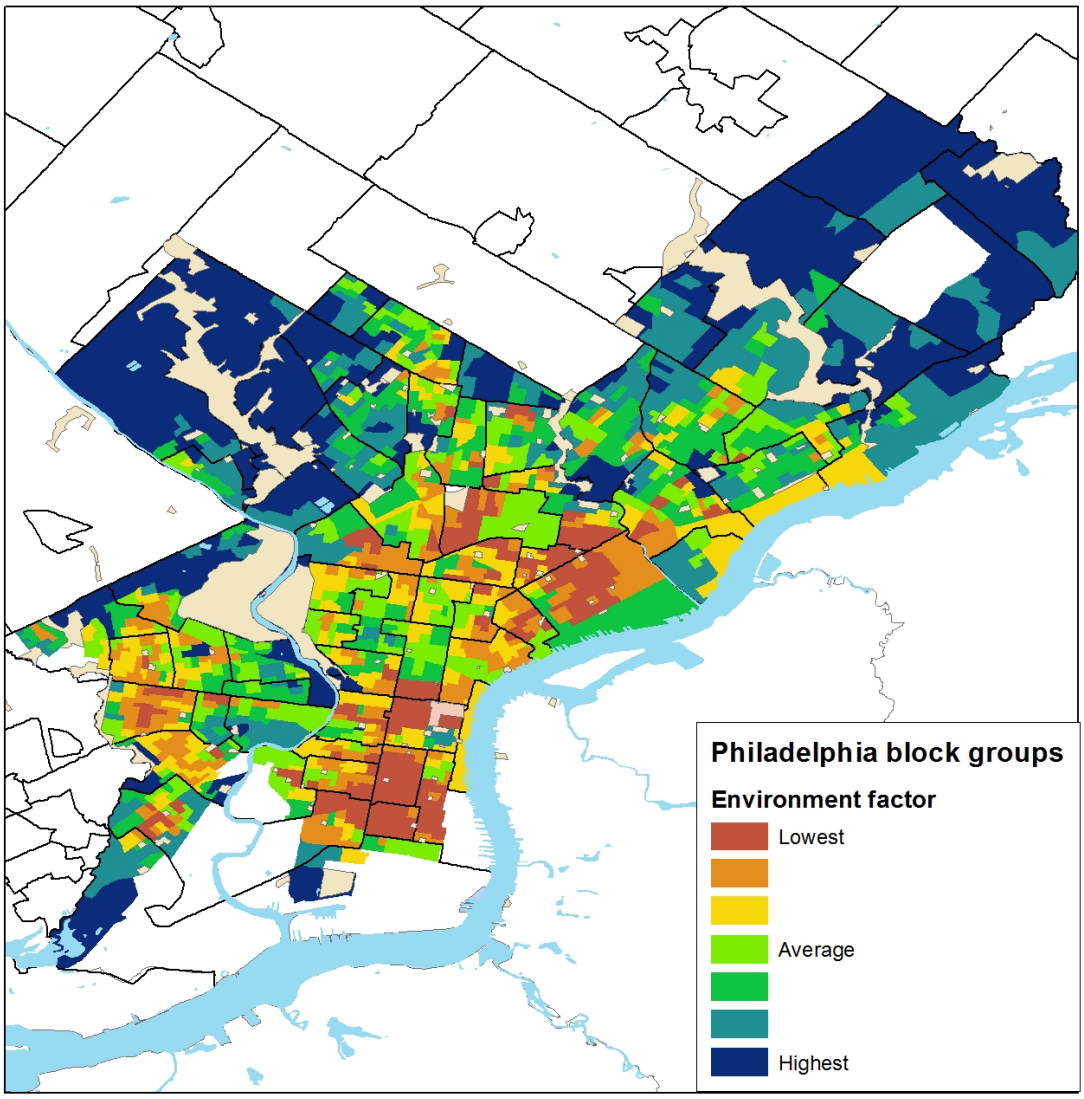
Environmental wellbeing takes on a different meaning at the local level than it does from the national perspective considered by the Sen/Stiglitz commission. Many ways that environmental factors vary across a nation or continent are irrelevant. Most natural disasters that hit Philadelphia will not have a significantly larger impact on one neighborhood than another, nor are the laws governing environmental hazards different in Mayfair or Eastwick. There are a number of environmental conditions, however, that affect one section of the city more than another. The concentration of environmental amenities like parks and trees, for example, will benefit particular neighborhoods.

Following our 2013 analysis, we focused on the concentration of environmental amenities (and lower hazards) by neighborhood. The final analysis included five measures: percent of block group covered by trees; percent of block group covered by grass; a measure of summertime infrared radiation from two hot, cloudless days in 2006 and 2007 (Landsat data); average distance to an historical stream; and average distance to a park. Thermal radiation, tree coverage, and grass coverage were the strongest variables in determining this factor.

Variables	**Factor loading**
Tree percentage	0.869
Grass percentage	0.713
Average infrared radiation	-0.908
Distance to historical stream	0.468
Distance to city park	0.209

The map of environmental amenities shows that Northwest Philadelphia—and, to a limited degree, parts of the Northeast—enjoy the highest concentration of these features. Center City and its surrounding neighborhoods, which have high scores on many other dimensions of wellbeing, suffer with respect to environmental amenities because of the high proportion of buildings and impervious surfaces.

As shown on the map below, several advantaged neighborhoods in the Northwest, like Chestnut Hill and West Mount Airy, have high levels of environmental amenities. Center City and its surrounding neighborhoods, by contrast, have below average rankings on this sub-index.



Political voice index

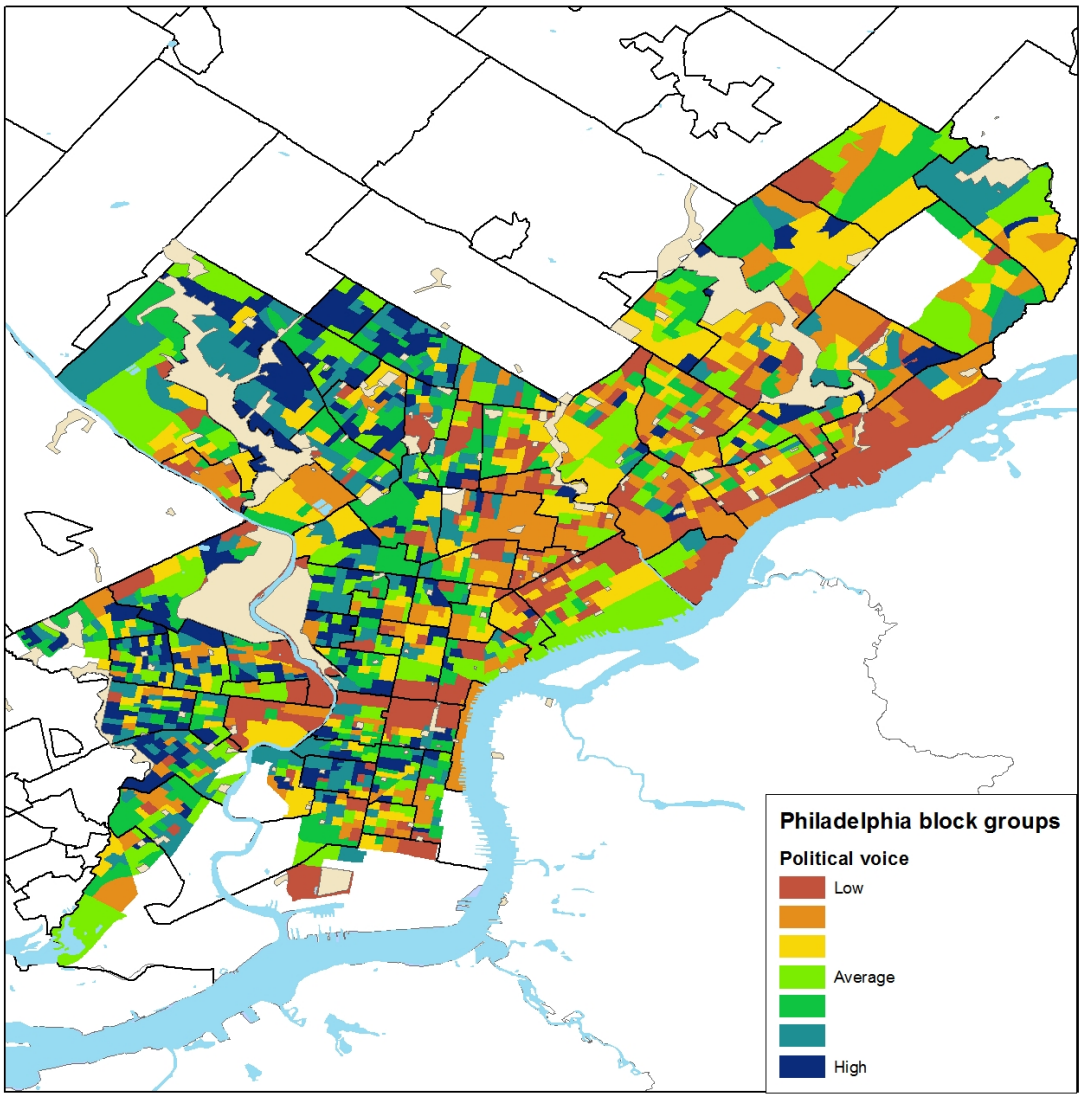
Political voice has been the least satisfying of the indexes that we've estimated as part of this project. First, there is a conceptual problem. Sen and Stiglitz, following the work of other capabilities approach writers, give great emphasis to freedom of expression and its abridgment through censorship and intimidation. Whatever we might say about the state of free expression, it certainly does not vary dramatically across the city of Philadelphia. Indeed, of the four dimensions of political voice mentioned by Sen and Stiglitz—institutional rights, discrimination, open political institutions, and civic participation—only civic participation might vary significantly across the city's census tracts.

Second, as discovered in our 2013 analysis, we have a data challenge. The most obvious measure of civic engagement concerns voting: what proportion of the eligible population registered to vote and what proportion of those registered actually voted. The first obstacle had to do with the nature of the data. Election data are gathered for the city's 1,684 voting divisions. Because election boundaries do not match census boundaries, we developed a complicated process to assign a voting division's numbers to each block in the district according to its population and then aggregated those totals for all of the blocks within each block group. We then calculated the number of eligible voters by aggregating census data on the number of U.S.-born and naturalized citizens over the age of 18.[9] These data were available only at the tract level, so to estimate a block group eligible population, we had to multiply the block group population aged 18 years and older by the tract's percentage of all residents 18 or older who were citizens.

As in the earlier analysis, we did not attempt to use the official number of registered voters because it generally exceeds that of the eligible population. As in 2013, we used the percent of eligible voters who voted in two elections. For this analysis we used the general election totals for the 2010 gubernatorial and 2012 Presidential elections.

The two variables—percent of eligible voters who voted in 2010 and 2012—were highly correlated, so the resulting factor loaded at .99 on each. As with our earlier analysis, this measure did not fit neatly with any of the other factors. The presence of Barack Obama on the ballot in 2012 clearly fueled high turnout in black sections of the city, which accounts for the negative correlation of political voice and diversity. Otherwise, as suggested on the map below, it's difficult to identify any clear pattern in the data.

[9] This is a high estimate of eligible voters because many citizens have lost their right to vote due to their involvement in the criminal justice system.


Philadelphia block groups
Political voice
Low
Average
High