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Getting on the Bus in Chicago: Accessible public transportation options in residential neighborhoods can lower transportation costs.

## Reducing Foreclosures and Environmental Impacts through Location-Efficient Neighborhood Design

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While the nation continues to grapple with a troubling housing market and a rash of mortgage defaults, new research has emerged drawing a direct link between “location efficiency”—a measure of the transportation costs in a given area—and mortgage foreclosure rates. The study shows that factors such as neighborhood compactness, access to public transit, and rates of vehicle ownership are key to predicting mortgage performance and should be taken more seriously by mortgage underwriters, policymakers, and real estate developers.<sup>1</sup> With transportation costs accounting for roughly 17 percent of the average American household’s income—and the ongoing foreclosure crisis still garnering much attention—the need for better land use planning and better lending practices has never been more clear. NRDC recommends changes both to planning-related policies and mortgage underwriting procedures that can reduce transportation costs and risk of foreclosure while offering significant environmental benefits.



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### What is Location Efficiency?

Location-efficient communities are neighborhoods where residents have access to an array of transportation options to meet their daily travel needs. The most important determinants of location efficiency are the compactness of residential development (number of housing units per acre of residential development) and the proximity of public transit (number of transit trips available per hour at transit stops within a walkable distance).<sup>2</sup> Location-efficient areas are also characterized by a mix of nearby uses and services, shorter travel distances, a concentrated business district or downtown area, and more opportunities to walk, bike, or use transit to get around.

These alternative travel options allow people living in location-efficient neighborhoods to drive fewer miles and own fewer cars, saving them substantial amounts of money on automobile lease or purchase costs, maintenance, gas, insurance, and parking—effectively increasing household income in these areas.

### Location Efficiency and Residential Mortgage Performance

Reduced automobile dependency creates an economic buffer for owners of location-efficient homes. The underlying principle is that the real cost of housing is a combination of mortgage and transportation costs. With more available alternatives to car ownership, residents of location-efficient homes have more flexibility when it comes to managing their transportation costs, making them less likely to default on a mortgage

when compared to otherwise similar homeowners who spend a substantial portion of their household budget on automobile transportation.

For example, homeowners in location-efficient areas may be better protected against rising gas prices such as those observed in the summer and fall of 2008. Even before that spike in gas prices, transportation costs were the second largest expenditure for the typical American household, averaging \$8,750 per year—or more than 17 percent of the average household's pretax income.<sup>3,4</sup> The Center for Neighborhood Technology has created a new index that takes into account the expected transportation costs associated with a home's location, challenging current models that consider only mortgage debt service, property taxes, and home insurance.<sup>5</sup> Analyzing the impact of gas prices on transportation costs shows that the expenses associated with living in car-dependent areas of metropolitan regions can be both volatile and much higher than conventional wisdom holds (see Figure 1).<sup>6</sup> Unfortunately, standard lending practices account for only 9 percent of automobile-related transportation costs for a typical household.<sup>7</sup>

Another aspect of location efficiency that may affect mortgage performance relates to home values. A study looking at 90,000 recent home sales in 15 different markets found a positive correlation between neighborhood walkability and home price, after controlling for both housing and other neighborhood characteristics.<sup>8</sup> If location-efficient homes are more highly sought after, they will be less likely to fall as far in value as other homes in an economic downturn. If homeowners in these areas do default, selling the home may provide a viable alternative to foreclosure.<sup>9</sup>

### Study Supports Connection between Mortgage Foreclosures and Vehicle Ownership

The "Location Efficiency and Mortgage Default" study pulled highly detailed performance data on 40,000 mortgages in Chicago, Jacksonville, and San Francisco, as well as census data on neighborhood conditions, incomes, and automobile ownership. The study then modeled the factors influencing the likelihood that lenders would foreclose on homes in these cities.<sup>10</sup> The average number of vehicles owned per household

### Comparing Two Hypothetical Borrowers in Chicago

In one neighborhood in the Chicago region, the median auto ownership per household is equal to one car per \$33,000 of household income. If a homebuyer in that neighborhood has a credit score of 680, a total debt-to-income ("back end") ratio of 41 percent, and a home loan-to-value ratio of 80 percent, the model predicts a 9.9 percent chance that the home will fall into foreclosure. Now imagine a second buyer purchasing a home in a more location-efficient part of the Chicago region, where auto ownership per household is lower—for instance, one car per \$58,000 of household income. If the second buyer has all of the same mortgage underwriting characteristics as the first buyer, the chance that the home will fall into foreclosure falls to 7.2 percent. Moreover, the model shows that the homebuyer could have a much higher debt-to-income ratio (up to 62.5 percent holding other factors equal), a lower credit score, or a higher loan-to-value ratio, and still have only the same risk of foreclosure as the first buyer.

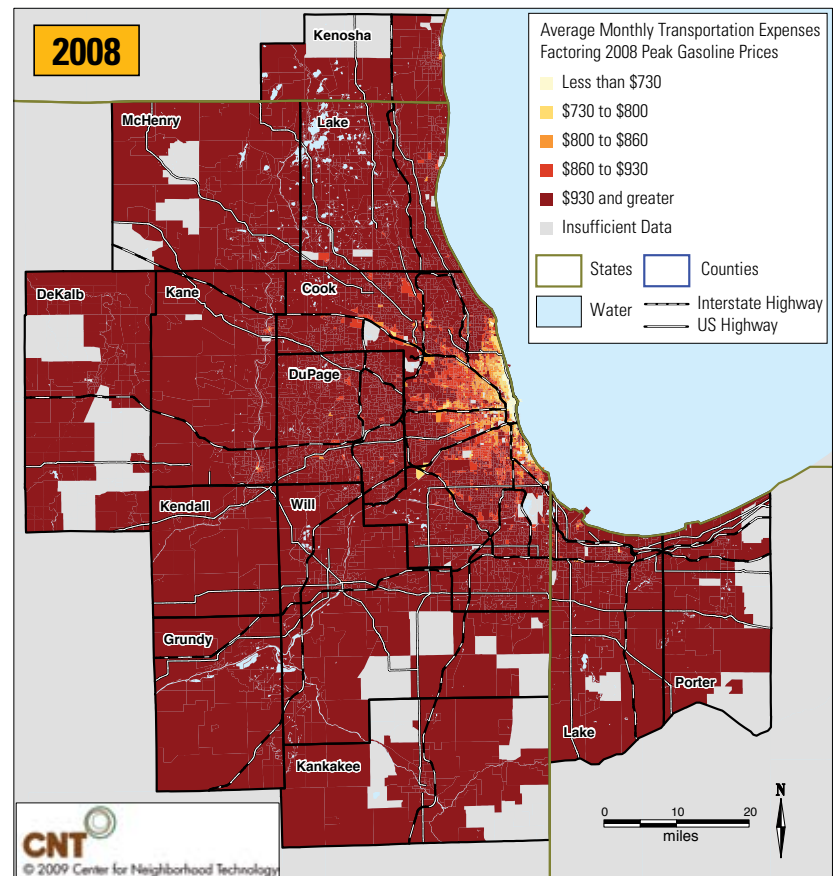
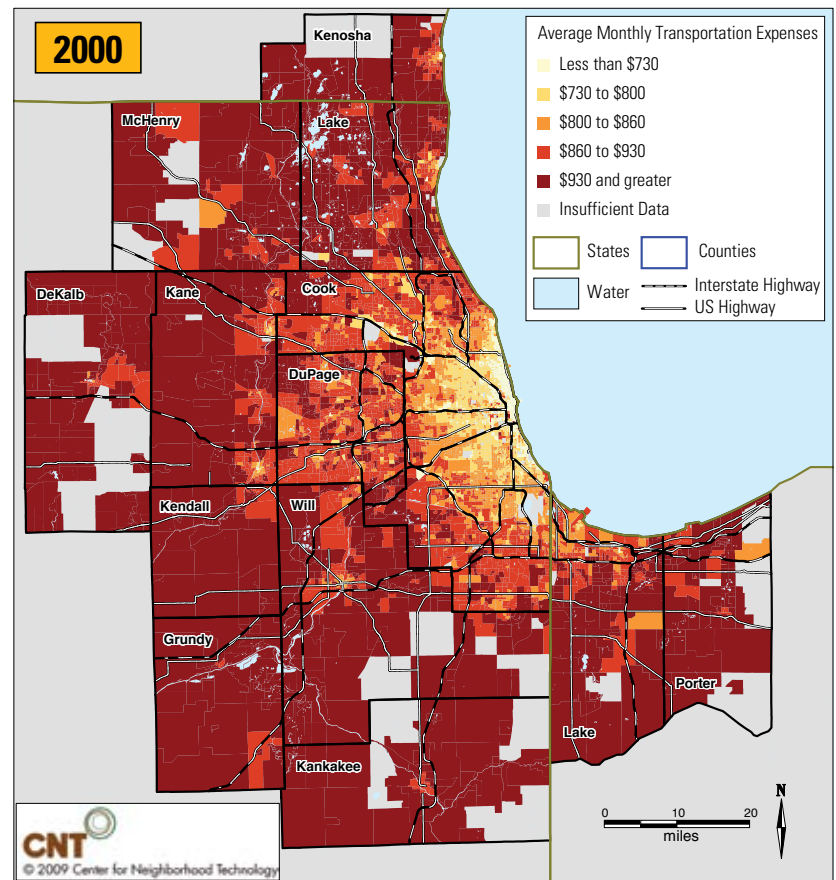
**FIGURE 1: Monthly Transportation Costs in the Chicago Region in 2000 versus 2008**

in the neighborhood, after controlling for income, was the key variable used as a proxy measure for location efficiency and was studied for its impact on mortgage foreclosure. Control variables also included the debt-to-income ratio at the time of mortgage origination for each borrower, borrower credit score, the home loan-to-value ratio at the time of origination, the age of the mortgage, whether the mortgage had fixed or adjustable rate interest, whether the property was owner-occupied, and variables on neighborhood racial composition, population growth, and unemployment.

In all three cities, the study found statistically sound results that the probability of mortgage foreclosure increases as neighborhood vehicle ownership levels rise, after controlling for income. These results suggest that mortgage lenders should include measures of location efficiency in their underwriting to more accurately predict the risk of default. They also support the notion that government land use, zoning, infrastructure, and transportation policies could help to reduce mortgage foreclosures, insofar as they succeed at creating more location-efficient communities.

### Environmental Benefits of Location Efficiency

Changes in policies and lending practices aimed at reducing automobile dependence will also yield substantial environmental benefits. Focusing development on location-efficient land use patterns can help conserve undeveloped farmland, wilderness, and habitat; reduce stormwater runoff pollution by decreasing the amount of paved surface area in a watershed; and lower the amount of unhealthy vehicle emissions in the air.<sup>11</sup> Benefits with respect to climate change may be among the most impressive, with models showing a potential reduction of transportation-related CO<sub>2</sub> from current trends by 7 to 10 percent by 2050.<sup>12</sup>



To view maps of other regions, visit CNT's Housing and Transportation Affordability Index at <http://htaindex.cnt.org>.

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### Conclusion and Policy Recommendations

It has never been more clear that the housing and mortgage industry plays a critical role within our overall economy. Lenders appear to have systematically underestimated mortgage risk for borrowers purchasing homes in automobile-dependent areas, thereby exposing themselves to increased credit losses. They also appear to have overestimated mortgage risk for borrowers in location-efficient areas, thereby losing significant business opportunities. More finely tuned lending practices that incorporate the importance of location efficiency can reduce foreclosure rates, which would benefit both borrowers and lenders, and strengthen the economy as a whole.

Based on the results of the “Location Efficiency and Mortgage Default” study and other evidence, NRDC recommends the following:

**1. Public policy relating to land use, infrastructure, and transportation should enable and encourage development of location-efficient communities to help improve mortgage performance and reduce foreclosures.** Examples of such policies—

commonly referred to as “smart growth”—include planning, designing, zoning, and providing incentives to promote more compact development; targeting infrastructure investments towards the previously developed areas of a region; enhancing and expanding transit systems; improving bicycle and pedestrian infrastructure; and preserving open space.<sup>13</sup>

**2. Mortgage underwriting practices should be changed to provide access to proportionally better borrowing terms for purchasers of location-efficient homes.** This would more closely reflect the actual affordability of different types of neighborhoods, and in turn drive the real estate market to more accurately match supply to demand.

**3. Further analysis should be conducted by lenders and researchers to develop and refine tools for assessing the impact of location-efficiency variables within their models.**

This analysis is particularly important for those working on automated mortgage underwriting models.

### Learn More about Location Efficiency and Smart Growth



Visit NRDC  
Smart Growth  
Program  
Director

Kaid Benfield's blog at  
<http://switchboard.nrdc.org/blogs/kbenfield>.

<sup>1</sup> Stephanie Yates Rauterkus, Grant Thall, and Eric Hangen (2009). “Location Efficiency and Mortgage Default.” Paper accepted for publication by the Journal of Sustainable Real Estate.

<sup>2</sup> John Holtzclaw, Robert Clear, Hank Dittmar, David Goldstein and Peter Haas (2002). Location Efficiency: Neighborhood and Socio-Economic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles, and San Francisco. *Transportation Planning and Technology* 25: 1-27.

<sup>3</sup> “The Affordability Index: A New Tool for Measuring the True Affordability of a Housing Choice.” Center for Transit Oriented Development and Center for Neighborhood Technology. Brookings Institution, *Market Innovation Brief*, January 2006.

<sup>4</sup> The US Bureau of Labor Statistics 2007 Consumer Expenditure Survey estimates annual household transportation costs at about \$8,758 per year, of which only \$538 is for public transportation. For the percentage breakdown see Table 46 of the 2007 Consumer Expenditures Survey report.

<sup>5</sup> “The Affordability Index: A New Tool for Measuring the True Affordability of a Housing Choice.” Center for Transit Oriented Development and Center for Neighborhood Technology. Brookings Institution, *Market Innovation Brief*, January 2006.

<sup>6</sup> For detailed data and maps of the Housing-Transportation Affordability Index, visit the Center for Neighborhood Technology website at: <http://www.cnt.org/tcd/ht>.

<sup>7</sup> 2007 Consumer Expenditures Survey data show that finance charges and “rentals, leasing, and licenses” together account for about 9% of the average household’s transportation expenditures. Net outlays for vehicle purchases accounts for another 37% of transportation expenditures, but these would generally not be accounted for in current mortgage underwriting practices.

<sup>8</sup> Walking the Walk: How Walkability Raises Home Values in U.S. Cities by Joe Cortright, Impresa Inc. for CEOs for Cities, August 2009. The study used Walk Score™, a computer mapping-driven rating of walkability to key services and amenities from a home address, as the key variable to research.

<sup>9</sup> For further discussion of this issue, see Foster, Chester, and Robert Van Order (1984). “An Option-Based Model of Mortgage Default.” *Housing Finance Review* 3(4): 351-72.

<sup>10</sup> Specifically, the analysis utilized a statistical propensity or “probit” model. The Census data utilized on vehicle ownership and incomes is at the block group level.

<sup>11</sup> Kaid Benfield, et al., *Once There Were Greenfields: How Urban Sprawl is Undermining America*, Natural Resources Defense Council, 1999. Kaid Benfield, et al., *Solving Sprawl*, Natural Resources Defense Council, 2001. Eliot Allen and Kaid Benfield, *Environmental Characteristics of Smart Growth*, Natural Resources Defense Council, 2003.

<sup>12</sup> The Urban Land Institute estimates that land use changes can cut vehicle miles traveled (VMT) by 30%, reducing total transportation-related CO<sub>2</sub> emissions from current trends by 7 to 10% in 2050 (*Growing Cooler: The Evidence on Urban Development and Climate Change*, 2008). The Center for Clean Air Policy estimates that comprehensive application of land use and transportation best practices could reduce VMT per capita by 10% and eliminate 145 megatons of CO<sub>2</sub> annually by 2030 (*Cost-Effective GHG Reductions through Smart Growth and Improved Transportation Choices: An Economic Case for Investment of Cap-and-Trade Revenues*, 2009). Researchers at NRDC and the Sierra Club estimate that within ten years, this type of development can reduce approximately 595 million metric tons of CO<sub>2</sub>, equal to about 10% of total US global warming pollutants in 2001 (“How Smart Growth Can Unlock Trillion Dollar Consumer Cost Savings,” 2004).

<sup>13</sup> The Smart Growth Network’s principles include creating a range of housing opportunities and choices; creating walkable neighborhoods; encouraging community and stakeholder collaboration; fostering distinctive, attractive communities with a strong sense of place; making development decisions predictable, fair and cost effective; mixing land uses; preserving open space, farmland, natural beauty and critical environmental areas; providing a variety of transportation choices; strengthening and directing development toward existing communities and taking advantage of compact building design. See the Smart Growth Network at <http://www.smartgrowth.org/about/principles/default.asp>.