

A LOOK BEHIND THE NUMBERS

Home Lending in Montgomery County Neighborhoods

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KEY FINDINGS

Preceding the Great Recession, home mortgage application rates were higher in Montgomery County's low- and moderate-income (LMI) neighborhoods compared to the county's non-LMI neighborhoods. In 2008, the application rates in the LMI neighborhoods dropped below the rates in non-LMI neighborhoods and have remained at a level lower than in non-LMI neighborhoods through 2016, mirroring the national trend.

Declines in application rates in Montgomery County's LMI neighborhoods were notably larger compared to declines in the nation's LMI neighborhoods. From 2004 to 2016, application rates fell by 84 percent in Montgomery's low-income neighborhoods and by 74 percent in its moderate-income neighborhoods. Nationally, application rates also decreased during this period, but the declines were not as large: Rates fell by 71 percent in the nation's low-income neighborhoods and by 63 percent in moderate-income neighborhoods from 2004 to 2016.

In the post-Great Recession years, application rates in Montgomery County's low-income neighborhoods remained relatively flat, while the middle- and high-income neighborhoods, and, to a lesser degree, moderate-income neighborhoods, experienced jumps in application activity driven mainly by low interest rates and refinance applications. This was similar to the national trend.

Since the Great Recession, origination rates in each neighborhood income group exceeded rates in the pre-Great Recession years. During this 13-year period (2004 to 2016), origination rates reached their highest point in 2015 in all but the high-income neighborhoods, which reached their peak rate in 2009. However, origination rates fell in all neighborhood income groups from 2015 to 2016, with the largest decline (6 percentage points) occurring in the low-income neighborhoods of Montgomery County.

While home purchase loan originations declined from 2005 to 2016 for non-Hispanic white and non-Hispanic black borrowers, the declines were greater for black borrowers (59 percent) than they were for white borrowers (28 percent). Looking at origination rates by race and borrower income, we find that black borrowers, regardless of income, are less likely to get approved for a home purchase loan than white borrowers are in each year we examined. Fifty-six percent of black LMI borrowers who applied for a home purchase loan in an LMI neighborhood in 2016 received one, compared to 73 percent of white LMI borrowers. In 2016, home purchase origination rates in LMI neighborhoods were also lower for black non-LMI borrowers (77 percent) compared to those for white non-LMI borrowers (81 percent).

The share of purchases made in LMI neighborhoods declined for both race and income groups from 2005 to 2016. Declines were largest for black borrowers, whose share of home purchases made in LMI neighborhoods dropped 37 percentage points (to 29 percent) in 2016. By comparison, the share fell 11 percentage points (to 13 percent) for white borrowers in 2016. However, black borrowers—regardless of income—are much more likely than their white counterparts to purchase homes in LMI neighborhoods.

OVERVIEW

In this series of reports, we examine home lending activity in some of the largest counties of the Fourth Federal Reserve District¹ 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.² By law, lenders must provide information on the disposition of applications, including loan purpose and type, applicant income and race, and 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 income groups.

This report on Montgomery County, home to the city of Dayton, Ohio, begins with a broad look at application and origination activity during the past 27 years (1990 to 2016) and then delves into trends during the 13-year period from 2004 to 2016. Looking at this 13-year period allows us to examine lending activity in the years leading up to and into the Great Recession and compare it to the lending activity in the years following the Great Recession. Using maps and a series of figures and tables, we tell the story of mortgage lending during these periods from both the neighborhood and borrower perspectives, with a particular focus on highlighting the differences observed in pre- and post-Great Recession periods.

THE PAST 27 YEARS

During the 27-year period examined, loan applications and loan originations peaked in 2003 before they fell through 2008 during the height of the Great Recession (*Figure 1*). Applications for the purpose of purchasing, refinancing, or improving a home dropped by 38,000 (68 percent) from 2003 to 2008, and originations declined by 28,000 (or 74 percent) during this same period. Both applications and originations fell to their lowest points in 2014 before they rebounded slightly in 2015 and increased again in 2016.

The origination rate—the share of loan applications approved by the lender and accepted by the borrower—reached a high of 86 percent (in 1992) and a low of 53 percent (in 2000) during the 27-year period. In the years leading up to the Great Recession, origination rates hovered around 55 percent. Since the Great Recession ended, origination rates in Montgomery County have increased, and they have exceeded 65 percent since 2009.

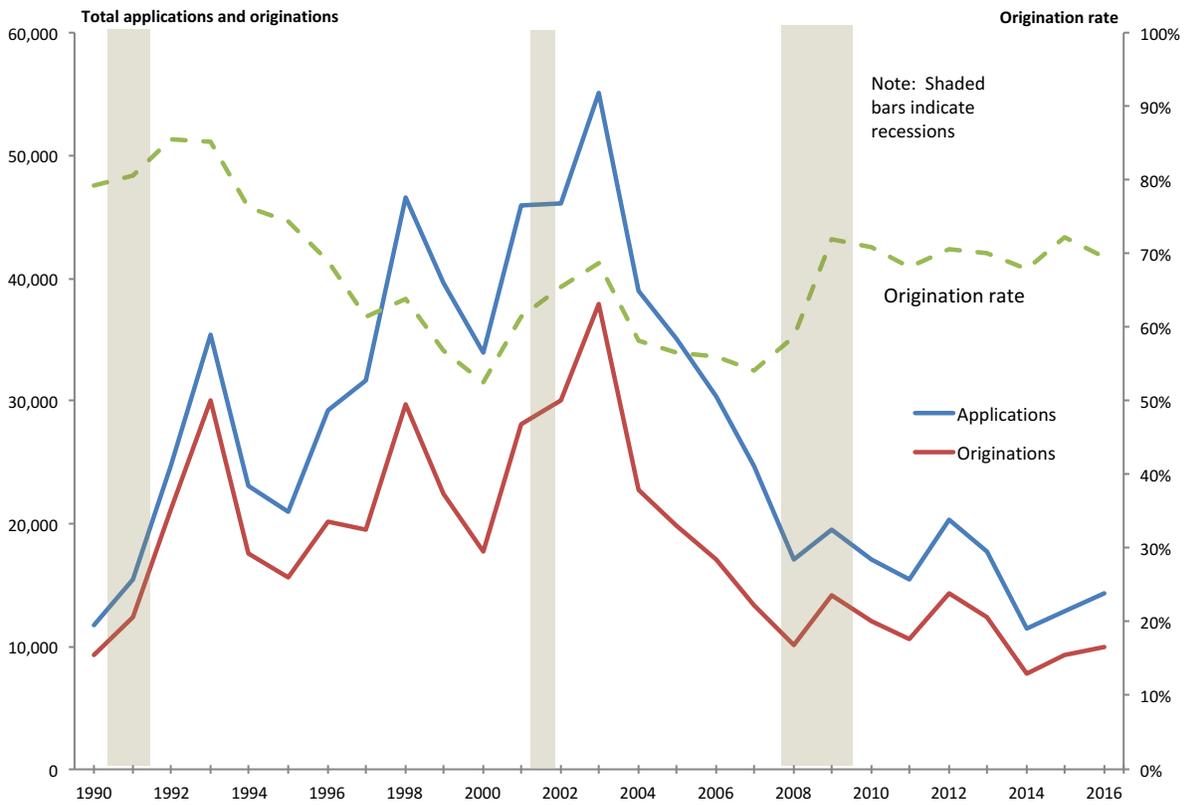
Figure 2 helps us better understand what drives these varying origination numbers over time by separating the loans by loan purpose: home purchase, home refinance, and home improvement. As shown in *Figure 2*, refinance originations reached their peak in 2003 at about 28,000; this number comprised 73 percent of all originations that year. Refinance originations drove the spikes in overall origination

activity, and these spikes coincided with lower interest rates. Home purchase originations reached their peak in 2005 at just more than 9,600; this number comprised 49 percent of all originations in that year.

In the post-Great Recession years, home refinance originations reached a high of more than 10,000 in 2012; this was 62 percent lower than the peak volume in 2003. Home purchase originations, on the other hand, reached a high in 2016 of just more than 5,600; this was 41 percent lower than the peak volume in 2005.

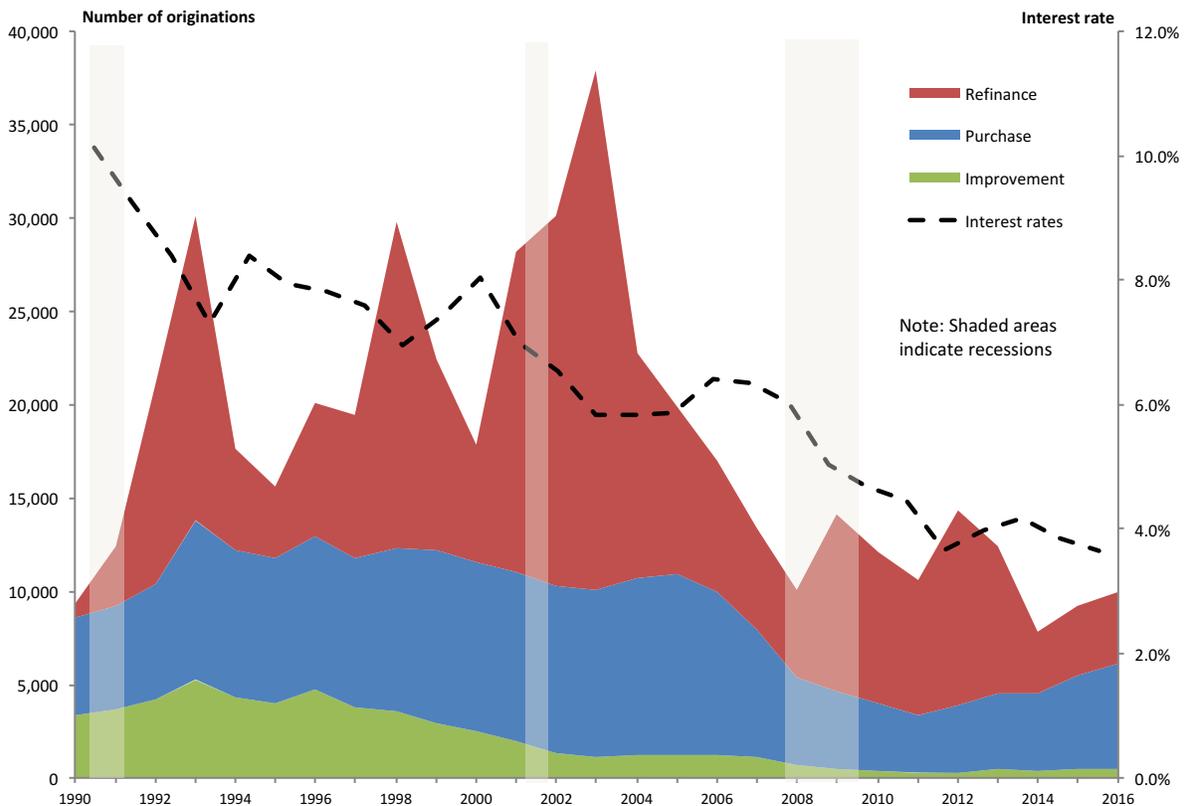
Looking at home purchase originations by loan type, we find that conventional loans comprised more than 80 percent of the home purchase activity in the years immediately preceding the Great Recession (2005 to 2007). However, by 2009, in the midst of the Great Recession, the share of FHA-insured loans (53 percent) exceeded the share of conventional loans (36 percent). Then, as the Great Recession ended, the share of conventional loan originations rebounded and has increased each year, reaching 55 percent in 2014 before decreasing to 50 percent in 2016. Conversely, the share of FHA-insured loans has continuously dropped since its peak in 2009, falling to 30 percent in 2014 before rising to 35 percent in 2016.

Figure 1: Montgomery County Application and Origination Activity



Source: Home Mortgage Disclosure Act (HMDA) data; 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: Montgomery County Originations by Loan Purpose

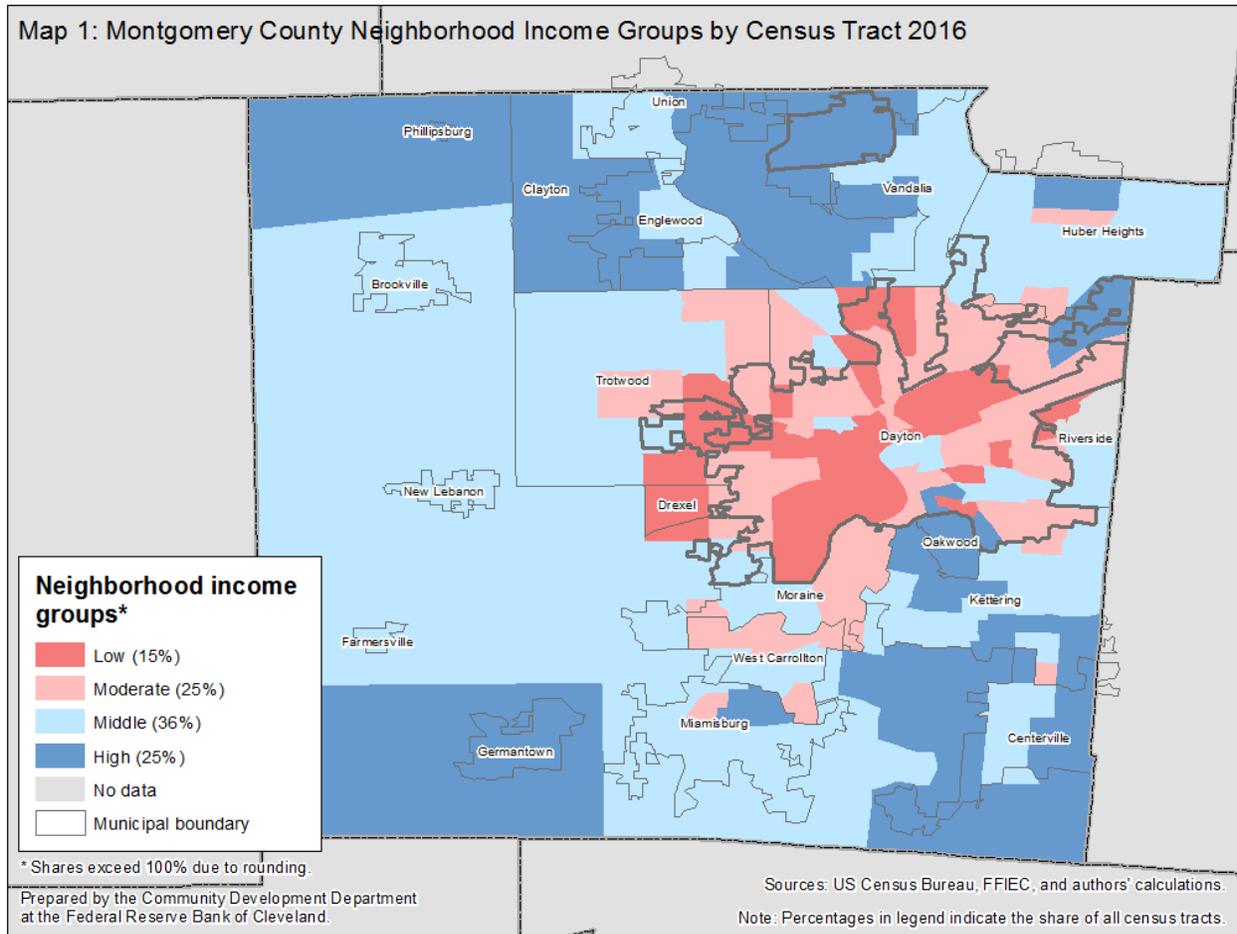


Sources: Home Mortgage Disclosure Act (HMDA) data and Freddie Mac Primary Mortgage Market Survey data (conventional, conforming 30-year fixed-rate mortgages); originations for owner-occupied, 1- to 4-family structures. Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

MONTGOMERY COUNTY MAP OF INCOME GROUPS

Map 1 shows the geographic distribution of income groups across Montgomery County in 2016. These groups are calculated by dividing the median family income of a census tract (a tract is also referred to as a neighborhood) by the median family income of the metropolitan statistical area

(MSA). As shown, the low- and moderate-income (LMI) census tracts are located mostly in the city of Dayton and in the communities bordering Dayton. The higher-income areas are found mainly in the outer-ring areas of the county.



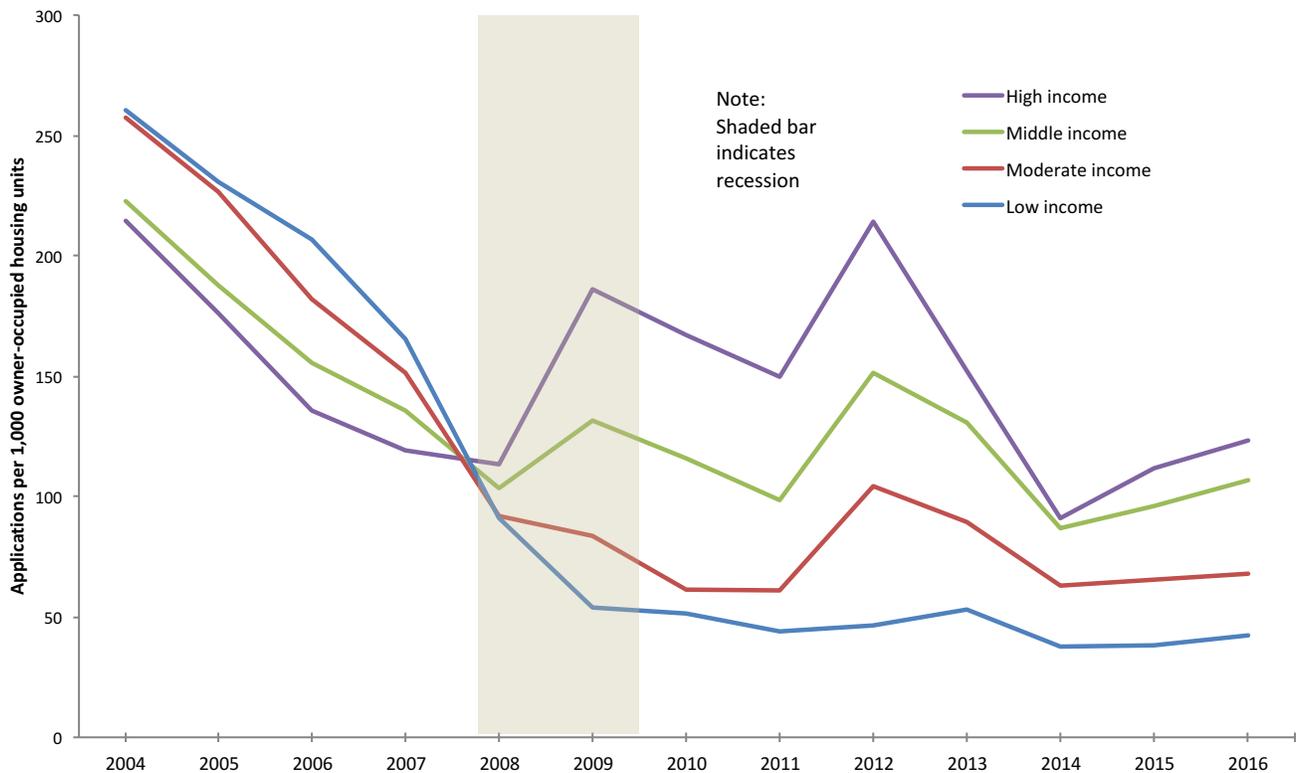
A CLOSER LOOK AT NEIGHBORHOOD INCOME GROUPINGS BY APPLICATIONS

Here we look at application rates in Montgomery County from 2004 to 2016 by neighborhood income groups. In order to compare loan applications across time and income groups, we examine application rates, which we calculate as the number of applications per 1,000 owner-occupied housing units. This allows us to control for neighborhood size.

As illustrated in *Figure 3*, application rates were higher in the county's LMI neighborhoods than in its middle- and high-income neighborhoods in the years leading up to the Great Recession. In 2004, there were 260 applications for every 1,000 owner-occupied housing units in low-income neighborhoods; 260 was the high during the 13-year period. This rate is lower than the national rate (291 applications for every 1,000 owner-occupied housing units in low-income neighborhoods).

As the Great Recession took hold in 2008, application rates in Montgomery County's LMI neighborhoods dropped below the rates in the middle- and high-income neighborhoods and have remained lower through 2016. A similar trend occurred in the nation. By 2016, there were just 43 applications for every 1,000 owner-occupied housing units in Montgomery County's low-income neighborhoods, a decline of 84 percent from 2004. By comparison, the application rate stood at 85 applications for every 1,000 owner-occupied housing units in the nation's low-income neighborhoods in 2016, down 71 percent from 2004. Since 2009, the noticeable spikes in Montgomery County's application rates, mostly found in the middle- and high-income neighborhoods, have been driven by refinancing activity and low interest rates.

Figure 3: Montgomery County Loan Applications per 1,000 Owner-Occupied Housing Units by Neighborhood Income Group



Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau data; 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

Looking at origination rates from 2004 to 2016, we see notable gains from 2008 to 2009, particularly in the LMI and middle-income neighborhoods (*Figure 4*). In the post-Great Recession period (2009 to 2016), fewer people were applying for mortgage loans in Montgomery County; however, those who did apply were more likely to get approved than those who applied for loans during the period prior to and leading into the Great Recession. This is true across all neighborhood income groups.

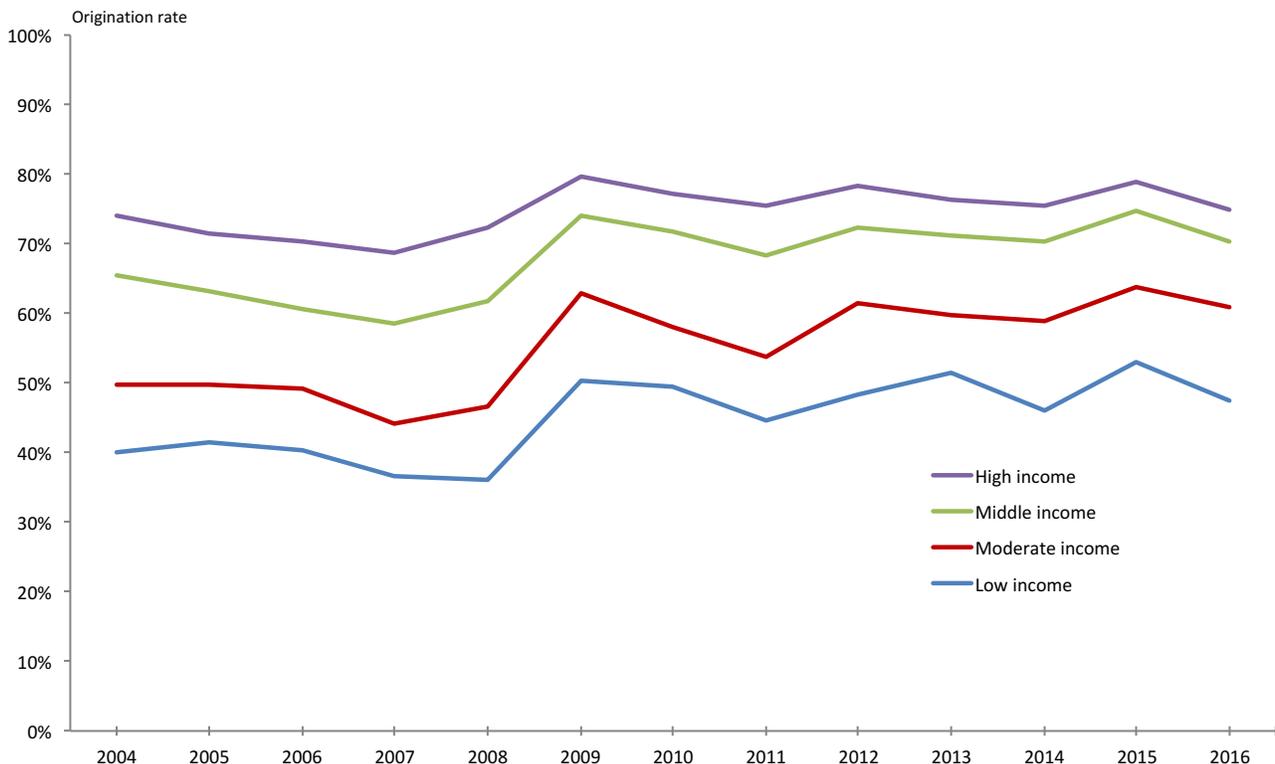
Origination rates reached their peaks in 2015 for each neighborhood income group except the high-income group, which reached its peak origination rate in 2009. More than half (53 percent) of the loans applied for in low-income neighborhoods in 2015 were approved, up from a low of 36 percent in 2008 during the 13-year period. However, origination rates from 2015 to 2016 fell across all neighborhood income groups, with the largest decline (6 percentage points) occurring in low-income neighborhoods. In moderate-income neighborhoods, origination rates fell 3 percentage points from 2015 to 2016

and dropped 4 percentage points in both the middle- and high-income neighborhoods.

Origination rates vary depending on the purpose of the loan. Loan applications for the purpose of purchasing a home are more likely to be approved than are applications for the purpose of refinancing a home. *Table 1* shows origination rates in Montgomery County by loan purpose for three years: 2005, two years prior to the Great Recession; 2010, the year immediately following the end of the Great Recession; and 2016, the most current year for which data are available.

Examining these three years of data, we find that home purchase origination rates increased from 2005 to 2010 in the moderate- and middle-income neighborhoods, but the rates remained virtually unchanged in the low- and high-income neighborhoods. Home purchase origination rates increased only in the low-income neighborhoods from 2010 to 2016; rates increased to 68 percent in 2016 from 59 percent in 2010. Refinance origination rates increased from 2005 to 2010 across all neighborhood income groups, but then they declined in all neighborhoods from 2010 to 2016.

Figure 4: Montgomery County Origination Rates by Neighborhood Income Group



Sources: Home Mortgage Disclosure Act (HMDA) data and US Census Bureau data; 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: Montgomery County Origination Rates by Loan Purpose and Neighborhood Income Group

	2005		2010		2016	
	Home purchase	Refinance	Home purchase	Refinance	Home purchase	Refinance
Low income	58.7%	34.3%	59.3%	45.9%	68.2%	32.7%
Moderate income	68.8%	39.9%	75.4%	50.8%	74.5%	46.3%
Middle income	80.9%	51.6%	82.7%	68.0%	81.0%	58.1%
High income	85.3%	59.5%	84.7%	75.0%	84.2%	65.3%

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

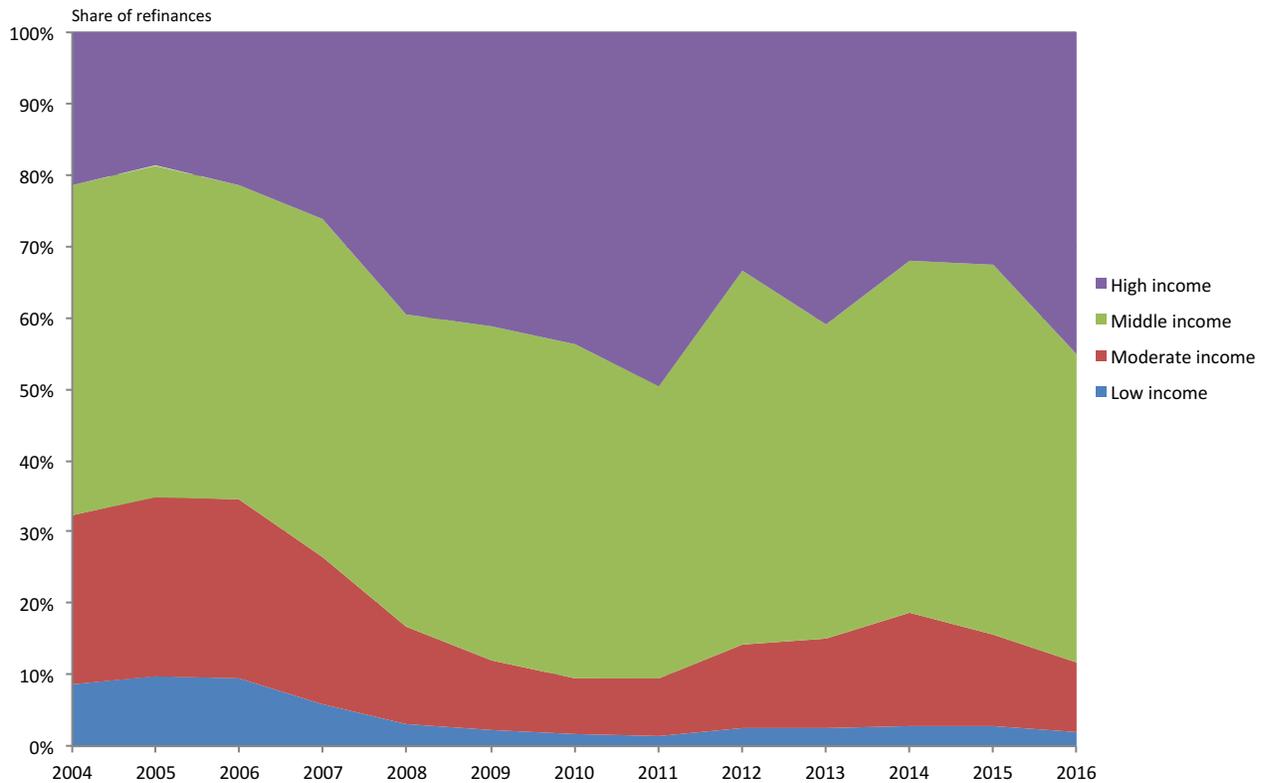
A CLOSER LOOK AT ORIGINATIONS BY INCOME GROUPS AND LOAN PURPOSE

Refinance loan shares in Montgomery County’s LMI neighborhoods peaked in the pre-Great Recession years. During that time, more than 30 percent of all refinance loans occurred in the county’s LMI neighborhoods (*Figure 5*), shares nearly double that of the national average. By 2016, the share of refinance loans in the LMI neighborhoods of Montgomery County was more in line with the national share: 12 percent in Montgomery County compared to 13 percent nationally. From 2004 to 2016, most refinances occurred in the middle-income neighborhoods of Montgomery County, with the exceptions in 2011 and 2016 when the

highest number of refinances occurred in the high-income neighborhoods; this mirrored national trends.³

Map 2 illustrates the percent change in the number of refinance loans from the period right before the Great Recession (2004–2006) and the period immediately following the Great Recession (2009–2011). As shown, refinancing activity increased mainly in the communities at the outer edges of Montgomery County. The largest declines in refinancing activity occurred mostly in Dayton and in the communities bordering Dayton.

Figure 5: Share of Refinance Loans in Montgomery County by Neighborhood Income Group



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

Map 2: Change in Montgomery County Refinances before and after the Great Recession*

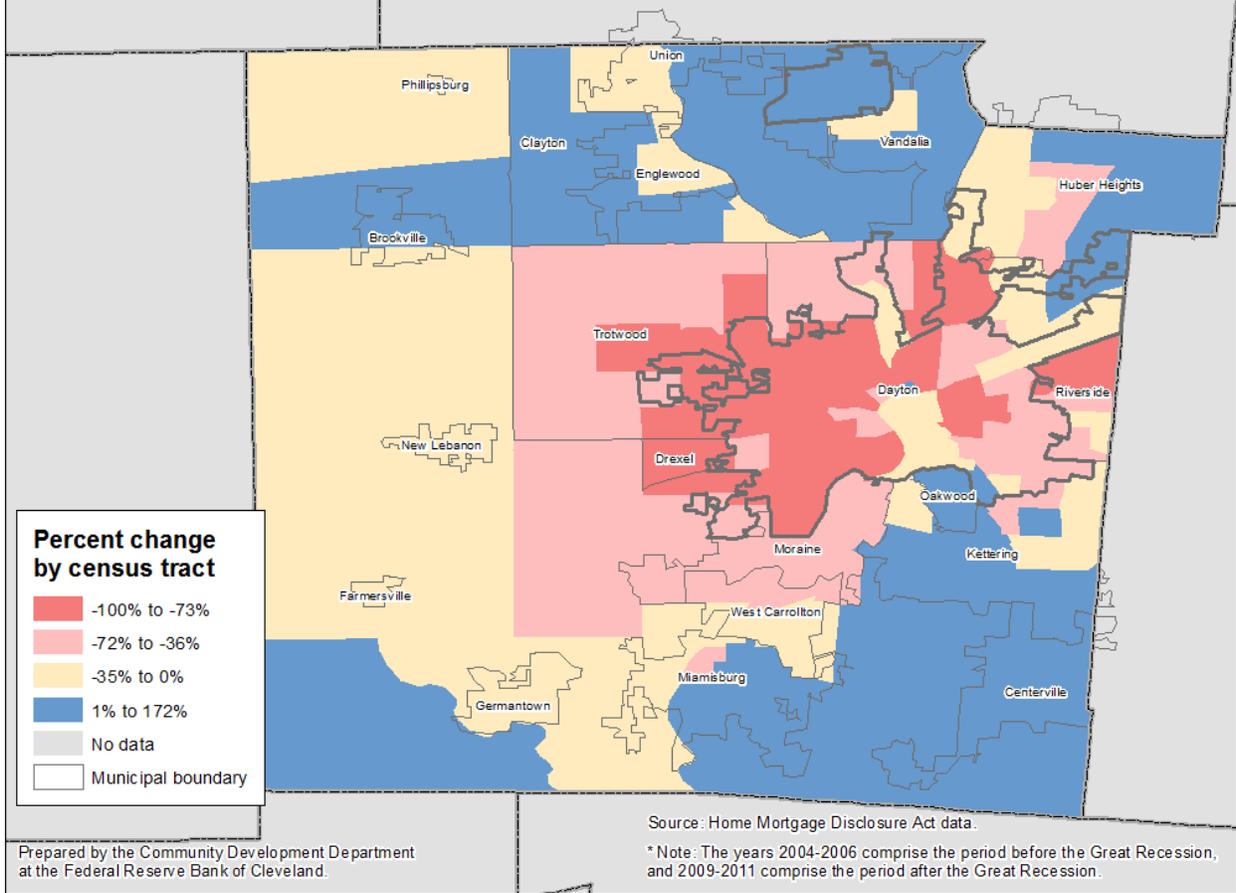


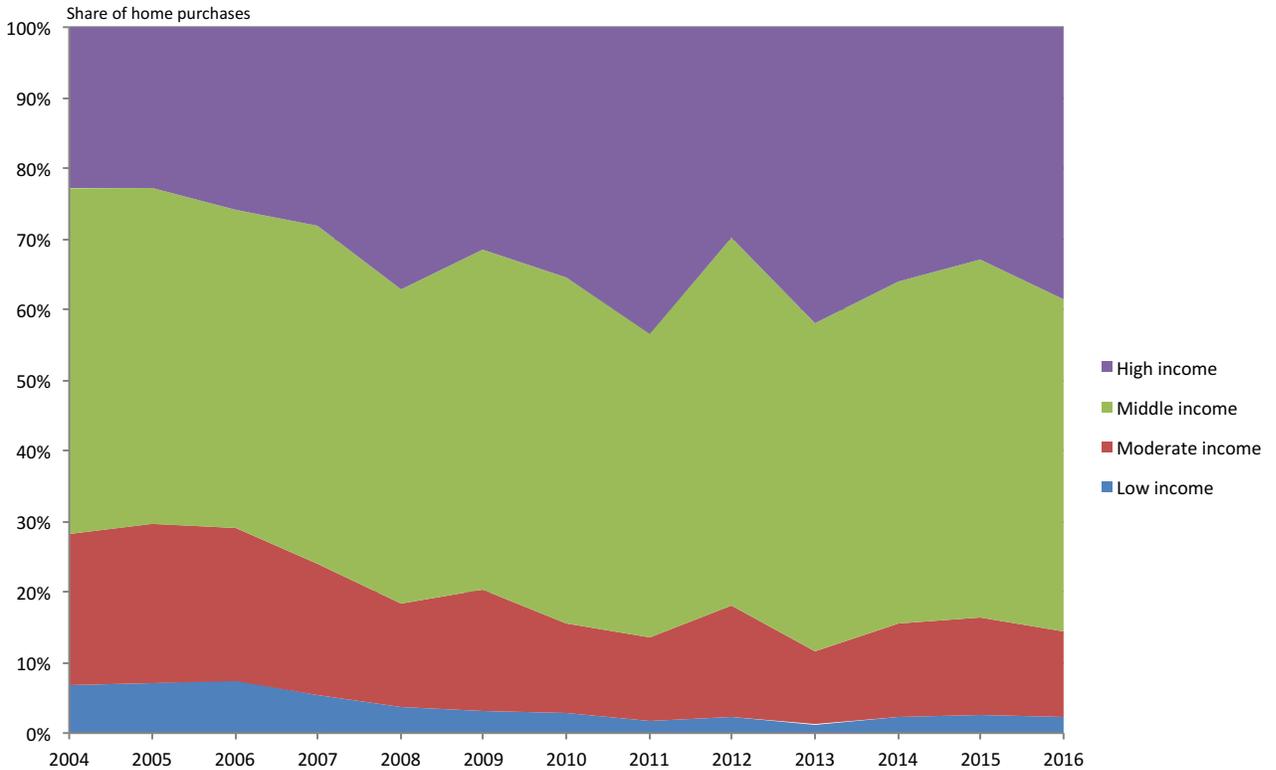
Figure 6 shows the share of home purchase loans by neighborhood income group. During the 13-year period from 2004 to 2016, the share of home purchase loans in LMI neighborhoods reached a high of 30 percent in 2005. Since then, the share of home purchase loans occurring in LMI neighborhoods has declined, and it has hovered around 15 percent since the Great Recession ended.

Conversely, the share of home purchases loans occurring in middle- and high-income neighborhoods (non-LMI) is higher in the post-Great Recession years than it was in

the years leading up to the Great Recession. In 2013, the share of home purchase loans occurring in Montgomery's non-LMI neighborhoods reached a high of 88 percent during the 13-year period.

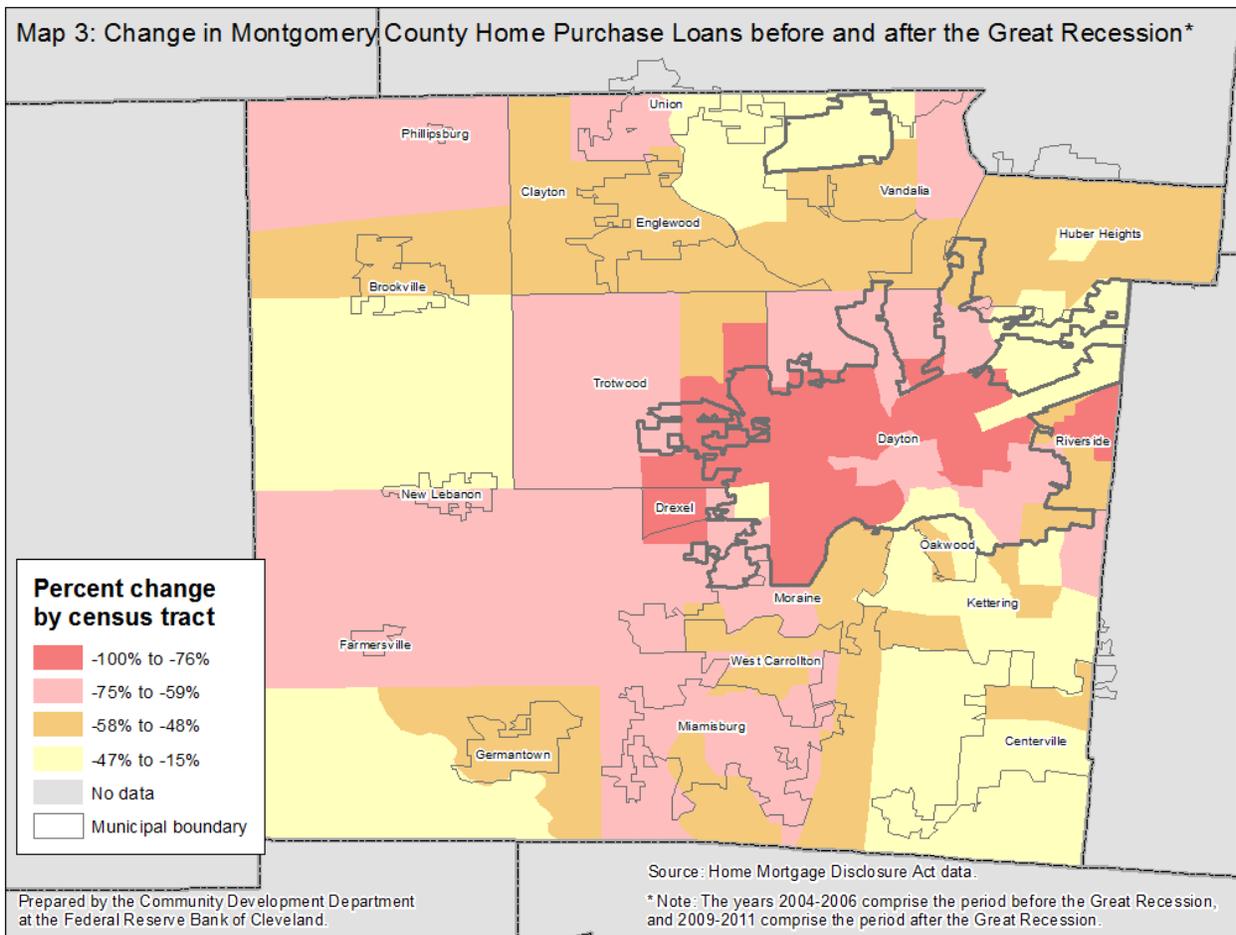
Map 3 displays the percent change in the number of home purchase loans from the period right before the Great Recession to the period immediately following the Great Recession. All areas in Montgomery County experienced declines in home purchase loans, with the largest declines occurring in and around the city of Dayton.

Figure 6: Share of Home Purchase Loans in Montgomery County by Neighborhood Income Group



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

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



Prepared by the Community Development Department at the Federal Reserve Bank of Cleveland.

WHO'S PURCHASING AND WHERE

Next, we take a look at who is purchasing homes (with a loan) by borrower income and race and in what neighborhoods these borrowers are purchasing.⁴ We look at three years for comparison: 2005—the peak year for home purchases—two years prior to the Great Recession; 2010, the year immediately following the end of the Great Recession; and 2016, the most current year of data available for our analysis.

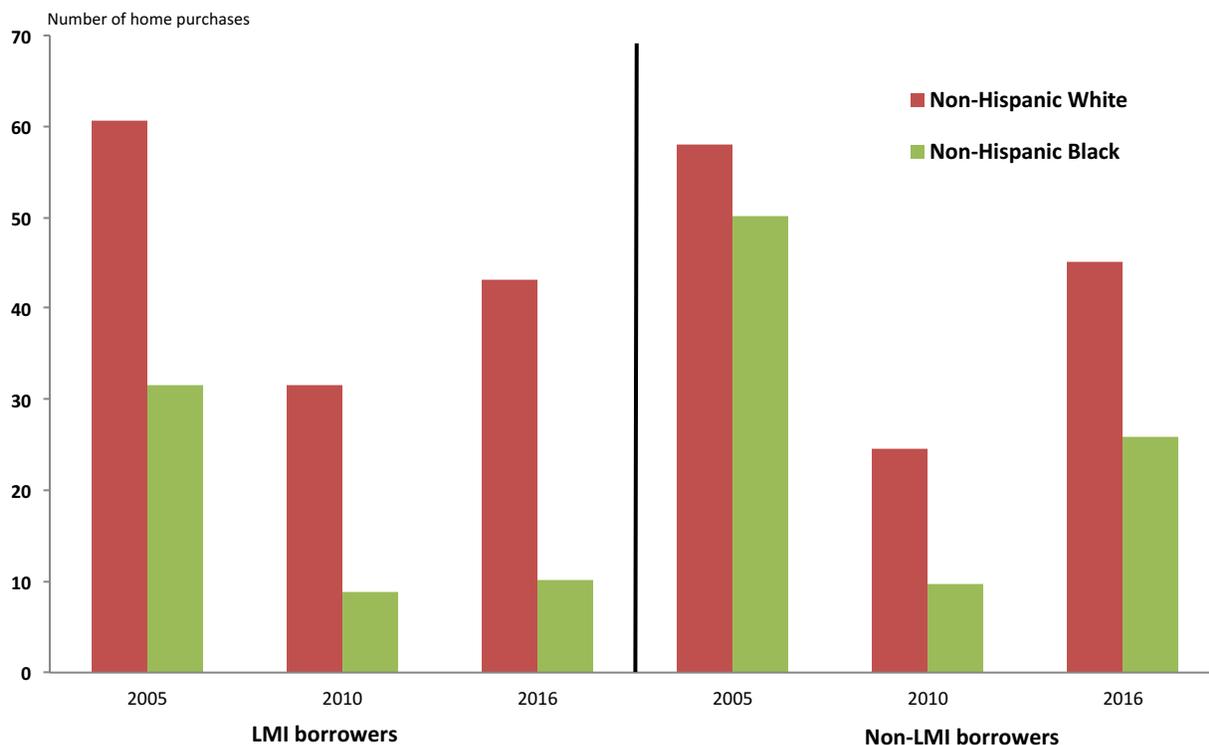
Home Purchase Loan Rates per 1,000 Households

Figure 7 shows the home purchase loan rates for non-Hispanic white and non-Hispanic black borrowers by income.⁵ We calculate these rates 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 only non-Hispanic black and non-Hispanic white borrowers because they account for the majority of home purchase loans originated in Montgomery County in every year of our analysis.

In each of the three years examined, we found that white borrowers are proportionally more likely to get a home purchase loan than are black borrowers.⁶ This was true for both LMI and non-LMI borrowers. For example, in 2005 there were 61 home purchase loans made to white LMI borrowers for every 1,000 white LMI households; that same year, there were just 32 home purchase loans made to black LMI borrowers for every 1,000 black LMI households.

Home purchase loan rates declined across both race and income groups from 2005 to 2010, but the declines were greater for black borrowers. From 2005 to 2010, the home purchase loan rate for black LMI borrowers dropped from 32 home purchase loans for every 1,000 black LMI households in 2005 to just 9 home purchase loans for every 1,000 black LMI households in 2010, a decline of 72 percent. By comparison, the home purchase loan rate declined 47 percent for white LMI borrowers, falling from 61 home purchase loans per 1,000 white LMI households in 2005 to 32 home purchase loans per 1,000 white LMI households in 2010.

Figure 7: Home Purchase Loans by Race and Income of Borrowers per 1,000 Households in Montgomery County



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

The declines in home purchase loan rates were even larger for non-LMI borrowers in Montgomery County from 2005 to 2010. In 2005, there were 50 home purchase loans made to black non-LMI borrowers for every 1,000 black non-LMI households; this number dropped to about 10 for every 1,000 households in 2010, a decline of 81 percent. For white non-LMI borrowers, the home purchase loan rate fell from 58 home purchase loans for every 1,000 white non-LMI households in 2005 to about 25 loans for every 1,000 white non-LMI households in 2010, a decline of 58 percent.

From 2010 to 2016, the home purchase loan rates increased across both races and income groups, but the rates in 2016 are still significantly lower than those in 2005 for both races and income groups.

Home Purchase Originations by Race and Borrower Income and Neighborhood Income Groups

Here we take a closer look at origination rates (loan applications approved by a lender and accepted by a borrower) and categorize them by race, income, and location for three years: 2005, or two years before the Great Recession; 2010, or the year immediately following the end of the Great Recession; and 2016, the most recent year for which data are available.

We see that origination rates increased from 2005 to 2010 for both LMI and non-LMI borrowers by race and by neighborhood income group (*Table 2*). At the same time, origination rates are higher for white borrowers than for black borrowers when applying for a home purchase loan. This is true across each year examined and within the same borrower income group and neighborhood income group.

As shown in *Table 2*, about 53 percent of black LMI borrowers who applied for home purchase loans in

Montgomery County's LMI neighborhoods in 2005 received those loans; however, almost 75 percent of their white counterparts received their loans, a difference of 22 percentage points. The difference in origination rates between white and black LMI borrowers, however, did narrow within LMI neighborhoods. By 2016, this difference fell to 17 percentage points. For black and white LMI borrowers purchasing homes in a non-LMI neighborhood, the difference in origination rates fell from 23 percent in 2005 to 19 percent in 2016.

Looking at non-LMI black borrowers in 2005, we find that 60 percent of those who applied for home purchase loans in an LMI neighborhood received these loans, compared to almost 78 percent of their white counterparts, a difference of almost 18 percentage points. The gap in origination rates between black and white non-LMI borrowers purchasing homes in low- and moderate-income neighborhoods decreased significantly, from 17 percent in 2005 to 4 percent in 2016.

With few exceptions, black non-LMI borrowers were less likely to receive home purchase loans they applied for than were white LMI borrowers, regardless of the neighborhood group. Only in 2016 did the home purchase origination rate for black non-LMI borrowers exceed the origination rate for white LMI borrowers. The 2016 origination rate for black non-LMI borrowers was 77 percent for purchases in LMI neighborhoods and 76 percent for purchases in non-LMI neighborhoods; this exceeded the origination rate of 73 percent for white LMI borrowers purchasing homes in LMI neighborhoods. Given that these data do not include information used in lending decisions—including a borrower's credit score, debt, and employment history—it is not possible with HMDA data alone to identify what might help explain the differences we observe.

Table 2: Home Purchase Origination Rates by Race, Income, and Location of Purchases in Montgomery County

Home purchase origination rates	2005		2010		2016	
	Non-LMI Borrowers	LMI Borrowers	Non-LMI Borrowers	LMI Borrowers	Non-LMI Borrowers	LMI Borrowers
in LMI neighborhoods						
Black borrowers	60.4%	52.9%	65.7%	60.4%	76.9%	56.4%
White borrowers	77.7%	74.9%	82.5%	76.3%	80.5%	73.3%
in non-LMI neighborhoods						
Black borrowers	71.1%	58.1%	73.6%	68.0%	75.8%	60.2%
White borrowers	87.3%	81.3%	87.6%	82.5%	86.9%	79.4%

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

Where Borrowers are Purchasing Homes

We take the analysis one step further and look at where LMI and non-LMI borrowers are using loans to purchase homes and how this activity has changed over time. *Table 3* shows the share of home purchase loans in each neighborhood income group by the race and income of the borrower.

Home purchase originations fell for both races and borrower income groups from 2005 to 2016, but the declines were considerably higher for black borrowers, whose home purchase originations decreased by 59 percent, compared to a decrease of 28 percent for white borrowers.

From 2010 to 2016, home purchase originations increased across both races and borrower income groups, with larger gains for black borrowers (a 66 percent increase) than for white borrowers (a 56 percent increase). Yet, when distinguishing between LMI and non-LMI borrowers, we see that, percent-wise, the gains were larger for LMI

white borrowers than they were for LMI black borrowers. For example, home purchase originations increased 24 percent from 2010 to 2016 for white LMI borrowers, while home purchase loans for black LMI borrowers increased 12 percent during this same period.

When looking at where borrowers were purchasing homes in 2005, we find that 66 percent of black borrowers, regardless of income, purchased homes in LMI neighborhoods, while just 24 percent of white borrowers purchased homes in the same neighborhoods. In more recent years, fewer borrowers are purchasing homes in the LMI neighborhoods of Montgomery County regardless of race or income. In 2016, the percent of black borrowers purchasing homes in LMI communities dropped to 29 percent (from 66 percent in 2005), while the percent of white borrowers purchasing homes in LMI neighborhoods fell to 13 percent (from 24 percent in 2005).

Table 3: Home Purchase Shares by Race and Income of Borrowers and Location of Purchases in Montgomery County

	2005	2010	2016	% Change 2005–2016	% Change 2010–2016
Home purchases by all black borrowers	983	241	401	-59.2%	66.4%
Purchases in LMI neighborhoods	66.0%	43.2%	28.9%		
Purchases in non-LMI neighborhoods	34.0%	56.8%	71.1%		
Home purchases by black LMI borrowers	566	151	169	-70.1%	11.9%
Purchases in LMI neighborhoods	80.9%	53.6%	39.1%		
Purchases in non-LMI neighborhoods	19.1%	46.4%	60.9%		
Home purchases by black non-LMI borrowers	417	90	232	-44.4%	157.8%
Purchases in LMI neighborhoods	45.8%	25.6%	21.6%		
Purchases in non-LMI neighborhoods	54.2%	74.4%	78.4%		
Home purchases by all white borrowers	6,254	2,882	4,493	-28.2%	55.9%
Purchases in LMI neighborhoods	24.4%	13.7%	12.9%		
Purchases in non-LMI neighborhoods	75.6%	86.3%	87.1%		
Home purchases by white LMI borrowers	2,651	1,252	1,550	-41.5%	23.8%
Purchases in LMI neighborhoods	39.3%	22.1%	22.9%		
Purchases in non-LMI neighborhoods	60.7%	77.9%	77.1%		
Home purchases by white non-LMI borrowers	3,603	1,630	2,943	-18.3%	80.6%
Purchases in LMI neighborhoods	13.5%	7.2%	7.6%		
Purchases in non-LMI neighborhoods	86%	93%	92.4%		

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

SUMMARY OF ANALYSIS

Data from the past 27 years (1990–2016) show that the number of loan applications and originations has fluctuated in tandem with mortgage interest rates and recessions, notably the Great Recession. Originations in Montgomery County reached a high point in 2003 and a low point in 2014. The fluctuations in originations are driven mainly by refinance loans, which comprised 73 percent of total origination activity in 2003, the high of the 27-year period. After decreasing annually since 2005, home purchase originations ticked up in 2011 and continued to do so through 2016. In 2014, home purchase originations exceeded refinance originations for the first time in the post-Great Recession period.

Application rates declined considerably across all neighborhood income groups as the nation entered the Great Recession, but the rates declined more dramatically in low-income neighborhoods. In 2012, there were notable spikes in application activity in all but the low-income neighborhoods; these spikes were driven mainly by refinance applications and low interest rates. Following the Great Recession, origination rates increased across all neighborhood income groups and reached their peaks in 2015 in all but the high-income neighborhoods before declining in 2016 across all neighborhoods.

In the years preceding the Great Recession, more than 30 percent of Montgomery County's refinancing activity occurred in the county's LMI neighborhoods; by 2016, refinances stood at 12 percent. As the Great Recession ended and we entered the post-Great Recession years, it was homeowners living in middle- and high-income neighborhoods who were more able to take advantage of the low interest rates to refinance their homes; in 2011, nearly 91 percent of all refinancing activity

took place in high- and middle-income neighborhoods. Tightening credit standards coupled with falling or stagnant home prices may have impacted the ability of some homeowners to refinance, particularly in the LMI areas of the county. Similar to the county's refinancing activity, we find the share of home purchase originations occurring in LMI neighborhoods was highest in the years preceding the Great Recession: Nearly 30 percent of the home purchase originations in 2005 occurred in Montgomery County's LMI neighborhoods. By 2016, this number had fallen to 14 percent.

When examining lending activity across race and borrower incomes, we find that white borrowers are proportionally more likely than black borrowers to obtain a home purchase loan. When applying for a loan, white borrowers are also more likely than black borrowers to be approved for a home purchase loan. While home purchase loan originations declined from 2005 to 2016 for both race groups, the declines were greater for black LMI and black non-LMI borrowers than were the declines for white LMI and white non-LMI borrowers.

From 2010 to 2016, black non-LMI borrowers experienced a larger percent increase in home purchase loans than did white non-LMI borrowers. However, the number of home purchases by black non-LMI borrowers in 2016 was 2.5 times lower than that number in 2005, compared to just 1.4 times lower for white non-LMI borrowers. In the years following the Great Recession, we do find higher shares of LMI borrowers purchasing homes in non-LMI neighborhoods for both races, but these shares are higher for white LMI borrowers.

DATA DETAILS & CAVEATS

The data we used in the charts showing the 1990 to 2016 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. Charts focusing on the 2004 to 2016 period also include owner-occupied units and 1- to 4-family structures; however, this subset includes loans secured by a first lien only. 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 2016 because census tract boundaries changed between decennial census years. While data from the earlier period are based on 2000 census tract boundaries, data from 2012 to 2016 are based on boundaries from the 2010 census. Therefore, caution should be used when comparing data from the earlier period to a later 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 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 2016, we use the owner-occupied 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 2016 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 used in the calculation of the home purchase loan origination rates (*Figure 7*) derive from the US Census Bureau’s Public Use Microdata Sample (PUMS) data. The PUMS data provide individual and household-level data with weights from the various Census Bureau surveys. The ACS 2005 to 2009 and 2010 to 2014 microdata were extracted from the IPUMS-USA, University of Minnesota, found at 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 FFIEC’s 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 GROUPS⁷

- **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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- ¹ The Cleveland Fed serves the Fourth Federal Reserve District, which comprises Ohio, western Pennsylvania, eastern Kentucky, and the northern panhandle of West Virginia.
- ² For additional information about HMDA, see <https://www.ffiec.gov/hmda/default.htm>.
- ³ 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; 2016 data for national shares are author's calculation.
- ⁴ This report includes only those home purchases for which the borrower took out a mortgage loan. Homes purchased with cash are not reflected in our analysis.
- ⁵ It has been well documented that in the years prior to the Great Recession, some loan applications may have overstated the income of the 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.
- ⁶ When we refer to black and white borrowers, we are referring to non-Hispanic black and non-Hispanic white borrowers.
- ⁷ In 2016, the median family income in the Dayton MSA was \$59,500. Therefore a low-income neighborhood/borrower is one with a median family income of less than \$29,750; a moderate-income neighborhood/borrower is one with a median family income of greater than or equal to \$29,750 and less than \$47,600; a middle-income neighborhood/borrower is one with a median family income of greater than or equal to \$47,600 and less than \$71,400; and a high-income neighborhood/borrower is one with a median income of greater than or equal to \$71,400.