

# A LOOK BEHIND THE NUMBERS

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## Home Lending in Allegheny County Neighborhoods

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### KEY FINDINGS

In the years leading up to and including the Great Recession (2004 to 2008), loan application rates across all income groups were relatively similar to each other, and all were declining. The year 2009 marked not only the end of the Great Recession (June 2009) but also a divergence in loan application activity. Middle- and high-income neighborhoods saw more erratic changes primarily driven by refinance activity, while application rates in low- and moderate-income (LMI) neighborhoods remained depressed, with only a slight uptick in 2015.

Prior to the Great Recession, application rates in low-income neighborhoods were greater than those in high-income neighborhoods. This was also true nationally, but the national rates were substantially higher than Allegheny County's for all neighborhood income groups. For example, low-income neighborhoods in Allegheny County had an application rate of 190 applications per 1,000 owner-occupied housing units, while the national rate was 291.

Origination rates across all neighborhood income groups were relatively flat from 2004 to 2008, but they jumped an average 12 percentage points in 2009. From 2009 to 2015, origination rates in all neighborhood income groups have increased, with these increases ranging from 3 percentage points in high-income neighborhoods to 15 percentage points in low-income neighborhoods.

During the Great Recession and in the years shortly after, high-income borrowers were increasingly able to take advantage of lower interest rates as the share of refinance activity in high-income neighborhoods increased 25 percentage points from 2006 to 2012. In 2015, the share remains a shade above 50 percent (51 percent).

The rate of home purchase loans per 1,000 households declined for all race and income groups following the Great Recession, but for blacks, the decline was steeper and their recovery has been weaker. However, home purchase rates did increase from 2005 to 2015 for all race and income groups.

The share of purchases made in LMI neighborhoods has declined for all race and income groups from 2005 to 2015. Declines were largest for black LMI borrowers, whose share of home purchases made in LMI neighborhoods declined 12 percentage points to 49 percent in 2015. However, the share of black LMI borrowers purchasing in LMI neighborhoods is 2.6 times greater than the share of white LMI borrowers purchasing in LMI neighborhoods, a share relatively unchanged since 2005.

## OVERVIEW

In this series of reports, we will examine home lending activity in the largest counties of the Fourth Federal Reserve District<sup>1</sup> using Home Mortgage Disclosure Act (HMDA) data. Enacted in 1975, the HMDA requires most mortgage lending institutions to report annually on their home mortgage lending activity via specific data that can be useful in identifying whether the institutions are meeting the housing finance needs of the communities in which they operate.<sup>2</sup> By law, lenders must provide information on the disposition of applications, including loan purpose and type, applicant income and race, and the geographic location of applications and originations. This rich dataset of application and loan-level data, which is distributed by the Federal Financial Institutions Examination Council (FFIEC), allows us to track application and origination trends across time and by neighborhood and borrower income groups.

We begin this report on Allegheny County, home to the city of Pittsburgh, with a broad look at application and origination activity over the past 25 years (1990 to 2015), and then focus on the 12-year period from 2004 to 2015. Using maps and a series of figures and tables, we tell the story of mortgage lending over these time periods from both the neighborhood and borrower perspectives, with a particular focus on the differences observed in the pre- and post-Great Recession periods.

## THE PAST 25 YEARS

Since 1990, no single year in Allegheny County posted more application and origination activity than 2003, with nearly 115,000 applications and 74,000 originations during that year (*Figure 1*). The impact from the Great Recession (December 2007 to June 2009) made 2003 even more conspicuous as the starting point of a steep decline in application and origination volume, both of which dropped by roughly 65 percent during the 5 years from 2003 to 2008. More recent activity since 2008 has been less volatile.

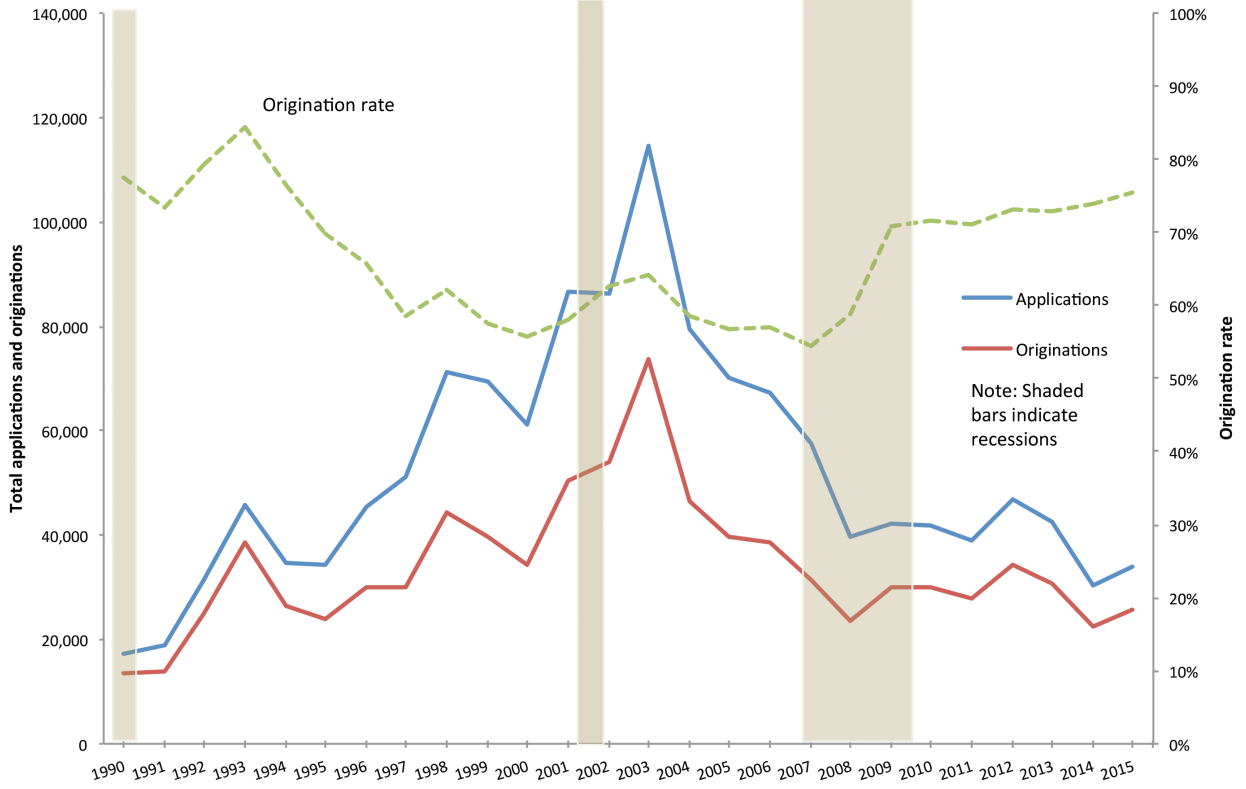
*Figure 1* also charts origination rates, or the share of applications approved by the lender and accepted by the borrower. These rates peaked in 1993, with 84 percent of loan applications approved that year. However, as application volume increased in ensuing years, origination rates declined significantly and averaged 61 percent from 1994 to 2008. Interestingly, origination rates in 2009 jumped 12 percentage points to 71 percent and have been increasing modestly through 2015.

*Figure 2* sheds light on what caused these spikes in loan activity. It is clear that refinancing activity was driven in part by low interest rates (dashed line). At their peak in 2003, refinances reached nearly 52,000, comprising 70 percent of total originations.

The other major component of loan activity is home purchases. This volume, while increasing in the early 1990s, was relatively flat until 2006, which began a 5-year period of decline and a 48 percent drop in volume. Since 2011, home purchases have been experiencing a slight upward trend. One final illustration of just how volatile refinance activity has been compared to home purchases is seen in the ratio of highest to lowest volumes during the 25-year period. For home purchases, volume was lowest in 1991 and nearly triple that figure at its peak in 2006, while refinance volume was lowest in 1990 and increased to a staggering 43 times that figure at its peak in 2003.

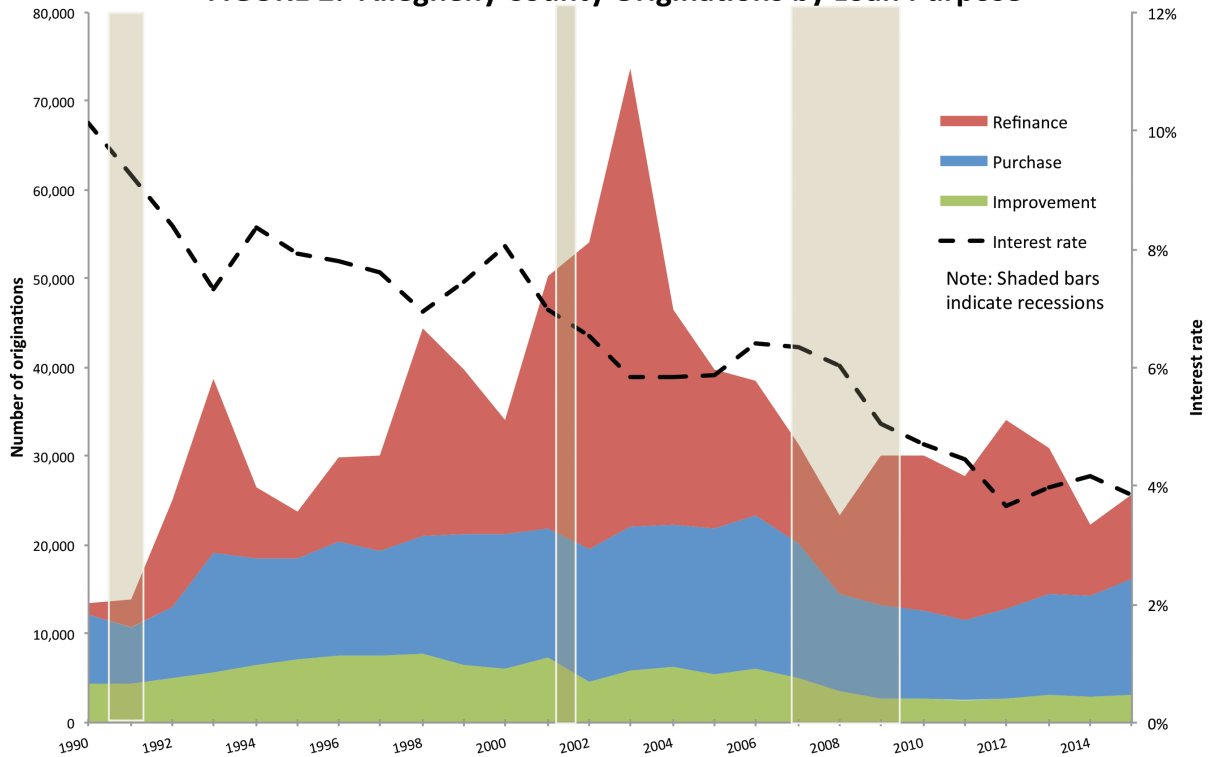
Next, we looked at home purchase by loan type: conventional and FHA-insured. Prior to the Great Recession, conventional loans made up the vast majority of home purchases in Allegheny County: about 90 percent on average. As the conventional mortgage market tightened in the years leading up to and during the Great Recession, FHA-insured loans filled the gap and have averaged 34 percent of the market since 2008.

**FIGURE 1: Allegheny County Application and Origination Activity**



Source: Home Mortgage Disclosure Act (HMDA) data; includes applications and originations for owner-occupied, 1- to 4-family structures. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

**FIGURE 2: Allegheny County Originations by Loan Purpose**

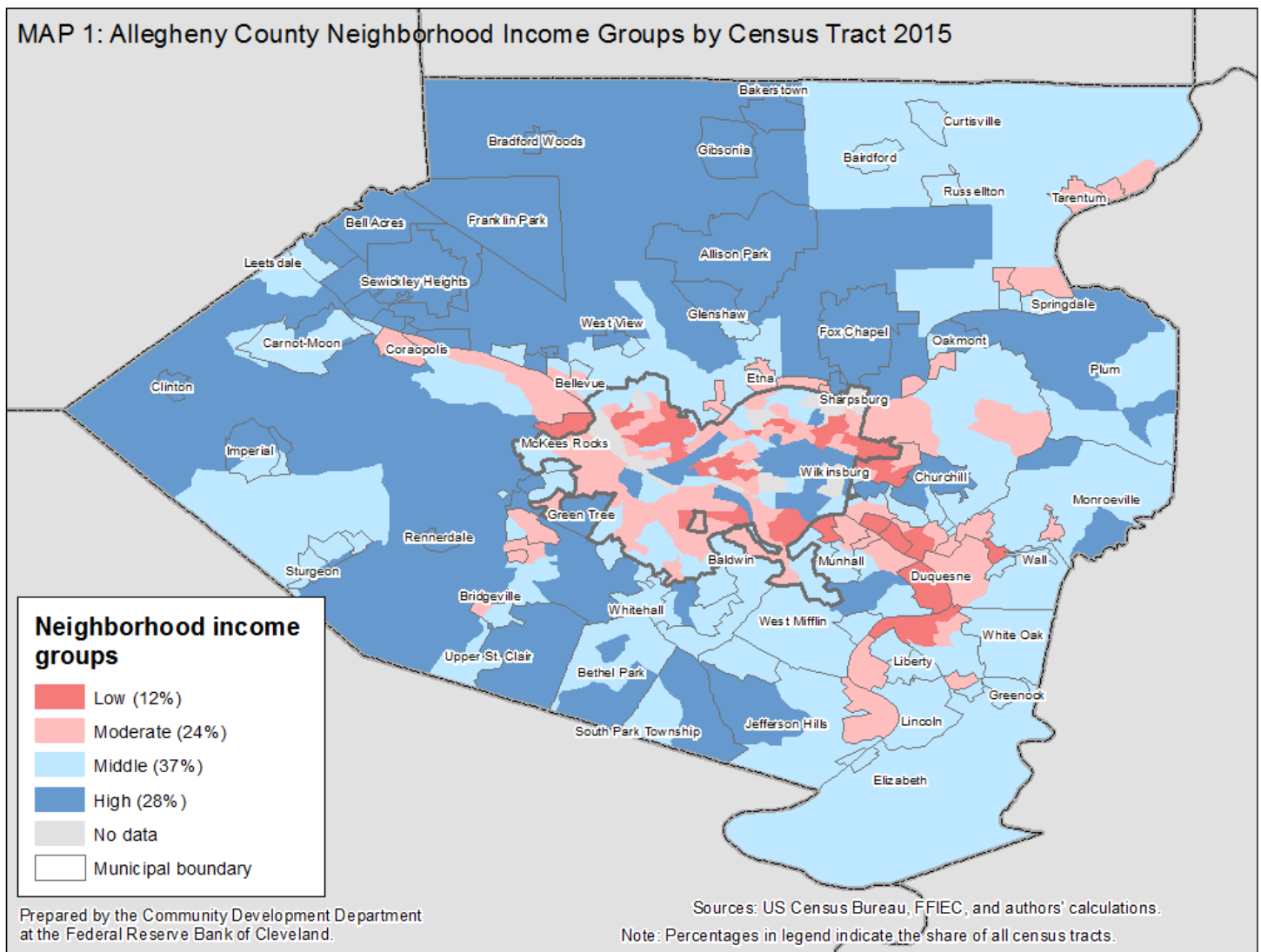


Sources: Home Mortgage Disclosure Act (HMDA) data and Freddie Mac Primary Mortgage Market Survey data (Conventional, Conforming 30-year Fixed Rate Mortgage); includes originations for owner-occupied, 1- to 4-family structures. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

## ALLEGHENY COUNTY MAP OF NEIGHBORHOOD INCOME GROUPS

Map 1 shows the geographic distribution of income groups across Allegheny County in 2015 by census tract (a tract is also referred to as a “neighborhood”). These groups are calculated by dividing the census tract’s median family income by the median family income of the metropolitan statistical area (MSA). LMI tracts (shades of red) tend to be within Pittsburgh city limits and in traditionally industrial areas. Interestingly, 64 percent of the census tracts in Allegheny County are classified as middle- or

high-income. For comparison, in Ohio’s Cuyahoga County (home to Cleveland), 49 percent of its census tracts are classified as middle- or high-income. This report uses occasional references to Cuyahoga County, a place often compared to Allegheny County in part because the two share similar industrial pasts. Our intent in making these comparisons is to identify notable differences and explore what is behind them.



## A CLOSER LOOK AT APPLICATIONS BY NEIGHBORHOOD INCOME GROUPS

### Applications per 1,000 owner-occupied housing units

In order to compare loan applications across time and income groups, we calculate the number of applications per 1,000 owner-occupied housing units (*Figure 3*). This allows us to control for neighborhood size. The application rate includes applications for home purchase loans, refinance loans, and home improvement loans. In Allegheny County, applications for the purpose of refinancing a home comprise a larger share of total applications than do applications to purchase a home. This is true for nearly every neighborhood income group and year in our analysis.

From the years leading up to and during the early stages of the Great Recession (2004 to 2008), three patterns emerge:

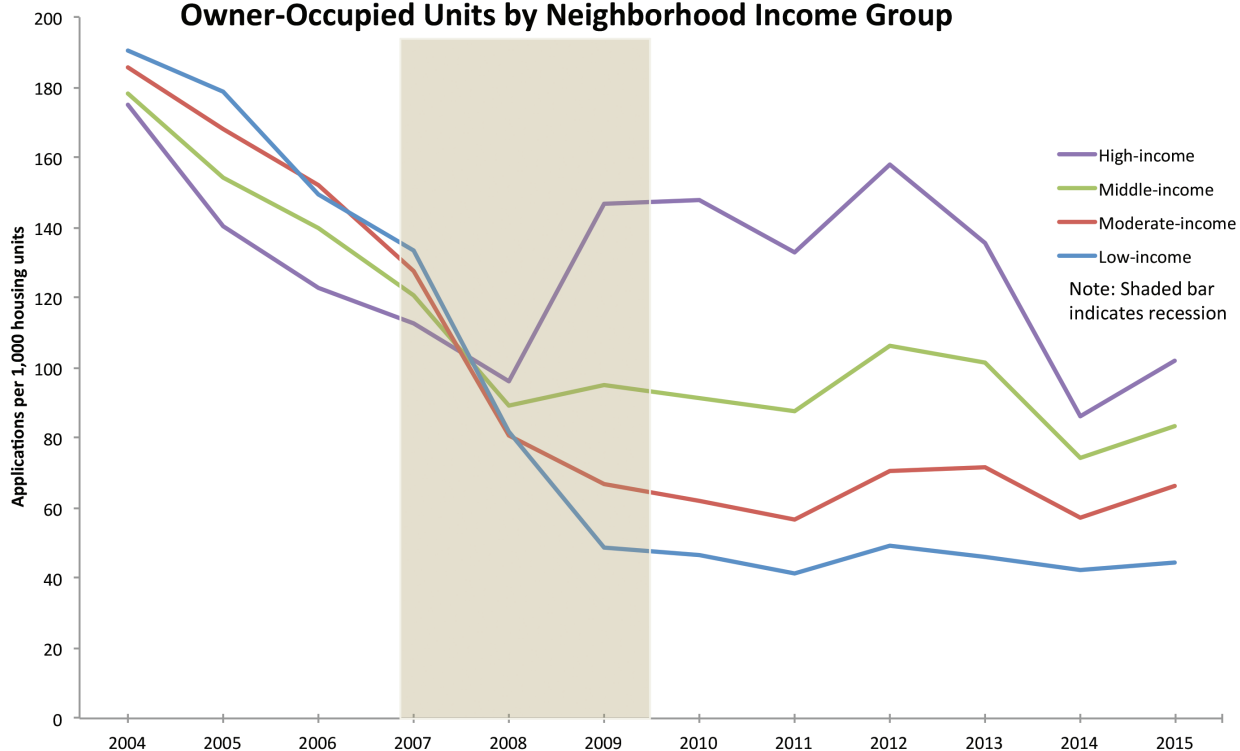
1. The application rates for every neighborhood income group experienced sharp declines ranging from 57 percent in low-income neighborhoods to 45 percent in high-income neighborhoods.
2. There were similar application rates in all neighborhoods.
3. Application rates in low-income neighborhoods were greater than those in high-income neighborhoods in the pre-Great Recession period. This was also true nationally, but the national rates were substantially higher

than Allegheny County's for all neighborhood income groups. For example, low-income neighborhoods in Allegheny County had an application rate of 190, but the national rate was 291.

The year 2009 marked not only the end of the Great Recession (June 2009) but also a more obvious divergence in loan application activity. Middle- and high-income neighborhoods saw more erratic changes primarily driven by refinance activity—changes that coincided with falling interest rates—while application rates in LMI neighborhoods remained depressed, with only a slight uptick in 2015.

One final observation for Allegheny County is that the gap between low- and high-income neighborhood application rates has widened post-Great Recession. In the years leading up to and during the early stages of the Great Recession (2004 to 2008), application rates per 1,000 owner-occupied housing units in low- and high-income neighborhoods were quite similar. However, in the post-Great Recession (2010 to 2015) period, application rates in high-income neighborhoods have been roughly three times greater than rates in low-income neighborhoods.

**FIGURE 3: Allegheny County Loan Applications per 1,000 Owner-Occupied Units by Neighborhood Income Group**



Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau; includes applications for first-lien, owner-occupied, 1- to 4-family structures. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

## A CLOSER LOOK AT ORIGINATIONS BY NEIGHBORHOOD INCOME GROUPS

### Origination rates

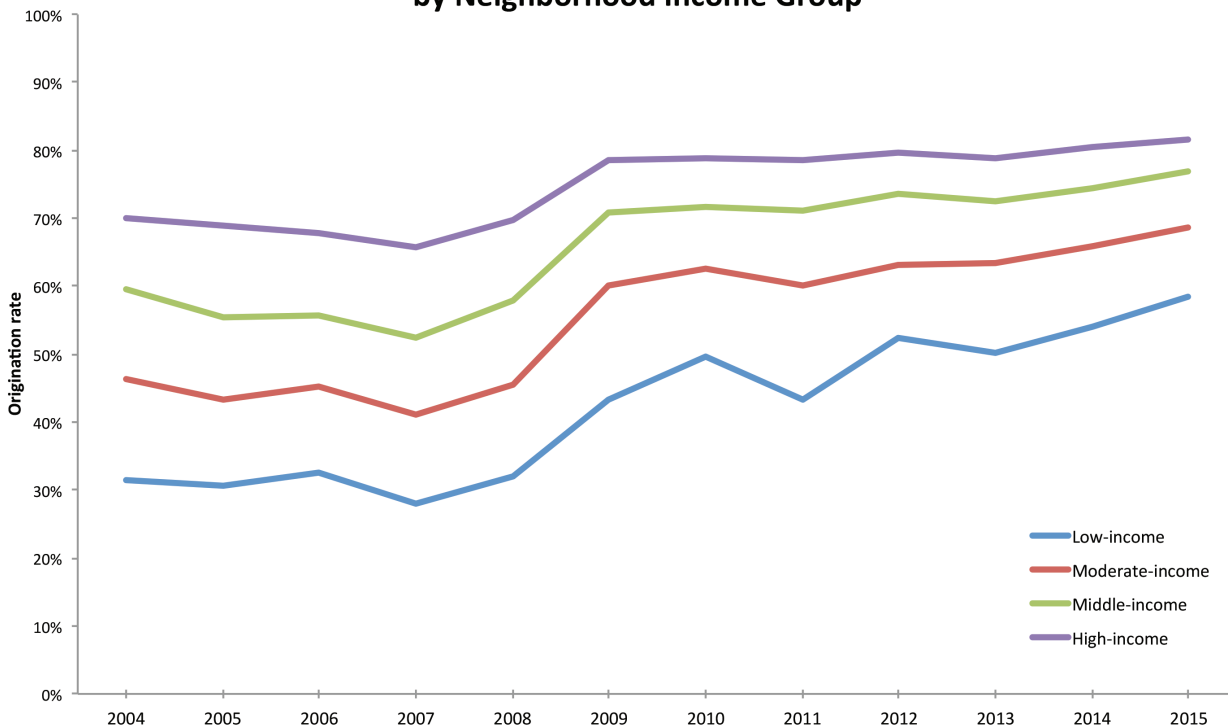
Origination rates across all neighborhood income groups were relatively flat from 2004 to 2008 (*Figure 4*), but they jumped an average of 12 percentage points in 2009. From 2009 to 2015, origination rates in all neighborhood income groups have increased, with these increases ranging from 3 percentage points in high-income neighborhoods to 15 percentage points in low-income neighborhoods. Notably, Allegheny County origination rates have been higher than Cuyahoga County origination rates in all income groups since 2009.

*Table 1* takes a closer look at origination rates and breaks them out by loan type and neighborhood income group for three years: 2005, or two years before the Great Recession; 2010, or the year immediately following the Great Recession; and 2015, the most recent year available.

Origination rates for home purchases are higher than for refinances, particularly in low-income neighborhoods,

where, in 2015, home purchase origination rates were 39 percentage points greater than refinance origination rates. In high-income neighborhoods, the gap was 20 percentage points. However, the difference in origination rates between home purchases and refinances has been shrinking since 2005. Comparing pre- and post-Great Recession (2005 versus 2015) origination rates reveals increases across all neighborhood income groups, particularly in low-income neighborhoods, which saw home purchase origination rates increase by 18 percentage points and refinance origination rates increase by 21 percentage points. These increasing origination rates have led to a shrinking of the gap between low- and high-income neighborhood rates. In 2015, the gap between origination rates for home purchases in low- and high-income neighborhoods was 10 percentage points (a decrease of 14 percentage points since 2005) and 29 percentage points for refinances (a decrease of 5 percentage points since 2005).

**FIGURE 4: Allegheny County Origination Rates by Neighborhood Income Group**



Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau; originations for first-lien, owner-occupied, 1- to 4-family structures. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.



**TABLE 1: Allegheny County Origination Rates by Loan Purpose and Neighborhood Income Group**

|                 | 2005          |           | 2010          |           | 2015          |           |
|-----------------|---------------|-----------|---------------|-----------|---------------|-----------|
|                 | Home purchase | Refinance | Home purchase | Refinance | Home purchase | Refinance |
| Low-income      | 64.2%         | 22.3%     | 73.7%         | 35.2%     | 81.7%         | 43.1%     |
| Moderate-income | 71.0%         | 32.8%     | 80.6%         | 52.9%     | 83.6%         | 56.1%     |
| Middle-income   | 82.0%         | 43.3%     | 84.9%         | 65.2%     | 89.0%         | 65.1%     |
| High-income     | 87.9%         | 55.7%     | 87.5%         | 75.5%     | 91.2%         | 71.7%     |

Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau; includes purchase originations for first-lien, owner-occupied, 1- to 4-family units. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

There are two interesting observations to make when comparing trends in Allegheny County with those in Cuyahoga County:

1. Allegheny County’s origination rates are higher than Cuyahoga County’s across all years, loan types, and neighborhood income groups with the exception of 2005. During that year, Cuyahoga County had higher refinance origination rates in all neighborhood income types.
2. In both counties, origination rates for home purchases are higher than those for refinances, but only in Allegheny County did the gap in rates shrink from 2005 to 2015.

## A CLOSER LOOK AT ORIGINATIONS BY NEIGHBORHOOD INCOME GROUPS AND LOAN PURPOSE

### Refinances

*Figure 5* shows home refinance shares by neighborhood income groups. Refinance activity in LMI neighborhoods peaked in 2006 at 20 percent, but in the post-Great Recession environment in 2012, that share had declined 14 percentage points. Over this same period, refinance shares in middle-income neighborhoods declined by 11 percentage points. High-income neighborhoods, on the other hand, saw an increase of 25 percentage points to account for 61 percent of all refinance activity in 2012. Since 2012, shares in LMI neighborhoods have increased by 5 percentage points, and high-income neighborhood shares have declined by 11 percentage points.

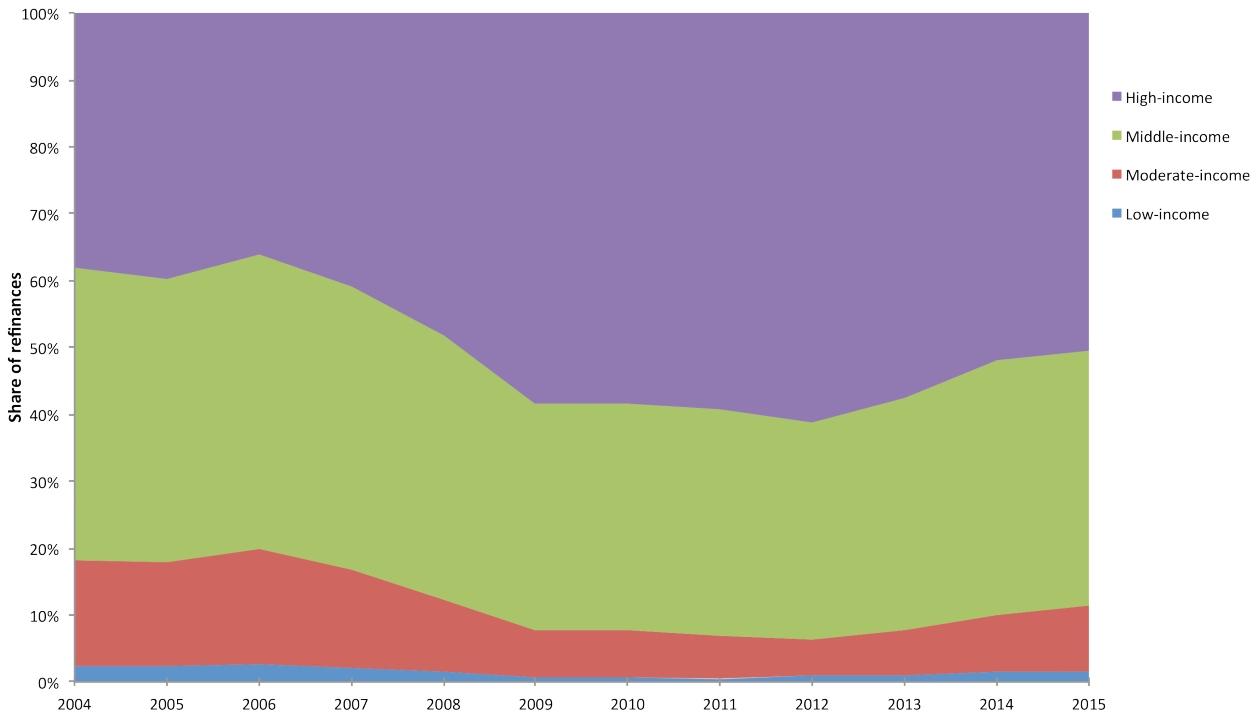
Nationally, the share of refinances in LMI neighborhoods also peaked in 2006 at 18 percent (2 points less than Allegheny County’s rate), declined 8 percentage points by 2012, and ticked back up 2 percentage points by 2015.<sup>3</sup> In high-income neighborhoods, the national share increased 18 percentage points from 2006 to 2012 to account for 48 percent of all refinances (13 percentage points less than Allegheny County’s).

The trend was quite different in Cuyahoga County, where 36 percent of refinances were occurring in low-income neighborhoods in 2005 (18 percentage points greater than in Allegheny County’s). By 2015, that share had declined to 15 percent (more in line with Allegheny County’s share, which stood at 11 percent in 2015).

One thing that may have influenced the fact that high-income neighborhoods account for such a large share of refinance activity is Allegheny County’s home price trend. Nationally, home prices increased 51 percent from 2000 to 2007, declined 32 percent by 2012, and grew 26 percent over the following four years (2012 to 2016). Over that same 17-year period of marked volatility in housing activity, Allegheny County home prices saw no declines but generated a steady increase of 50 percent; this allowed neighborhoods to retain and increase home values.<sup>4</sup>

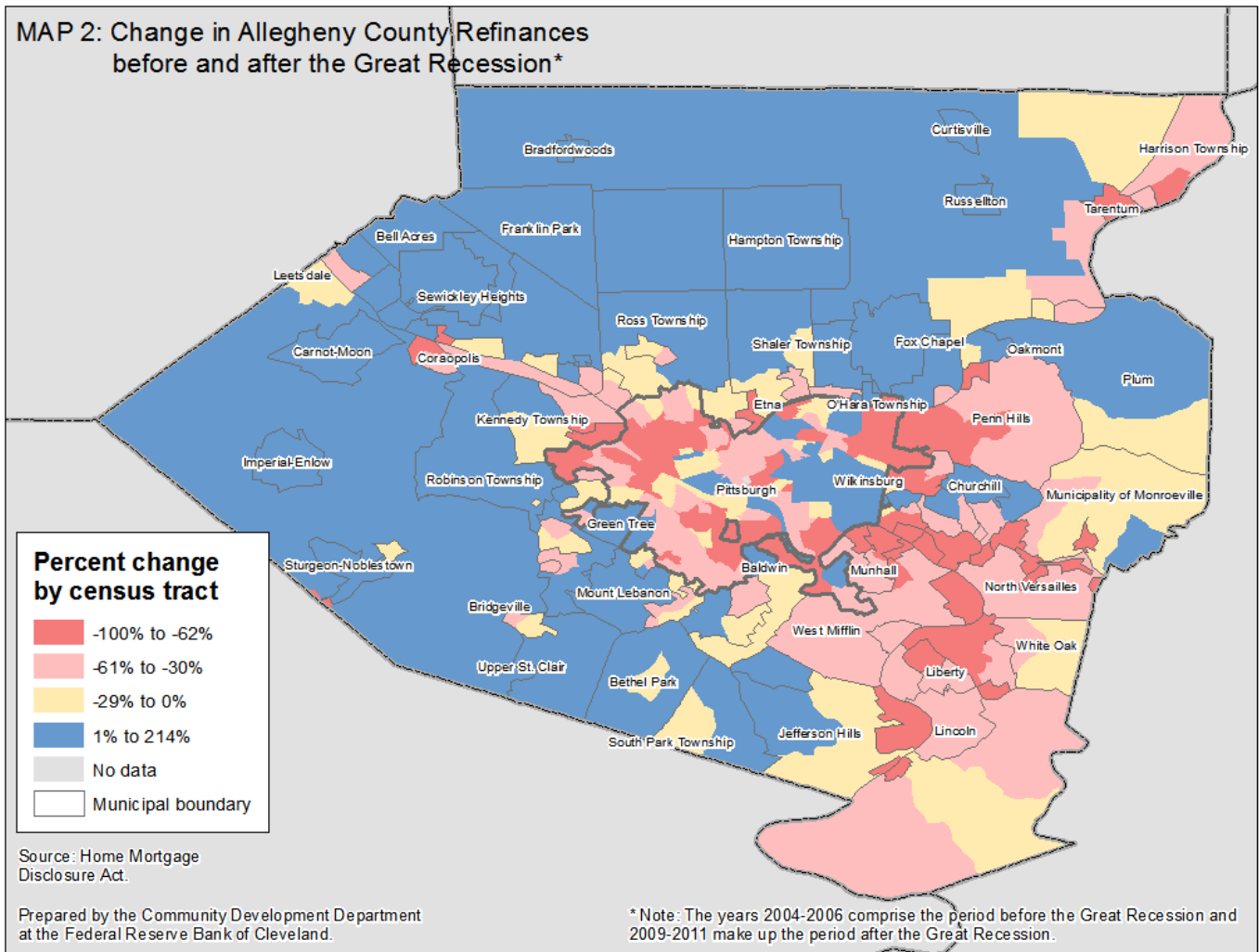
*Map 2* shows the percent change in refinances before (2004 to 2006) and after (2009 to 2011) the Great Recession. Declines tended to occur within the city of Pittsburgh and in many eastern neighborhoods in the county, while increases occurred primarily north and west of Pittsburgh.

**FIGURE 5: Share of Refinance Loans in Allegheny County by Neighborhood Income Group**



Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau; originations for first-lien, owner-occupied, 1- to 4-family structures. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

**MAP 2: Change in Allegheny County Refinances before and after the Great Recession\***





## HOME PURCHASES

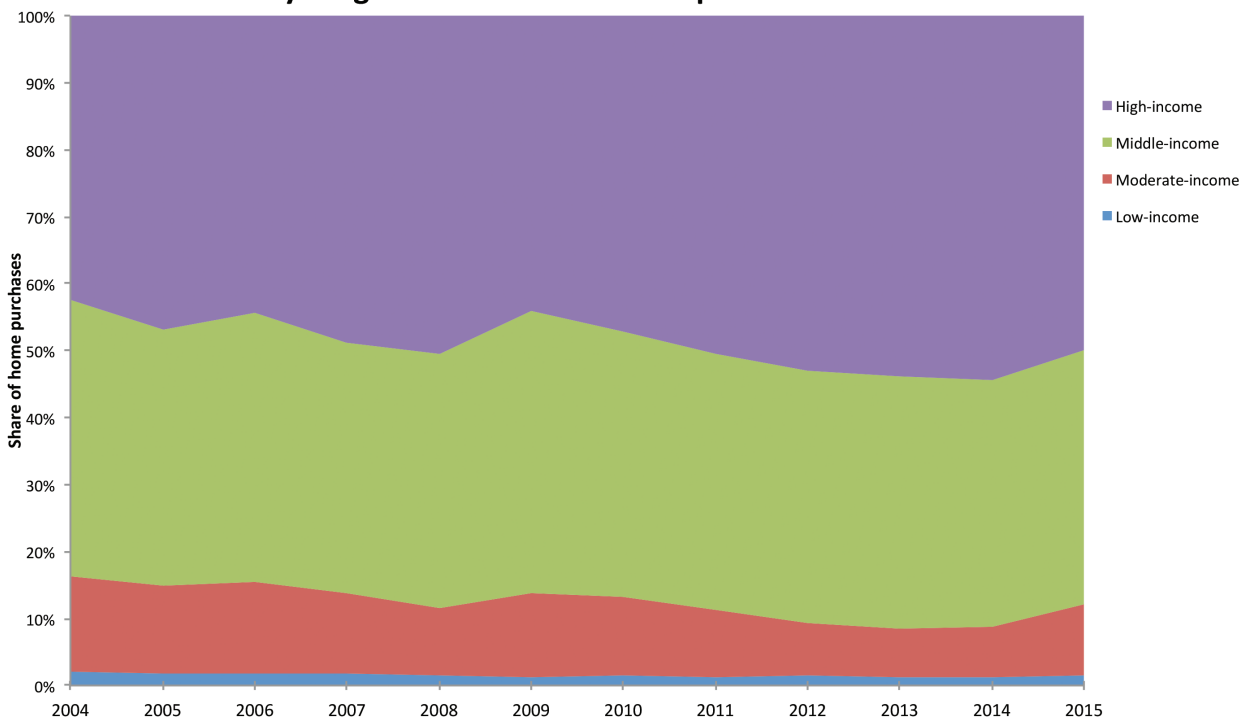
*Figure 6* shows home purchase shares by neighborhood income groups. Prior to the Great Recession, about 16 percent of home purchases occurred in LMI neighborhoods. That share slowly shrank post-Great Recession to a low of 8 percent in 2013, but it has since increased to 12 percent in 2015. Conversely, as shares were decreasing in LMI neighborhoods, home purchase activity was increasing in middle- and high-income neighborhoods, activity which accounted for a high of 92 percent of the county's overall home purchases in 2013. The trend in Allegheny County was very similar to the national trend up to 2012. Beginning in 2012, the share of home purchases occurring in LMI neighborhoods was on average 4 percentage points lower than the nation's share,

but the rates have become closer by 2015 (1 percentage point gap).<sup>5</sup>

Once again, Cuyahoga County exhibited very different trends. In 2005, LMI neighborhoods accounted for 30 percent of home purchase activity (double Allegheny County's rate), declined 19 percentage points by 2011 to be the same share as Allegheny County's, and increased 17 percent by 2015 (5 percentage points greater than Allegheny County's).

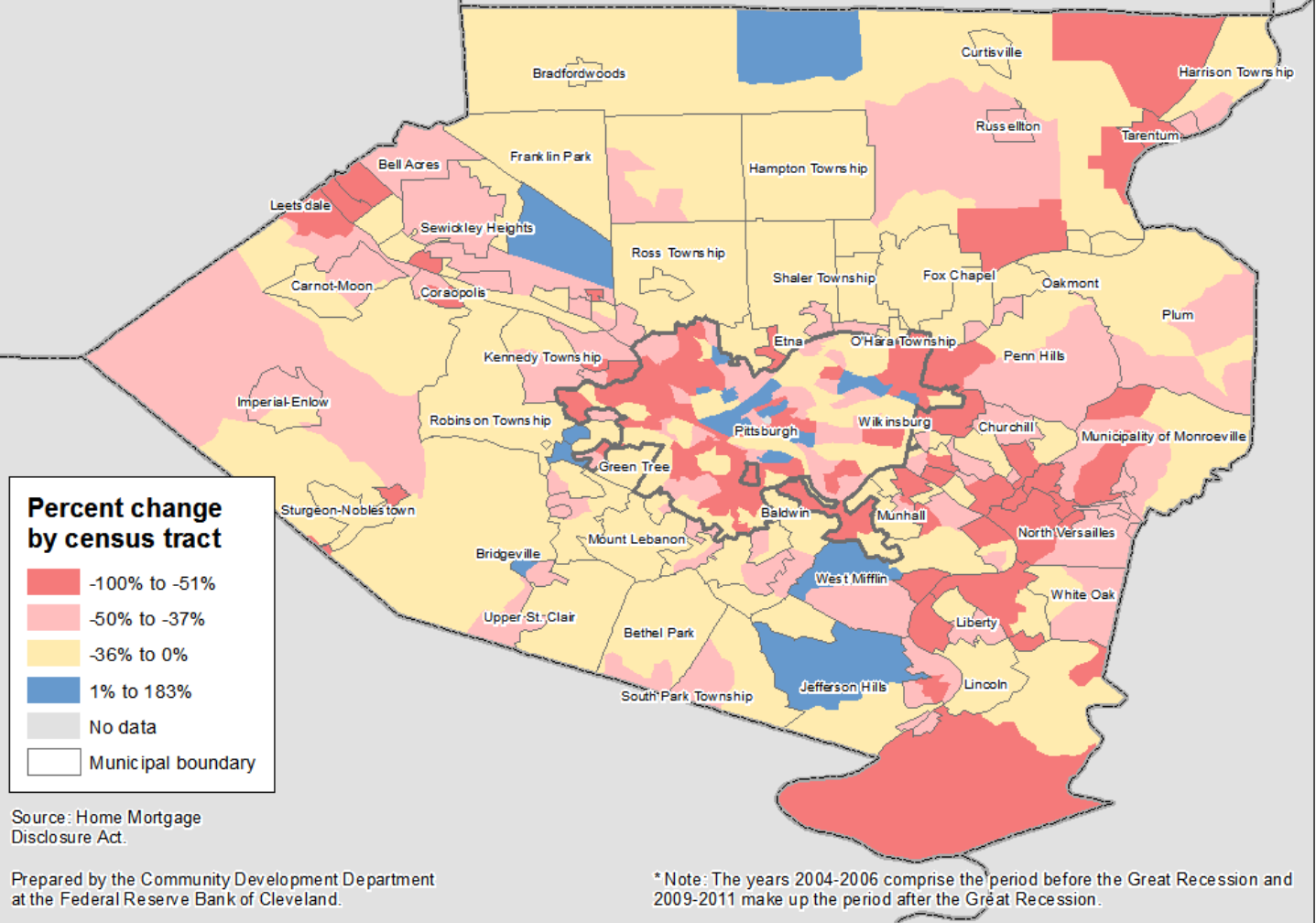
*Map 3* shows the percent change in home purchases before and after the Great Recession. Declines occurred in most neighborhoods, with only a handful of neighborhoods scattered throughout the county showing increases.

**FIGURE 6: Share of Home Purchase Loans in Allegheny County by Neighborhood Income Group**



Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau; originations for first-lien, owner-occupied, 1- to 4-family structures. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

**Map 3: Change in Allegheny County Home Purchase Loans before and after the Great Recession\***



## WHO'S PURCHASING AND WHERE

Next, we look at who is purchasing homes (with a loan) by borrower income and in what neighborhoods.<sup>6</sup> We look at three years for comparison: 2005, or two years before the Great Recession; 2010, or the year immediately following the Great Recession; and 2015, the most recent year available.

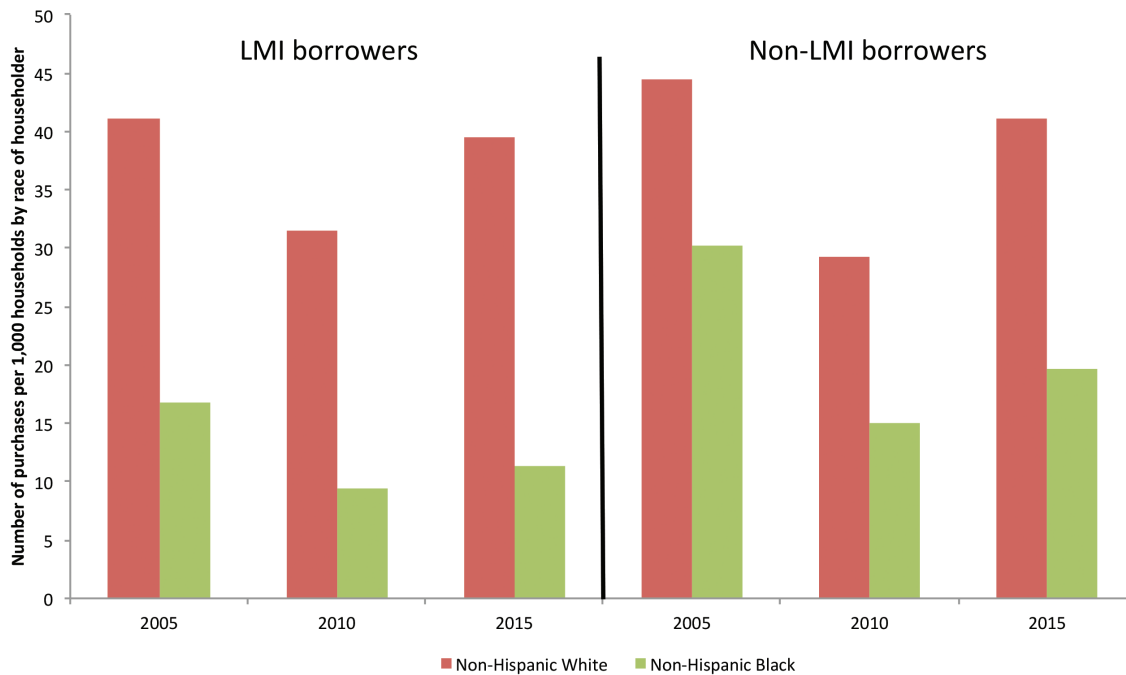
## HOME PURCHASE LOAN RATES PER 1,000 HOUSEHOLDS

Figure 7 compares home purchase loan rates for black and white borrowers by income.<sup>7</sup> We calculate the home purchase loan rate by dividing the number of home purchase originations by race and income group by the number of households with that same race and in that same income group. This allows us to compare the differences across race and income categories while accounting for the size of the population in each of these groups. We focus on non-Hispanic black and non-Hispanic white borrowers only since they account for the majority of home purchase loans originated in Allegheny County in every year of our analysis.

In all years and across all income groups, white borrowers obtain home purchase loans at a higher rate than black

borrowers, and that gap has been widening over time. When looking at LMI borrowers, the rate for whites was 2.4 times greater than for blacks in 2005, but by 2015 the rate for whites was 3.5 times greater than that of their black counterparts. For non-LMI borrowers, that rate gap increased from 1.5 times greater in 2005 to 2.1 times greater in 2015. The home purchase rate declined for all race and income groups following the Great Recession (2005 versus 2010), but has since increased in 2015 for all race and income groups. However, the decline from 2005 to 2010 was steeper for blacks, and their recovery has been weaker in both income groups.

**FIGURE 7: Home Purchase Loans by Race and Income of Borrowers per 1,000 Households in Allegheny County**



Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau; purchase originations for first-lien, owner-occupied, 1- to 4-family units. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

## HOME PURCHASE ORIGINATIONS BY RACE AND BORROWER INCOME AND NEIGHBORHOOD INCOME GROUPS

Next, we look at origination rates for home purchases—the share of applications for home purchases that are approved by the lenders and accepted by the borrowers—by race, borrower income, and neighborhood income groups. A few observations from [Table 2](#)

1. Origination rates for all borrower types increased from 2005 to 2015, and these increases were highest for black borrowers—their increases were all more than 10 percentage points.
2. In 2015, the highest origination rates were for non-LMI borrowers purchasing in non-LMI neighborhoods, which for blacks and whites were 89 percent and 92 percent, respectively.
3. Origination rates for whites of both income groups were higher than rates for their black counterparts for all income types and years, but those gaps have declined from 2005 to 2015. By 2015, the largest gap between black and white borrowers were for LMI borrowers purchasing in LMI neighborhoods (5 percentage point gap), and the smallest gap was between non-LMI borrowers purchasing in non-LMI neighborhoods (3 percentage point gap).
4. In 2015, Allegheny County's origination rates were higher than Cuyahoga County's across all race, neighborhood, and income types.

**TABLE 2: Home Purchase Origination Rates by Race, Income, and Location of Purchases in Allegheny County**

|   | 2005  | 2010  | 2015  |
|---|-------|-------|-------|
| <b>LMI BORROWERS</b>  |       |       |       |
| <b>Home purchase origination rates in LMI neighborhoods</b>     |       |       |       |
| Black LMI borrowers   | 63.2% | 80.0% | 79.5% |
| White LMI borrowers   | 75.8% | 81.5% | 84.9% |
| <b>Home purchase origination rates in non-LMI neighborhoods</b> |       |       |       |
| Black LMI borrowers   | 70.0% | 79.0% | 83.2% |
| White LMI borrowers   | 84.4% | 85.3% | 88.3% |
| <b>NON-LMI BORROWERS</b>  |       |       |       |
| <b>Home purchase origination rates in LMI neighborhoods</b>     |       |       |       |
| Black non-LMI borrowers   | 63.2% | 75.5% | 81.8% |
| White non-LMI borrowers   | 80.7% | 81.5% | 87.0% |
| <b>Home purchase origination rates in non-LMI neighborhoods</b> |       |       |       |
| Black non-LMI borrowers   | 76.9% | 86.3% | 89.2% |
| White non-LMI borrowers   | 88.7% | 88.6% | 92.2% |

Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau; includes purchase originations for first-lien, owner-occupied, 1- to 4-family units. Prepared by the Community Development Department at the Federal Reserve Bank

## WHERE BORROWERS ARE PURCHASING HOMES

We take our analysis one step further and look at where LMI and non-LMI borrowers are using loans to purchase homes and how that activity has changed over time. *Table 3* looks at the share of home purchase loans in each neighborhood income group by the borrowers' race and income at three points in time: pre-Great Recession (2005), post-Great Recession (2010), and the year of the most recent available data (2015). Here are two points focused on LMI borrower trends:

1. The share of purchases made in LMI neighborhoods has declined for all race and income combinations from 2005 to 2015. Declines were largest for black LMI borrowers, whose share of home purchases made in LMI neighborhoods declined 12 percentage points to 49 percent in 2015. However, the share of black LMI borrowers purchasing in LMI neighborhoods is 2.6 times greater than the share of white LMI borrowers purchasing in LMI neighborhoods, a share relatively unchanged since 2005.
2. When looking at changes in the purchase volume, all income and race categories saw declines between 2005 and 2015, led by a 48 percent decline in home purchases made by white LMI borrowers (black LMI borrowers declined by 34 percent). However, that trend appears to be reversing in the post-Great Recession recovery, as all groups saw an increase in volume from

2010 to 2015, led by white non-LMI borrowers' purchase volume increasing by 37 percent.

The first-time homebuyer tax credit enacted in 2008 and available through mid-2010 may have also impacted LMI borrowers' home purchase activity during this period. Researchers from the Board of Governors of the Federal Reserve System documented an increasing share of home purchase loans to LMI borrowers with a corresponding decrease in refinance activity from 2008 to 2009, the period when the first-time homebuyer tax credit program was in place. In the period immediately following the expiration of the program, they find the share of home purchase originations to LMI borrowers declined significantly.<sup>8</sup>

Turning our focus to non-LMI borrowers, we see that black non-LMI borrowers made 80 percent of their home purchases in non-LMI neighborhoods, a share that has increased 9 percentage points since 2005. White non-LMI borrowers made 92 percent of their purchases in non-LMI neighborhoods, a share that has remained unchanged since 2005. On the flipside, black LMI borrowers made 51 percent of their purchases in non-LMI neighborhoods in 2015 (an increase of 12 percentage points since 2005), while white LMI borrowers made 81 percent of their purchases in non-LMI neighborhoods.

**TABLE 3: Home Purchase Shares to Borrowers by Income and Location of Purchases in Allegheny County**

|  | 2005   | 2010  | 2015   | % Change<br>2005-2015 | % Change<br>2010-2015 |
|--|--------|-------|--------|-----------------------|-----------------------|
| <b>Home purchases by all Black Borrowers</b>     | 785    | 416   | 506    | -35.5%                | 21.6%                 |
| Purchases in LMI neighborhoods                   | 45.7%  | 40.6% | 35.8%  |                       |                       |
| Purchases in non-LMI neighborhoods               | 54.3%  | 59.4% | 64.2%  |                       |                       |
| <b>Home purchases by Black LMI Borrowers</b>     | 422    | 241   | 280    | -33.6%                | 16.2%                 |
| Purchases in LMI neighborhoods                   | 60.7%  | 54.8% | 48.6%  |                       |                       |
| Purchases in non-LMI neighborhoods               | 39.3%  | 45.2% | 51.4%  |                       |                       |
| <b>Home purchases by Black Non-LMI Borrowers</b> | 363    | 175   | 226    | -37.7%                | 29.1%                 |
| Purchases in LMI neighborhoods                   | 28.4%  | 21.1% | 19.9%  |                       |                       |
| Purchases in non-LMI neighborhoods               | 71.6%  | 78.9% | 80.1%  |                       |                       |
| <b>Home purchases by all White Borrowers</b>     | 11,351 | 7,848 | 10,251 | -9.7%                 | 30.6%                 |
| Purchases in LMI neighborhoods                   | 12.9%  | 12.3% | 11.2%  |                       |                       |
| Purchases in non-LMI neighborhoods               | 87.1%  | 87.7% | 88.8%  |                       |                       |
| <b>Home purchases by White LMI Borrowers</b>     | 3,464  | 2,752 | 3,275  | -5.5%                 | 19.0%                 |
| Purchases in LMI neighborhoods                   | 24.3%  | 21.2% | 19.0%  |                       |                       |
| Purchases in non-LMI neighborhoods               | 75.7%  | 78.7% | 81.0%  |                       |                       |
| <b>Home purchases by White Non-LMI Borrowers</b> | 7,887  | 5,096 | 6,976  | -11.6%                | 36.9%                 |
| Purchases in LMI neighborhoods                   | 7.9%   | 7.4%  | 7.5%   |                       |                       |
| Purchases in non-LMI neighborhoods               | 92%    | 93%   | 92%    |                       |                       |

Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau; includes purchase originations for first-lien, owner-occupied, 1- to 4-family units. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

## SUMMARY OF ANALYSIS

Since 1990, application and origination activity in Allegheny County has been heavily influenced by mortgage interest rates and the Great Recession. This activity peaked in 2003, led overwhelmingly by refinances, which accounted for 70 percent of originations that year. From there, applications and originations dropped by 65 percent during a 5-year period (2003 to 2008) that marked the start of the Great Recession. This decline in applications occurred in all neighborhood income types from 2004 to 2008, followed by a divergence in 2009. From that year on, middle- and high-income neighborhoods saw more erratic changes primarily due to refinance activity, where high-income neighborhoods saw an increase of 25 percentage points to account for 61 percent of all refinance activity in 2012. Application rates in LMI neighborhoods remained depressed, with only a slight uptick in 2015.

Overall, origination rates have been ticking up for all neighborhood income groups since 2009, led by low-income neighborhoods and their 15 percentage point increase through 2015. Comparing origination rates by loan type shows rates for home purchases are higher than those for refinances; this is particularly true in low-income neighborhoods, where, in 2015, home purchase origination

rates were 39 percentage points greater than refinance origination rates (82 percent origination rate for home purchases and 43 percent for refinances). When looking at origination rates by race, those for whites of both income groups (LMI and non-LMI borrowers) were higher than rates for their black counterparts for all years, but those gaps have declined from 2005 to 2015.

The share of home purchases made in LMI neighborhoods has declined for all race and income groups from 2005 to 2015. Declines were largest for black LMI borrowers, whose share of home purchases made in LMI neighborhoods declined 12 percentage points to 49 percent in 2015. However, the share of black LMI borrowers purchasing in LMI neighborhoods is 2.6 times greater than the share of white LMI borrowers purchasing in LMI neighborhoods, a share relatively unchanged since 2005. Turning our focus to non-LMI borrowers, we see that black non-LMI borrowers in 2015 made 80 percent of their home purchases in non-LMI neighborhoods, a share 9 percentage points higher than in 2005. White non-LMI borrowers in 2015 made 92 percent of their purchases in non-LMI neighborhoods, a share that is unchanged since 2005.

## DATA DETAILS AND CAVEATS

The data we used in the charts showing the 1990 to 2015 trends include applications and originations for owner-occupied and 1- to 4-family properties and both first and junior liens. First liens are those that are in the first or priority position to receive proceeds from the liquidation of the collateral (the home) that secures the loan. The Consumer Financial Protection Bureau (CFPB) defines a junior lien “as a loan you take out using your house as collateral while you still have another loan secured by your house.” Junior liens are subordinate to first liens in terms of receiving proceeds from liquidation. Figures focusing on the 2004 to 2015 time period also include owner-occupied units and 1- to 4-family structures; however, this subset includes only loans secured by a first lien (reflecting a flag in the HMDA dataset that began in 2004). When we refer to *applications* we mean all of the following: loan applications that were approved by a financial institution and accepted by the applicant (i.e., originated), applications that were approved but not accepted by the applicant, and applications that were denied by a financial institution. When we refer to *originations*, we mean the loans that were approved by a lender and accepted by the applicant.

The data for 2004 to 2011 are based on a different set of census tracts than the data for 2012 to 2015 because of census tract boundary changes between decennial census years. While data from the earlier period are based on 2000 census tract boundaries, data from 2012 to 2015 are based on boundaries from the 2010 census. Therefore, caution should be used when comparing data from the earlier time period to current time period because differences *may* be attributable to changing tract definitions rather than to changing lending patterns.

In [Figure 3](#), owner-occupied housing units are used in the application rate calculation. The housing unit counts we used in generating rates for the 2004 through 2011 time period are based on the 2000 census and the 2010 census. We use linear interpolation to obtain annual housing unit estimates between 2004 and 2011. For the years 2012 to 2015, we use the housing unit estimates from the 2010 to 2014 American Community Survey (ACS).

The tract median family income used to categorize the neighborhood income groups for the 2004 to 2011 years is obtained from the 2005 to 2009 ACS and is adjusted annually for inflation using the Bureau of Labor Statistics’ consumer price index research series (CPI-U-RS). For the 2012 to 2015



years, the tract median family income is from the 2010 to 2014 ACS and is adjusted annually for inflation using the CPI-U-RS. The annual MSA median family income used in the neighborhood income group calculations is obtained from the FFIEC.

The estimates of households by income and race of householder that are used in the calculation of the home purchase loan rates (*Figure 7*) come from the Public Use Microdata Sample (PUMS) data. The PUMS data provides individual and household level data from the various census

surveys. The ACS 2005 to 2009 and 2010 to 2014 micro data was extracted from the IPUMS website at [www.ipums.org](http://www.ipums.org). We used family income by race of householder and adjusted it annually for inflation as we did with the tract income described above. We then compared the inflation-adjusted family income to the MSA median family income in each year and grouped the households into the four income groups as we did with the neighborhood income groups.

## NEIGHBORHOOD AND BORROWER INCOME GROUPS<sup>9</sup>

- **Low-income:** Median family income for the census tract (or borrower income) is less than 50 percent of the MSA's median family income
- **Moderate-income:** Median family income for the census tract (or borrower income) is greater than or equal to 50 percent but less than 80 percent of the MSA's median family income
- **Middle-income:** Median family income for the census tract (or borrower income) is greater than or equal to 80 percent but less than 120 percent of the MSA's median family income
- **High-income:** Median family income for the census tract (or borrower income) is greater than or equal to 120 percent of the MSA's median family income

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<sup>1</sup> The Cleveland Fed serves the Fourth Federal Reserve District, which comprises Ohio, western Pennsylvania, eastern Kentucky, and the northern panhandle of West Virginia.

<sup>2</sup> For additional information about HMDA, see <https://www.ffiec.gov/hmda/default.htm>.

<sup>3</sup> Neil Bhutta and Daniel R. Ringo (2016), "Residential Mortgage Lending from 2004-2015: Evidence from the Home Mortgage Disclosure Act Data." Federal Reserve Bulletin, vol. 102 (November), pp. 1-26.

<sup>4</sup> Home prices were gathered from the Federal Housing Finance Agency's annual county house price index (developmental index; not seasonally adjusted), available at <https://www.fhfa.gov/DataTools/Downloads/pages/house-price-index-datasets.aspx>.

<sup>5</sup> Bhutta and Ringo (2016).

<sup>6</sup> This report includes only home purchases for which the borrower took out a mortgage loan. Homes purchased with cash are not reflected in our analysis.

<sup>7</sup> It has been well documented that in the years prior to the Great Recession, some loan applications may have overstated the income of borrowers seeking to purchase or refinance a home. Therefore, it is possible that borrowers categorized as middle- and high-income borrowers in 2005 may have been misclassified.

<sup>8</sup> Robert B. Avery, Neil Bhutta, Kenneth P. Brevoort, and Glenn B. Canner (2011), "The Mortgage Market in 2010: Highlights from the Data Reported under the Home Mortgage Disclosure Act," Federal Reserve Bulletin, vol. 97 (December), pp. 1-60.

<sup>9</sup> In 2015, the median family income in the Allegheny MSA was \$69,700. Therefore, a low-income neighborhood or borrower is one with a median family income of less than \$34,850; a moderate-income neighborhood or borrower is one with a median family income of greater than or equal to \$34,850 and less than \$55,760; a middle-income neighborhood or borrower is one with a median family income of greater than or equal to \$57,760 and less than \$83,640; and a high-income neighborhood or borrower is one with a median income of greater than or equal to \$83,640.



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