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## Foreclosure, Vacancy and Crime

■ *By Lin Cui*

**T**here are many social problems arising from foreclosure. On individual levels, families undergoing foreclosure can lose accumulated home equity and access to future stable housing; on social levels, foreclosure can have implications for surrounding neighborhoods and larger communities. One potential impact of increased foreclosures in a community is crime.

While the relationship between foreclosures and crime has received widespread attention in the news media, to date there has been little careful empirical work on this subject. In this article, I examine the impact of residential foreclosures and vacancies on violent and property crime in the city of Pittsburgh. The model uses a difference-in-differences design to test the relationship between foreclosures and crime, with data from the Pittsburgh Neighborhood and Community Information System (PNCIS) used. The data are distinguished by an unusually fine level of geographic precision, which enable me to exploit the exact timing and

locations of foreclosure, vacancy and crime incidents.

The link between foreclosure and crime is an example of the Broken Window theory. The problem starts when a homeowner facing foreclosure takes less care of the house. While the property can still be occupied, it may already show visible signs of disrepair. It signals to potential criminals a lower level of surveillance in the nearby area and thus increases their incentive to commit crimes. Later, if the property becomes vacant, the lack of surveillance is more apparent and those neglected and abandoned buildings can offer criminals places to gather and conduct their activities. The above scenarios suggest that both foreclosure and vacancy are positively associated with crime rates, with vacancy having possibly a stronger impact.

The results from this work find that violent crime rates are more than 15 percent higher in areas within 250 feet of foreclosed and vacant properties compared to areas slightly

■ ■ ■ *continued on page 2*

## Transit and Commuting Patterns in Southwestern Pennsylvania

■ *By Christopher Briem and Sabina Deitrick*

**C**hanges in the Pittsburgh region have created new and different opportunities for thinking about transit and commuting. The beginning of the 21st century shows a different geography of the location of people and jobs that make transit planning for these changes imperative for the region.

Transit and commuting patterns within the Pittsburgh metropolitan region and the greater Southwestern Pennsylvania area continue to be impacted by flows of residential migration away from the region's core. While Allegheny County has retained a significant proportion of the jobs located in the Pittsburgh region, the same is not true of the residential population.

In 1969, an estimated 65 percent of jobs in the 7-county Pittsburgh Metropolitan Statistical Area (MSA) were located in Allegheny County, and by 2009, that share of the region's jobs dropped only slightly, to 62 percent. Over that same period, however, Allegheny County's share of the region's population showed a larger decline. In 1969, 58 percent of

the MSA's population lived in Allegheny County. By 2010, that figure fell to 52 percent, as other parts of the rest of the region have grown. The continuing increase in the number of workers working in Allegheny County, but residing elsewhere, has had a direct impact on the commuting patterns in the region.

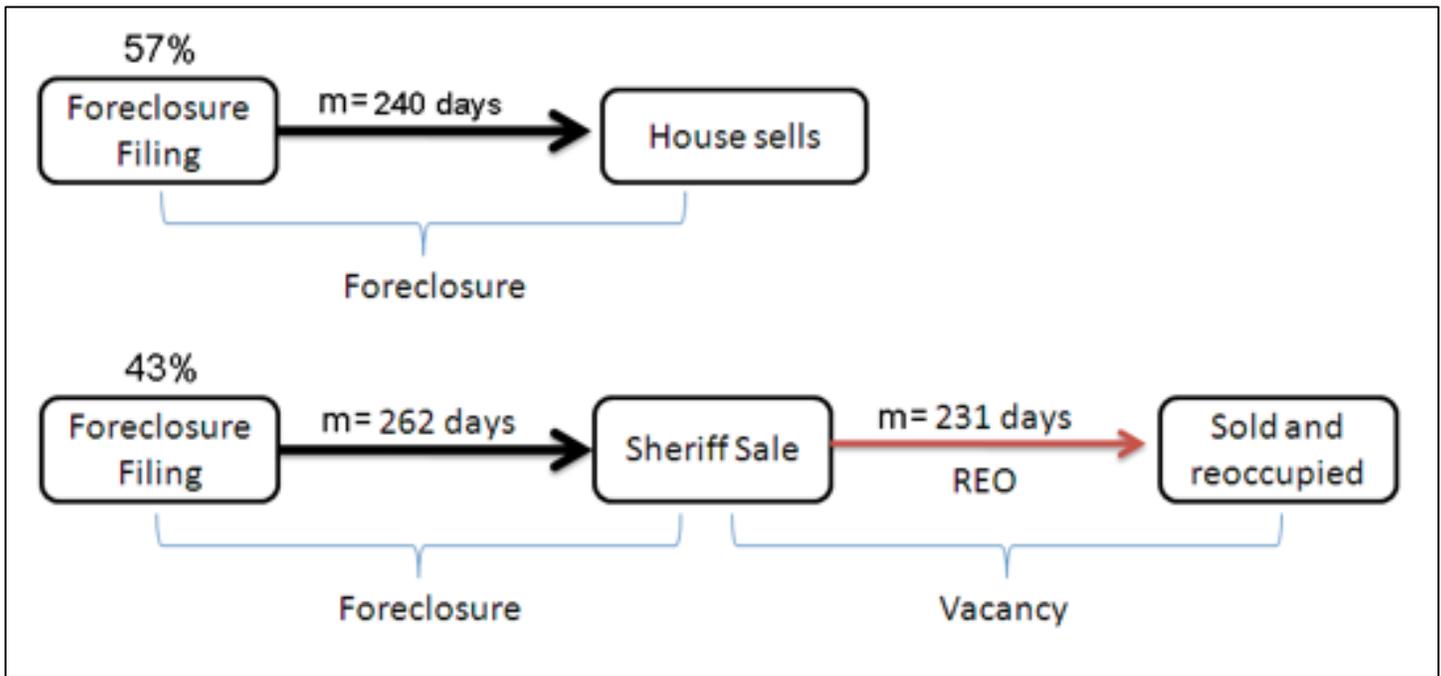
Also contributing to the changes in commute patterns involves what is known as "reverse commuting," generally defined as residents who reside in or near an urban core commuting to jobs in nearby suburbs. Over recent decades, increasing numbers of workers commuted from their residence in Allegheny County to jobs in counties in the rest of the region.

In 2006 - 2008, the largest inter-county commuting flows within Southwestern Pennsylvania were from Westmoreland, Washington, Beaver, and Butler counties, respectively, into Allegheny County (see Table 1), with over 44,000 residents of Westmoreland County alone commuting to jobs in Allegheny

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**Figure 1. Foreclosure Process**



farther away. Results indicate that foreclosure alone does not have significant effects on crime, but foreclosure properties that become vacant do. Effects on property crime are similar, but are less precisely estimated.

A typical foreclosure case in Pennsylvania consists of multiple stages: foreclosure filing, sheriff sale, and sale to a new permanent owner (an REO – or real-estate owned sale). Figure 1 provides an illustration of the two possible outcomes following foreclosure filing. In this study, 57 percent of the foreclosure filings result in a property sale to another permanent owner before sheriff sale, while 43 percent experience a period of vacancy until they are finally resold.

To differentiate foreclosure per se from foreclosure-led vacancy, four stages of the foreclosure process are defined: a pre-foreclosure stage that takes place before the date of foreclosure filing, a foreclosure stage between the date of filing and the date of sheriff sale, a vacancy stage, and a reoccupation stage that takes place after the REO sale date. Due to the judicial nature of foreclosure in Pittsburgh, the whole process typically takes one to two years to complete. As shown in Figure 1, the median length of foreclosure stage is 240 days for those

without sheriff auction, and 262 days for those experiencing vacancy. The median length of vacancy is 231 days.

With information on both foreclosure filing and foreclosure-led vacancy, this study is the first to separate the impact of foreclosure from the impact of vacancy during the foreclosure process. The mechanisms through which the two impact neighborhood crime rates are similar, but the effects can be different in scale.

More importantly, this study is also the first to exploit both inter-temporal and cross-sectional variance in foreclosure and foreclosure-led vacancy, and their effects on crime. Data on exact locations of foreclosure filing, vacancy, and crime incidents are used to exploit variations of crime within small, relatively homogenous areas surrounding the foreclosed and/or vacant properties. The exact timing of foreclosure filing and vacancy allows me to confirm the absence of substantive preexisting differences in crime rate of treatment and control areas.

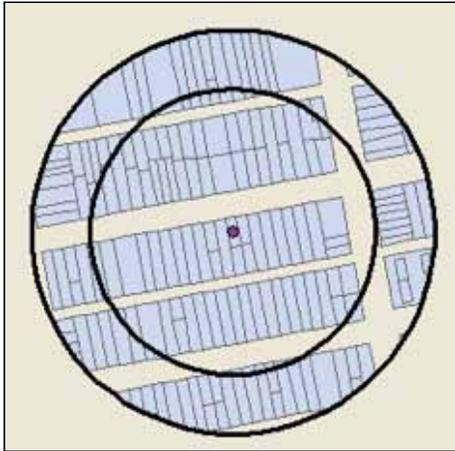
The treatment group is defined as the number of crimes in areas within 250 feet of foreclosed properties. To get reasonable counts of each crime type, I group the number crime incidents by quarter. For each foreclosed property,

quarterly crime counts in the same treatment area in different quarters are labeled according to the specific timing of foreclosure filing and vacancy of that property. To better demonstrate the impact on spatial patterns of crime, I proceed by adding control areas outside the treatment rings, beyond the 250 feet mark (to 353 feet). Because the number of crimes happened within an area depends on the size of that area, the treatment and control areas of the foreclosed and/or vacant properties are equal in size.

Figure 2 provides an illustration of the treatment and control areas surrounding a foreclosed property. Note that if the effect on crime is a decreasing function of its distance to the foreclosure site, the control areas will also be treated, though to a lesser extent. Nevertheless, the differences in crime rates between treatment and control areas will underestimate the actual difference, making my results a lower bound of the actual effect.

Figure 3 shows the violent and property crime trends in both treatment and control areas after taking off the quarterly fixed effects. There is evidence that the control areas experience increases in crime rates in vacancy quarters,

**Figure 2. Treatment and Control Areas Surrounding a Foreclosed Property**



but to a much smaller scale. This confirms the hypothesis that the impact on crime is a decreasing function of distance from the center. After adding the control group, it is more evident that vacancies increase violent and property crimes while foreclosure alone does not have strong impacts on crime.

The results find that during the time a foreclosed property stays vacant, the neighboring areas have more violent crimes than areas slightly further away from the vacant property at

the same time, while foreclosure alone seems to have little effect. Vacancy has a sizable impact on violent crimes and the effect persists after the property is reoccupied. Those results are consistent with the graphical evidence in Figure 3. For property crimes, vacancy still has some impact but the coefficients are no longer significant. Possibly it is due to the fact that those coded as property crimes are only the non-violent ones.

I further explore the impact of different lengths of vacancy on violent crime rates. The reason is twofold: first, to rule out the possibility that the main results are driven by compositional effects; second, to better understand the role of vacancy length in violent crime rate changes. The results indicate that longer-term vacancy has a stronger effect on violent crime rates, and confirm the absence of compositional effect in the main results.

To conclude, the model finds that foreclosure alone has no effect on crime, but foreclosure coupled with vacancy does, while effects on property crime are similar but are less precisely estimated. Using detailed data on addresses and dates of foreclosures and crime, I estimate that, on average, violent crimes within 250 feet of foreclosed homes increase by more than 15 percent once the foreclosed home becomes vacant, compared to crimes in the control areas

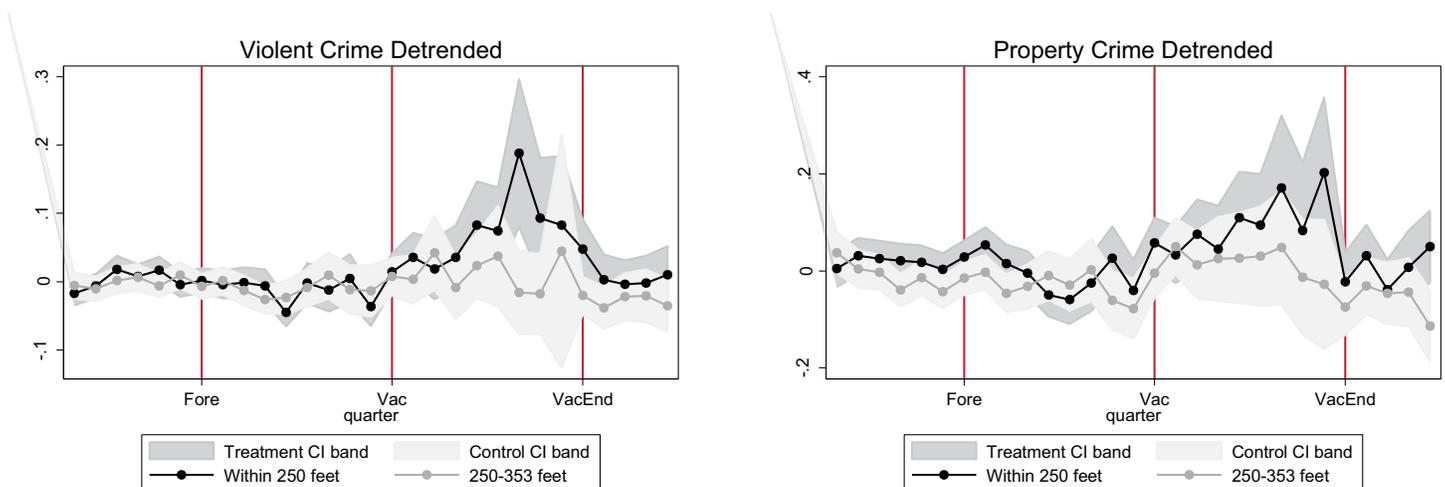
between 250 and 353 feet away.

Because this research uses the exact timing and location of foreclosure, vacancy and crime by comparing crime rates in geographically small and homogenous areas at different stages of foreclosure, available with the PNCIS, these results provide a significant improvement upon the existing literature that attempts to identify the impact of foreclosure and vacancy on crime with cross-sectional design or analysis at aggregate levels.

In addition, this paper provides the first evidence on the impact of vacancy length on crime and concludes that longer terms of vacancy have a stronger effect on violent crime compared to shorter-terms of vacancy. While the majority of current federal and state level foreclosure programs are focusing on loan modification, my results strongly indicate that policies aiming at post-foreclosure vacancy reduction will most effectively alleviate the external cost of foreclosure.

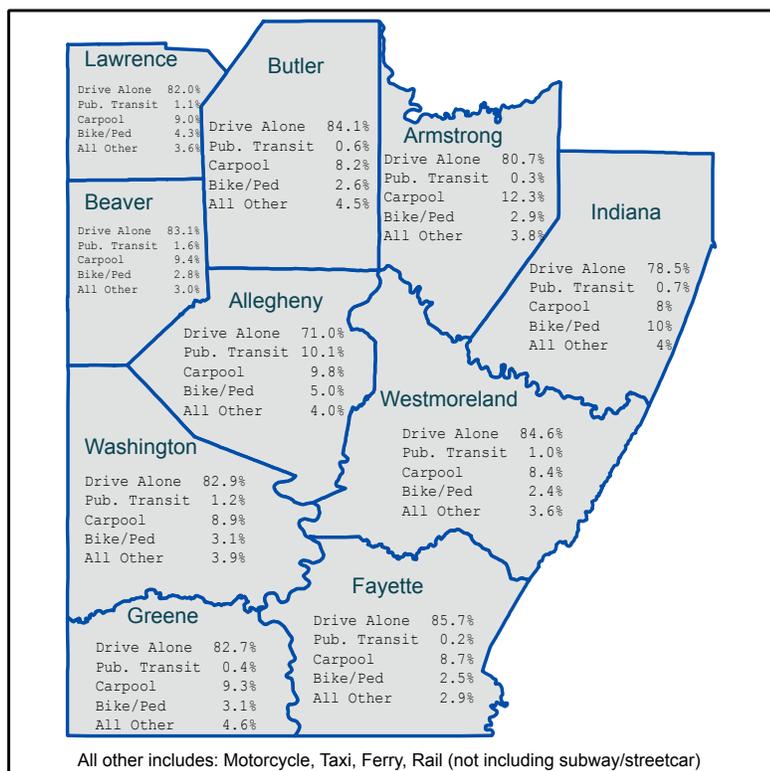
*Lin Cui, PhD, completed her doctorate in economics at the University of Pittsburgh, where she was also a Graduate Student Researcher at UCSUR. Lin is now a senior researcher at Freddie Mac in Virginia.* ■■■

**Figure 3. Crime Trend By Quarter By Treatment And Control Groups**



continued from page 1

**Figure 1. Journey to Work by Mode, Southwestern Pennsylvania Counties (2005-2009)**



Source: American Community Survey (2005-2009) Estimates

**Table 1. Largest Inter-County Commuter Flows in Southwestern Pennsylvania (2006-2008)**

From	To	Workers
Westmoreland	Allegheny	44,580
Washington	Allegheny	29,210
Beaver	Allegheny	25,220
Butler	Allegheny	23,740
Allegheny	Westmoreland	14,080
Allegheny	Washington	12,830
Allegheny	Butler	9,730
Fayette	Westmoreland	8,135
Beaver	Butler	6,225
Armstrong	Allegheny	6,020
Allegheny	Beaver	3,835
Fayette	Allegheny	3,710
Armstrong	Westmoreland	3,195
Westmoreland	Washington	2,995
Armstrong	Butler	2,910

Source: Compiled from the Census Transportation Planning Package (2006-2008)

County. Nearly 40,000 Allegheny County residents also “reverse commuted” from Allegheny County to jobs in counties in the rest of the region in 2006-2008.

Since 1960, the number of workers commuting into Allegheny County from the other counties in the MSA has increased in every decade. Between 1990 and the latest period available for data on commuting, 2006-2008, the number of workers commuting into Allegheny County from the rest of the MSA increased by 24.6 percent (see Table 2). Commuters to Allegheny County from Armstrong and Butler counties increased by 67.3 percent and 54.1 percent, respectively, over the period, indicating the continuing expansion of commute sheds and patterns across the region.

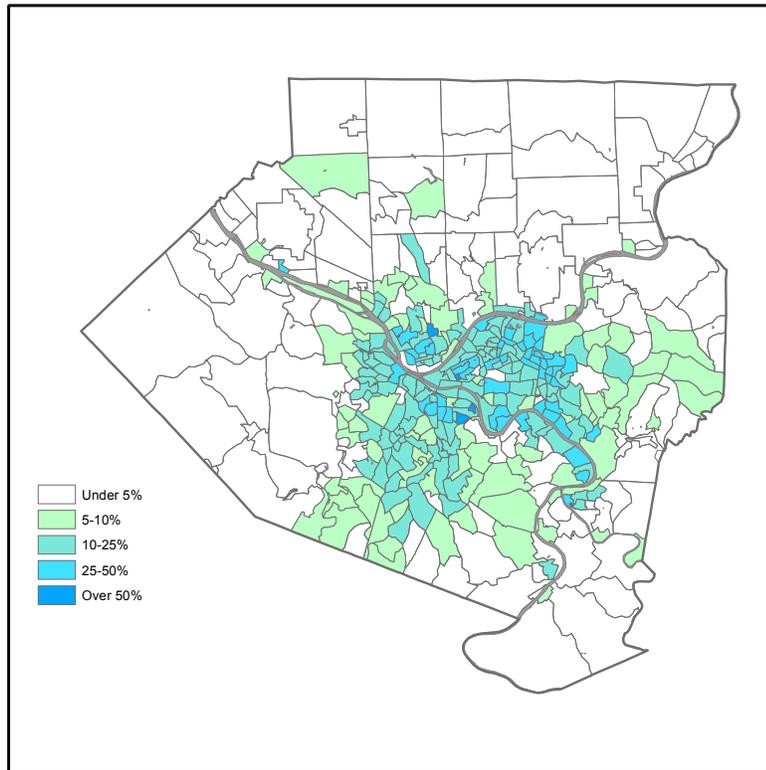
As workers live further from the urban core and major job centers, options for public transit or alternative modes of commuting become more limited. Like elsewhere in the nation, most people traveling to work in Southwestern Pennsylvania commute by driving alone. Much smaller proportions of the workforce use public transit, carpool or other modes of transportation for their journey to work.

Across counties in Southwestern Pennsylvania, the proportion of workers driving alone in the 2005-09 period ranged from a low of 71.0 percent in Allegheny County to over 80 percent in the rest of the region, with the exception of Indiana County (see Figure 1). Indiana County fell below 80 percent of commuters driving alone owing to its relatively large share of pedestrian and bicycle commuting. Indiana County led all counties in Southwestern Pennsylvania with the largest share of commuters biking or walking to work -- 10 percent -- likely reflecting the commute pattern for workers living near Indiana University of Pennsylvania.

Not surprisingly, public transit as a mode of commuting is concentrated in Allegheny County, with 10.1 percent of commuters using public transit in the 2005 – 2009 period. With few transit options from dispersed population and job centers, public transit use in the remaining counties in Southwestern Pennsylvania ranged from 0.2 percent in Butler County to 1.6 percent in Beaver County.

Making a greater dent in commuting patterns for those outside the urban core

**Figure 2. Public Transit Commuting by Census Tract, Workers Age 16 and Over, Allegheny County (2005-2009)**



Source: Compiled from American Community Survey (2005-2009) Estimates

in Southwestern Pennsylvania was car pool commuting. Across Southwestern Pennsylvania, commuters using car pools and vanpools ranged from a low of 8 percent in Indiana County to 12.3 percent in Armstrong County. Carpooling and vanpooling together represent an important – and often overlooked – form of commuting for many workers across the region (see PEQ, December 2010).

Using data from the American Community Survey, we can distinguish the spatial patterns of public transit usage within Allegheny County (see Figure 2), where transit use was concentrated in the county's core, the densest parts of the county. Significantly higher rates of public transit utilization were seen in the city of Pittsburgh, with other concentrations in the nearby Mon Valley, parts of the Eastern suburbs, and communities and municipalities in the South Hills. In exurban parts of Allegheny County, public transit use fell below five percent of commuters in 2005-2009, registering rates more common in the outlying counties.

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## Spring 2012 Urban and Regional Brown Bag Seminar Series

The Urban and Regional Analysis program is happy to announce its Spring schedule for the Urban and Regional Brown Bag Seminar Series. The seminar series focuses on issues of importance to urban and regional scholars and practitioners. All seminars are held at UCSUR at 3343 Forbes Avenue (across from Magee Women's Hospital) from Noon – 1:30. The public is invited.

1. Judy Geyer, PhD, Carnegie Mellon University  
"Housing Demand and Neighborhood Choice with Housing Vouchers"  
Thursday, January 12, 2012

Judy Geyer completed her doctorate in Economics at CMU in December and is a Visiting Scholar at the Federal Reserve Bank in Boston. Her research involves applications from the Housing Authority of Pittsburgh of voucher recipients and neighborhood-level

data analysis.

2. Donald Buckwalter, PhD, Indiana University of Pennsylvania  
"Analyzing Urban Structure in Pittsburgh with Network Models and Cartography"  
Friday, January 20, 201

Don Buckwalter is Professor of Geography and Regional Planning at Indiana University of Pennsylvania. His research concerns transportation and its interaction with regional economic development.

3. Elza Souza, MD, University of Brasilia, Brazil  
"Active Aging in an Intergenerational Perspective"  
February 10, 2012

Dr. Souza is Professor of Health Promotion and Health Education, Department of Public Health, Faculty of Health Sciences, University

of Brasilia. Her current research interests include intergenerational studies and its relationship to elder care.

4. Ziona Austrian, PhD, and Kathryn Hexter, Cleveland State University  
"Anchor-Based Community Development Strategies"  
Friday, March 30, 2012

Ziona Austrian is Director of the Center for Economic Development and Kathy Hexter is Director of the Center for Community Planning at the Maxine Goodman Levin College of Urban Affairs at Cleveland State University. They will discuss the Evergreen Cooperatives, a Cleveland-based initiative designed to help low-income entrepreneurs succeed through partnerships with anchor institutions.

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**Table 2. Commuting Trends To Allegheny County, 1990 to 2006-08**

County	1990	2000	2006-08	% change, 1990 – 2008
Armstrong	3,598	4,582	6,020	67.3%
Beaver	21,328	23,946	25,220	18.2%
Butler	15,406	21,403	23,740	54.1%
Fayette	3,174	5,151	3,710	16.9%
Washington	22,096	27,645	29,210	32.2%
Westmoreland	40,681	43,536	44,580	9.6%
Total	106,283	126,263	132,480	24.6%

Sources: 1960-2000: Decennial Censuses, 2006-2008: Census Transportation Planning Package

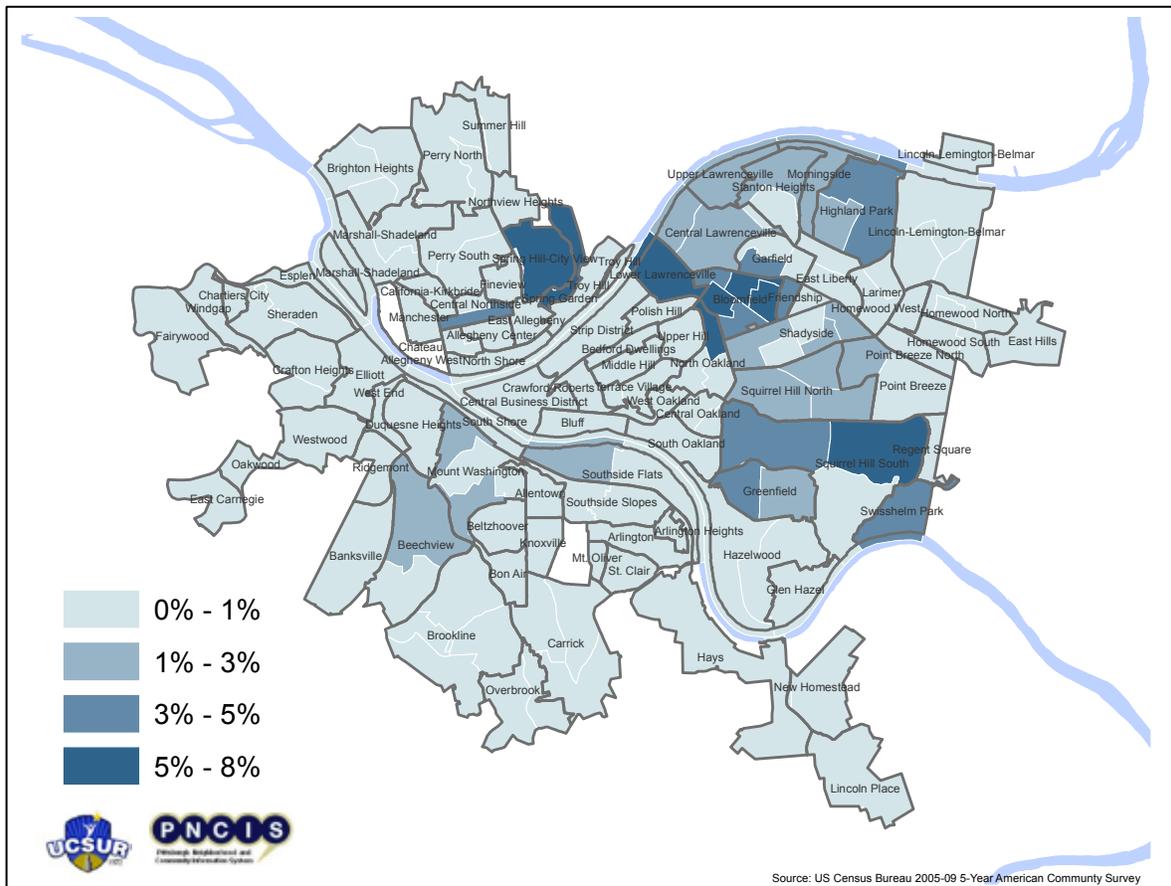
Bicycle and walking as a mode of commuting was limited mostly to areas within the city of Pittsburgh (with the exception of Indiana County, noted above). The neighborhoods with the highest proportion of workers commuting by bicycle were Lower Lawrenceville (7.5 percent),

Bloomfield (6.4 percent), and Spring Hill/City View (6.3 percent), respectively (see Figure 3). With its density and close mix of housing and jobs, as well as its proximity to other neighborhood employment centers, pedestrian commuters represented over half the

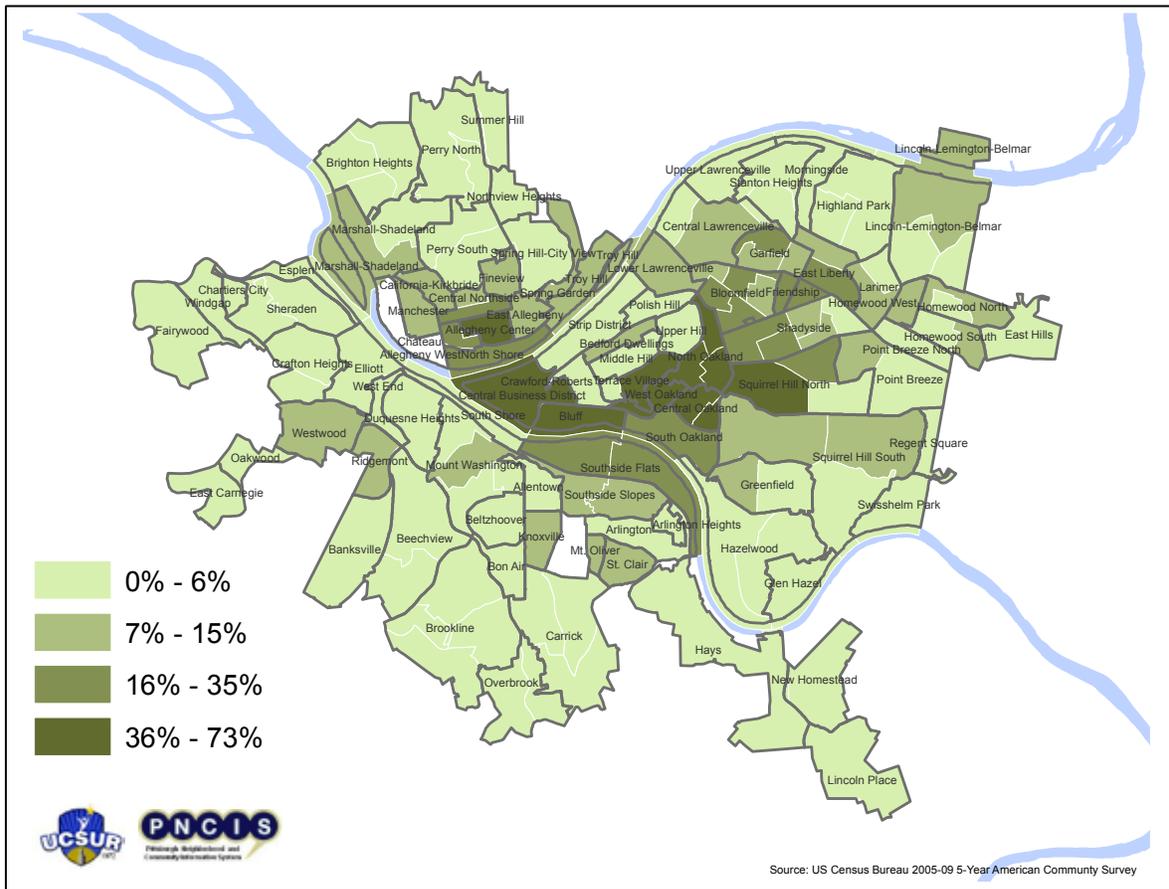
commuters in the Central and North Oakland neighborhoods of the city of Pittsburgh in the 2005-2009 period. The downtown neighborhoods, Allegheny Center, Bluff and the Central Business District, along with West Oakland, also had large numbers of pedestrian commuters, registering between 40 and 45 percent of all commuters. In total, 16,610 city of Pittsburgh residents, or 11.5 percent of total commuters, commuted to their jobs by walking in the 2005-2009 period, on average.

Recently released data from the American Community Survey allow more in-depth understanding of commuting in the Pittsburgh region. The diversity of commute modes is represented across the region and changes in commute patterns are also evident. The continued growth and dispersal of jobs presents a challenge to incorporating commute mode options for many in the region, while presenting opportunities for expanded regional planning and sustainable development efforts. ■ ■ ■

**Figure 3. Percent of Commuters Traveling by Bicycle, City of Pittsburgh, by Census Tract, 2005-09**



**Figure 4. Percent of Commuters Walking to Work, City of Pittsburgh, by Census Tract, 2005-09**



## Updated Population Migration Report

UCSUR has updated its periodic report on population migration trends impacting the Pittsburgh using data from the Internal Revenue Service (IRS). The IRS distributes county-to-county migration data compiled from changes to the addresses used on federal tax filings. UCSUR's report recompiles this into migration flows in and out of the 7-county Pittsburgh Metropolitan Statistical Area (MSA). Also compiled are the intra-regional migration flows between the counties of the 10-county area of Southwestern Pennsylvania. This latest report includes data on migration between 2009 and 2010.

One of the key findings of the report is that for the latest year of data, 1,430 more people moved into of the Pittsburgh MSA than moved out. This represents the second successive year the IRS county-to-county migration data has shown positive net migration into the Pittsburgh region.

The most prominent places where people from Pittsburgh moved to are also the same regions people where new Pittsburgh residents moved from. Destinations of the largest annual out-migration flows from the Pittsburgh region between 2009 and 2010 included 1,133 people moving to the Washington, D.C. region, 1,065 moving to the Philadelphia region, and 1,024

moving to the New York City region. Regions that were the originations of the largest migration flows into the Pittsburgh MSA between 2009 and 2010 were the New York City (1,050 in-migrants), Philadelphia (956 in-migrants) and Washington D.C. (903 in-migrants) regions.

The full report is available online via the UCSUR publications Web page: [www.ucsur.pitt.edu/technical\\_reports.php](http://www.ucsur.pitt.edu/technical_reports.php)



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