TECHNICAL APPENDIX

This technical appendix accompanies the report, The Lending Hole at the Bottom of the Homeownership Market, and provides an in-depth account of our quantitative methods.

DATA SOURCES AND PROCESSING

ATTOM Data

Received Files

We received two primary datasets from ATTOM on June 6, 2021.

One dataset contained records of property transactions from the late 1990s to early 2021, and the other contained 2020 property tax related information. Both data sets covered the state of North Carolina.

Transaction Data

The property transaction datasets, though split into two files, contained 238 variables and 12,946,194 records in total.

The dataset contains a wide variety of variables related to property transactions, including the sale amount, type of mortgage (if one was involved), name of the purchaser, and name of the seller. Descriptions of the variables are contained in excel workbooks named 5.0 Recorder Layout.csv and 5.0 Catalog of Elements - Codes v2.28.csv in a sheet named “Recorder Codes.” The first file defines the provided variables. The second file, in the sheet, defines the values that the nominal and categorical variables can have.

Preparing the Transaction Dataset

We are interested in analyzing residential property sales, however, not all the records in the transaction dataset meet this criterion. For example, some of the records involve cases where an individual transfers their ownership of a property to an LLC that they own, some involve a parent transferring ownership to a child, and others involve company-to-company transactions of non-residential (commercial) properties.

To isolate only records involving a market transaction of residential property sales, we followed the explicit instructions provided by ATTOM:

1) ATTOM’s Data Engineering team created an indicator variable called ArmsLengthFlag, which equals 1 or “Y” if the transaction was a market transaction (a sale).
2) To ensure we are taking into account only residential properties, we used a variable named PropertyUseGroup, which identifies the type of property involved in the transaction. To isolate residential properties, we isolated records where PropertyUseGroup equaled “Residential.”
3) There are cases where a market transaction was made, but no transaction amount (sale price) is recorded, which is a data quality issue. Therefore, we took a third step to only

include records of residential market transactions that were not missing a transaction amount.

Enacting steps 1 and 2 drops the total number of records down from 12,946,194 records to 3,589,410. Enacting the third step drops the number from 3,589,410 to 3,402,602.

With the final set of records compiled, we then created new variables. The primary variable created, which did not exist in the initial dataset, was a binary variable indicating whether the transaction was paid in cash or a mortgage. ATTOM's Data Engineering team advised that the best way to identify whether a transaction was paid in cash is whether all of the mortgage fields are missing. If all are in fact missing, then the transaction was most likely paid in cash; if even one of the mortgage fields is not missing, then there was a mortgage involved. This process involved checking the values of 41 variables.

Another important variable is GranteeInvestorFlag, which is an indicator for whether the purchaser of a property is considered a "large investor" by ATTOM. A purchaser is considered a large investor if the purchaser is a non-lending entity that has made more than 10 purchases in 12 months.

Limitations with Final Transaction Dataset

1. There is missing data for many counties in NC, especially prior to 2005. Moreover, there are two counties (Chowan and Beaufort) where transaction data is completely missing. Hence, analyzing counts at the NC level may result in the undercounting of the total transactions that have occurred. We do not focus on the NC-level data, however, if data is missing for other counties throughout the state, there may be missing data for Forsyth too.

2. ATTOM uses an indicator variable called ArmsLengthFlag to identify whether a transaction was a true "market transaction" involving an independent buyer and seller (so not, for example, a parent selling a house at a discounted price to their child). This type of real estate transaction is known as an Arm's Length sale. ATTOM created this variable using a series of complex programming rules and logic. Undoubtedly, based on the messy nature of the raw data, some transaction records may be flagged as an Arm's Length sale that should not be, while other records that ought to be flagged are not. However, there is no real way to know the extent to which this happens.

3. Determining whether a transaction involved a mortgage or all-cash is challenging. It depends on the availability of data that may be missing. To determine whether a transaction involved cash, ATTOM advised determining whether the mortgage information fields were missing, and, if so, this strongly suggested that it was a cash transaction. However, there are cases where mortgage-related information is missing for unknown reasons, even though a mortgage was involved. There is no real way to know the full extent to which this happens.

4. ATTOM provides a variable to indicate whether a property was purchased by a large investor, which is defined as a "Non-lending entity with more than 10 purchases in 12 months." Using 10 purchases as the threshold is an arbitrary designation. Moreover, many large property companies throughout the United States own multiple smaller companies that make purchases. Even though the larger company ultimately owns the property, ATTOM's flag does not tie these smaller companies together when counting the number of purchases to determine whether it was made by an investor. To illustrate this issue, let us consider an example. Company X owns companies x1 and x2. In the last year, x1 purchased 7 properties while x2 purchased 9 properties. Also, X happened to purchase 2 properties itself in the last year. According to ATTOM's logic, transactions involving x1, x2, and X would not be flagged as involving an investor, since none of them, individually, purchased more than 10 properties in the last year.

Property Tax Data

The property tax data received from ATTOM contained 129 variables and 5,683,079 records. The dataset contains variables related to the physical property, including the number of bedrooms, square footage, building material, type of property, presence of a pool, and so on. Descriptions of the variables are contained in excel workbooks named 5.0 Tax Assessor Layout V13.csv and 5.0 Catalog of Elements - Codes v2.28.csv in sheet named "Tax Assessor Codes." The first file defines the provided variables. The second file, in the sheet, defines the values that the nominal and categorical variables can have.

Preparing the Property Tax Dataset

The process of preparing the property tax dataset primarily involved filtering out residential properties from all other property types (commercial, etc.). To do this, we used the PropertyUseGroup variable, and specified that it equal either "Residential" or "RESIDENTIAL." This drops the number of rows from 5,683,079 records to 4,289,623 records.

Another important variable to mention is CompanyFlag. If this variable equals "Y" then the property is owned by a company.

Home Mortgage Disclosure Act (HMDA) Data

Enacted in 1975, HMDA requires that eligible lending institutions report loan-level characteristics about mortgage applications, including applicant demographics, loan amounts, and application outcomes (e.g., whether a mortgage application resulted in an origination, denial, incomplete, etc.). Not all lending institutions are required to report data, but this data is the "most comprehensive source of publicly available information on the U.S. mortgage market."

Raw Files

We downloaded 14 HMDA datasets from the Consumer Financial Protection Bureau, corresponding to the 14 years between 2007 and 2020. The datasets were downloaded as CSV files (.csv) from the following locations: the files for the 2007-2017 were collected from

https://www.consumerfinance.gov/data-research/hmda/historic-data/. The files for 2018-2020 were collected from: https://ffiec.cfpb.gov/data-browser/data/2020?category=states.

For the 2007 to 2017 datafiles, we specified that the Geographic Area includes the state of North Carolina, that the records include All Records. For the 2018 to 2020 datafiles, we specified that the geographic level be the State, and selected North Carolina. We left the Select Financial Institution section and the Select a Filter section blank.

The downloaded files contain mortgage loan application records across the state of North Carolina, at the individual applicant level from 2007 to 2020. Included in the dataset are variables related to the mortgage loan size, the outcome of the application process (denied, originated, etc.), applicants' reported income, lien status, loan type (conventional, FHA, etc.), loan purpose (home purchase, refinancing, etc.), applicants' race, applicants' gender, lending institutions' name, etc.

Preparing the Analysis Dataset

We downloaded files separately by year, and appended them to create a single dataset. We are interested in analyzing mortgage loan applications in Forsyth County, North Carolina that meet certain conditions. The following logic describes how we filtered the raw appended dataset

1) First, we specified the county_code variable equal 67, which is the numeric FIPS code for Forsyth County, NC (NC's state FIPS code is 37).
2) Second, we set the loan_purpose variable equal 1, indicating that the purpose of the applicants' attempts at getting a mortgage loan is to purchase a home (not to refinance or make home improvements).
3) Third, we set the occupancy_type variable equal to 1, indicating that the home, if purchased, will be the loan applicants' principal dwelling place (and not an investment property or secondary home).

The action_taken variable in the HMDA data records a loan application as taking 1 of 8 mutually exclusive values, which are:

1 - Loan originated
2 - Application approved but not accepted
3 - Application denied
4 - Application withdrawn by applicant
5 - File closed for incompleteness
6 - Purchased loan
7 - Preapproval request denied
8 - Preapproval request approved but not accepted

For the fourth step, we keep applications in which the action_taken variable is equal to either 1, 2, 3, 4, or 5. We do not include applications where action_taken equals 6, 7, or 8 because there is no way to verify how these application processes concluded and what the application resulted

in. The action_taken values 1 through 5 indicate that the loan application process was officially started and a final outcome occurred, whether 1) the lender approved the loan prior to closing and the loan was originated, 2) lender approved the loan prior to closing, however, the applicant either did not respond or the loan did not close for some reason, 3) the application is denied, 4) the applicant withdraws the application prior to any credit decision, or 5) the lending institution closes the application due to incompleteness, after sending the borrower a notice, which the borrower failed to adequately respond to. In these five cases, the application process is resolved prior to closing and concludes.

For values 6 through 8, we do not have enough information on how the application process is resolved. “Purchased loan” (value 6) means that a financial institution purchased the loan after closing but no credit decision was made prior to closing. “Preapproval request denied” (value 7) means that the applicant requested a preapproval according to a preapproval program but the applicant was denied the request.” And “preapproval request approved but not accepted” (value 8) means that an applicant’s preapproval request was approved but not accepted, but no credit was extended. So, for values 6 through 8, we cannot verify how the process ultimately concluded (https://regulatorysol.com/action-taken-action-taken-date/). Table A1 shows the yearly counts by action_taken in Forsyth County, before dropping records where action_taken equals 6, 7, or 8.

Table A1. HMDA "Actions Taken" on Loan Applications in Forsyth County, NC									
Year	Approved, but Not Accepted	Closed for Incompleteness	Denied	Originated	Withdrawn by Applicant	Loan Purchased by Institution	Preapproval request approved but not accepted	Preapproval request denied by financial institution	TOTAL
2007	453	166	980	5,583	517	2,073	-	-	**9,772**
2008	277	118	618	3,969	426	1,497	-	1	**6,906**
2009	137	150	499	3,190	435	1,590	-	9	**6,010**
2010	136	96	506	2,646	405	1,268	-	-	**5,057**
2011	157	68	445	2,590	383	1,390	-	-	**5,033**
2012	161	90	561	2,685	384	1,434	-	-	**5,315**
2013	176	69	532	3,056	465	1,581	-	1	**5,880**
2014	121	89	558	3,343	467	1,368	-	2	**5,948**
2015	84	172	541	3,918	520	1,245	-	-	**6,480**
2016	130	188	622	4,584	641	1,268	-	-	**7,433**

2017	114	222	648	4,962	807	1,286	-	-	**8,039**
2018	126	117	607	5,038	991	977	-	2	**7,858**
2019	129	106	537	5,453	914	1,093	2	4	**8,238**
2020	174	192	679	5,627	1,092	670	1	9	**8,444**

Note. All applications related to a home purchase for a principal dwelling place, *regardless* of loan size, loan type, property type (manufactured, single family, multi-family), or lien status

After taking the steps above, the final analysis dataset contained 77,642 records spanning the 14 years between 2007 and 2020 in Forsyth County, NC.

Calculations of Rates

We are primarily interested in using HMDA data for estimating the number of originations and application denial rates. There is no single method of calculating denial rates; different researchers use varying methodologies. For example, in reports by CoreLogic that use HMDA data, they calculate denial rates as the total number of Denied applications divided by the total number of applications that were Originated or Approved But Not Accepted. This is similarly followed by Dietrich, Liu, Skhirtladze, Davies, and Candalis (2019) in their article titled "Data point: 2018 mortgage market activity and trends" published at the Consumer Financial Protection Bureau. Phillip Thorne of Moody Analytics calculates denial rates as the the total number of Denied applications divided by the total number of applications were Originated, Approved But Not Accepted, Withdrawn By Applicant, or Closed For Incompleteness. Glantz and Martinez (2018, https://s3-us-west2.amazonaws.com/revealnews.org/uploads/lending_disparities_whitepaper_180214.pdf) and Srivastava (2021, https://law.unc.edu/wp-content/uploads/2021/02/Racial-ethnic-disparities-home-loans-Srivastata.pdf) calculate Denial Rates as the number of Denied applications divided by the sum of Denied and Originated loans.

We calculate our denial rates as the the total number of Denied applications divided by the total number of applications were Originated, Denied, Approved But Not Accepted, Withdrawn By Applicant, or Closed For Incompleteness.

Limitations with HMDA data

There are numerous limitations associated with the use of HMDA data (many of which are documented here). We are primarily concerned with underscoring the limitations associated with using HMDA data for geographic-related analysis. In our report, we present multiple choropleth maps that plot denial rates at Forsyth County's census tract level. Unfortunately, many HMDA application records are missing census tract FIPs information, so we cannot determine what census tract in Forsyth they belong to, resulting in a large number of records being dropped and not incorporated. Moreover, years prior to 2012 used Census 2000 FIPS codes, while the other years used 2010 FIPS codes, which further complicates the issue. There are some years where some tracts have no loan applications. As a result of these issues, converting HMDA data to the census tract level results in a large loss of data. These maps are intended to illustrate that denial rates do not appear to be randomly redistributed across Forsyth.

A special note on connecting pre-2012 and post-2012 census tracts. We used area interpolation to estimate the count of mortgage loans which were denied and the count of total mortgage loan applications from the 2000 census geographies to 2010 geographies for all pre-2012 records.

This method estimates the count of (any count variable) for 2010 census tracts based on their polygon intersections with 2000 census tracts. It assigns weights to each intersected polygon, and uses those weights to calculate the count estimate for the 2010 geography. Then we join those estimates to the rest of the post-2012 records, summarize across years, and map. As an illustration, if Census Tract A (2000) perfectly (and equally) overlaps with Census Tract A and B (2010) then:

Census Tract A (2000 boundary)	Census Tract A (2010 boundary)	Census Tract B (2010 Boundary)
Total mortgage apps: 100	Total mortgage apps: 50	Total mortgage apps: 50
Total denied mortgage apps: 20	Total denied mortgage apps: 10	Total denied mortgage apps: 10

Note: The above is a 'spatially extensive' interpolation method that uses the 'sum' approach. It was executed with R. A detailed description of the method can be found here.

ANALYSIS

Calculating Home Values and Wealth in East Winston Versus Non-East Winston

Real Home Values and Boundaries

Data Sources

There are two data sources used for the analysis. The first is Zillow and the second is the U.S. Census Bureau's American Community Survey (ACS).

Zillow Home Value Index

The market value data comes from Zillow. Specifically, data includes the Zillow Home Value Index (ZHVI) for all home types, which can be downloaded at multiple place-levels here. The index is a robust estimate of the typical property's market value in a given region. We use twomarket value estimates. , we use a neighborhood-level estimate for the neighborhood of East Winston. Zillow's neighborhood-level file contains estimates for the typical home in East Winston, and most other neighborhoods in Forsyth County. East Winston is defined as the homes located in the boundary highlighted in Figure 1. While the boundary doesn't cover the entirety of what is locally and colloquially considered East Winston, it does encompass most of it and certainly the central part of the neighborhood. Therefore, it is a good proxy to represent the market value of typical home in East Winston.

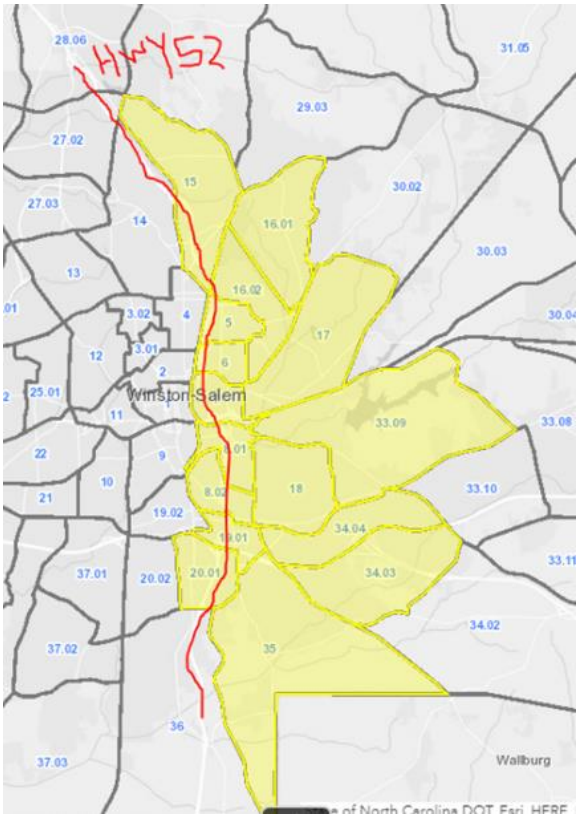
Figure A1. Zillow's East Winston Neighborhood Boundary

Second, we use an estimate for the value of a typical home in the Rest of Forsyth County. To find this estimate, , we use neighborhood-level estimates for the typical homes in all the non-East Winston neighborhoods. Hence, it is an average of the neighborhood-level estimates of these typical homes' values . Therefore, this is a rough proxy for the value of the typical home in the Rest of Forsyth County. There are drawbacks associated with this approach. The primary drawback is that not all neighborhoods are the same size, yet they are equally weighted when we average them. As a result, we may be overestimating the value of the typical property in the Rest of Forsyth County.

ACS

We use ACS data for census-tract level estimates of the total number of housing units. We use the ACS's 5-year estimates from the following waves: 2006-2010, 2007-2011, 2008-2012, 2009-2013, 2010-2014, 2011-2015, 2012-2016, 2013-2017, 2014-2018, and 2015-2019, which represent estimates for each year between 2010-2019, respectively. With these data, we estimate the housing units in East Winston and the Rest of Forsyth County. For East-Winston, we sum the housing units in the 16 census tracts highlighted in Figure A2. The highlighted tracts in the image closely follow what is often colloquially considered East Winston. The designation was provided by Dr. Joseph Sloop, Geographic Information Officer at MapForsyth. The remaining tracts, excluding the 16 East Winston tracts, are what comprise what we refer to as Rest of Forsyth County.

Figure A2. Locally Considered Boundary of East Winston



Adjusting for Inflation

To adjust the ZHVI estimates from nominal to real values, we adjusted the raw estimates for inflation using the U.S. Bureau of Labor Statistics CPI Inflation Calculator found here. All values were adjusted to their June 2021 values.

The nominal and real ZHVI estimates are summarized in Table A2, for East Winston and the Rest of Forsyth County.

Table A2. Nominal and Real Home Values

	East Winston		Rest of Forsyth County	
Year	Nominal	Real	Nominal	Real
1996	91,660.2	158,926.0	120,778.8	209,413.6
1997	85,658.9	145,185.2	127,153.0	215,514.4
1998	91,151.5	151,935.6	130,081.7	216,826.2
1999	95,532.4	156,171.9	134,161.1	219,320.3
2000	105,807.2	166,748.2	140,603.1	221,585.3
2001	107,933.4	164,747.6	146,694.8	223,912.3
2002	108,881.8	164,440.0	150,697.0	227,591.8
2003	103,633.8	153,276.4	153,386.1	226,861.1
2004	107,846.5	154,462.1	158,753.6	227,373.2
2005	104,362.5	145,783.4	164,426.1	229,686.0
2006	113,333.6	151,760.9	170,997.5	228,976.6
2007	115,132.9	150,136.1	175,618.9	229,011.2
2008	104,993.7	130,367.5	175,634.9	218,080.6
2009	75,431.3	95,016.4	169,827.6	213,922.1
2010	68,219.1	85,035.9	164,590.6	205,164.2
2011	51,504.4	61,994.6	157,343.0	189,390.0
2012	46,377.8	54,910.1	152,116.6	180,102.1
2013	42,689.4	49,671.7	150,589.6	175,220.1
2014	39,825.3	39,825.3	156,591.5	178,504.5
2015	39,031.3	44,438.2	156,407.7	178,074.5
2016	40,789.3	45,981.1	159,312.5	179,590.6
2017	43,077.3	47,779.9	166,246.4	184,395.0
2018	47,859.6	51,602.5	176,951.7	190,790.3
2019	50,101.0	53,143.1	185,488.5	196,751.4
2020	55,681.0	58,683.0	198,718.0	209,431.8
2021	63,854.0	63,854.0	220,003.6	220,003.6

Table A3 summarizes how real median ZHVI values compare in East Winston and the Rest of Forsyth County between 1996 to 2007 and 2014 to 2020. In East Winston, the real median ZHVI estimate decreased by nearly 69 percent between these two timeframes, while in the Rest of Forsyth County, it decreased by around 17 percent.

Table A3. Comparison of *Real* Home Values

	1996 – 2007	2014 – 2021	

Place	Median Value	Standard Deviation	Median Value	Standard Deviation	% Change in Median Value from 1996-2007 to 2014-2020
East Winston	153,869.26	6,867.49	49,691.17	7,346.72	-68.12%
Rest of Forsyth County	225,386.70	6,236.90	187,592.66	14,576.06	-16.77%
% Difference	-30.84%		-73.51%		

Table A4 summarizes the same calculations but using unadjusted numbers (nominal).

Table A4. Comparison of *Nominal* Home Values

	1996 – 2007		**2014 – 2021**		
Place	Median Value	Standard Deviation	Median Value	Standard Deviation	% Change in Median Value from 1996-2007 to 2014-2020
East Winston	105,084.83	8,990.14	45,468.42	8,189.07	-56.73%
Rest of Forsyth County	148,695.90	16,974.08	171,599.02	21,390.28	15.40%
% Difference	-29.33		-73.50		

Real Home Wealth

To calculate real wealth, we needed an estimate of the number of housing units in East Winston and the Rest of Forsyth County, for each year between 1996 and 2020. Using housing unit estimates for 2010-2019 from the American Community Survey (ACS), we estimate a simple linear regression equation for both the East Winston and the Rest of Forsyth series (shown in Figure A3). Using these equations, we can predict the housing stock values for the years 1996-2009 and 2021. One drawback to this method is that we are predicting more values than we actually use to estimate the line. Moreover, the relationship during the past was unlikely to have been completely linear, especially during the early 2000s. The values are summarized in Table A5.

Figure A4. Estimating Housing Stock in East Winston and the Rest of Forsyth County

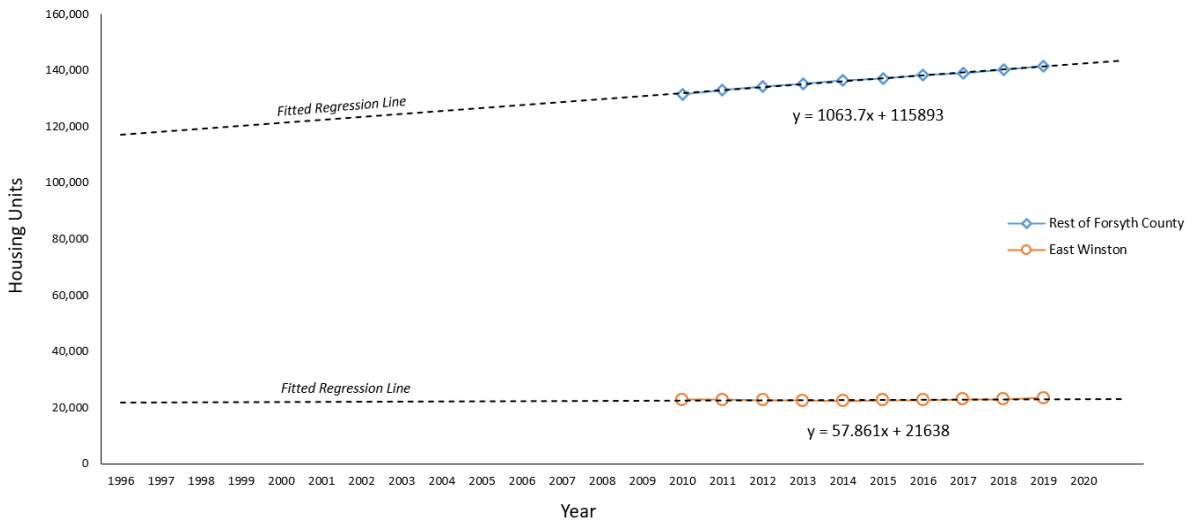


Table A5. Housing Stock Estimates for East Winston and the Rest of Forsyth County (Shaded Grey are Predictions)

Year	Rest of Forsyth County	East Winston
1996	116,956.9	21,695.8
1997	118,020.6	21,753.7
1998	119,084.3	21,811.5
1999	120,148.0	21,869.4
2000	121,211.7	21,927.3
2001	122,275.4	21,985.1
2002	123,339.1	22,043.0
2003	124,402.8	22,100.8
2004	125,466.5	22,158.7
2005	126,530.2	22,216.6

2006	127,593.9	22,274.4
2007	128,657.6	22,332.3
2008	129,721.3	22,390.1
2009	130,785.0	22,448.0
2010	131,345.0	22,808.0
2011	132,921.0	22,818.0
2012	134,327.0	22,630.0
2013	135,311.0	22,404.0
2014	136,370.0	22,374.0
2015	137,105.0	22,643.0
2016	138,212.0	22,609.0
2017	138,965.0	22,891.0
2018	140,355.0	23,027.0
2019	141,439.0	23,463.0
2020	142,485.7	23,084.5
2021	143,549.4	23,142.3

Using the estimates in Table A5 above, in addition to the median value estimates from Tables A3 (real values) and A4 (nominal values), we can estimate home wealth. Since we are interested in the particular time periods of 1996-2007 and 2014-2021, we calculate the median housing units in East Winston and the Rest of Forsyth County across these two timeframes, which are presented in Table A6.

Table A6. Median Housing Stock in East Winston and the Rest of Forsyth County in 1996-2007 and 2014-2021

Place	1996-2007	2014-2021
East Winston	22,014	22,891
Rest of Forsyth County	122,807	138,965

Regarding the numbers in Table A7 (real home wealth), they were generated by multiplying the relevant numbers in Table A6 by the corresponding real median ZHVI estimates in Table A3. The resulting numbers are estimates of the total real housing wealth in both East Winston and the Rest of Forsyth County. According to the estimates, real total home wealth in East Winston in 2014-2020 is around 68% less than it was in 1996-2007, while in the Rest of Forsyth County it is around 7.4% less.

Table A7. Change in *Real* Home Wealth in East Winston versus the Rest of Forsyth County

Place	1996-2007	2014-2021	% Change in Wealth from 1996-2007 to 2014-2021	Overall % Change from 1996 to 2021
East Winston	3,387,284,319	1,137,480,572	-66.42%	-57.14%
Rest of Forsyth County	27,679,120,200	26,068,813,997	-5.82%	28.94%
% Difference	-87.76%	-95.64		

Table A8. Change in *Nominal* Home Wealth in East Winston versus the Rest of Forsyth County

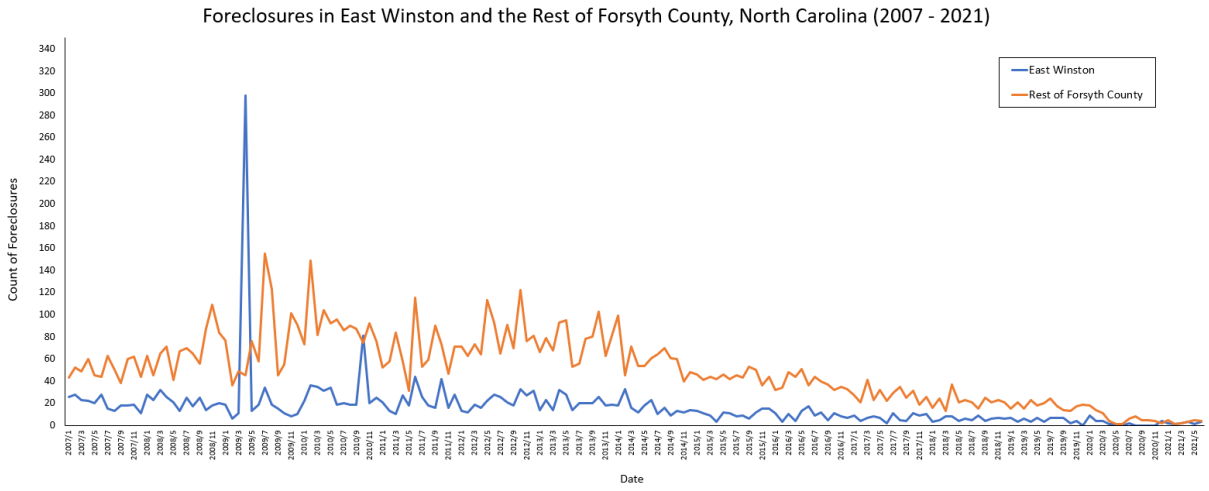
Place	1996-2007	2014-2021	% Change in Wealth from 1996-2007 to 2014-2021	Overall % Change from 1996 to 2021

East Winston	105,084.83	45,468.42	-56.73%	-25.69%
Rest of Forsyth County	148,695.90	171,599.02	15.40%	123.57%
% Difference	-29.33%	-73.50%		

Estimating Rate of Foreclosures

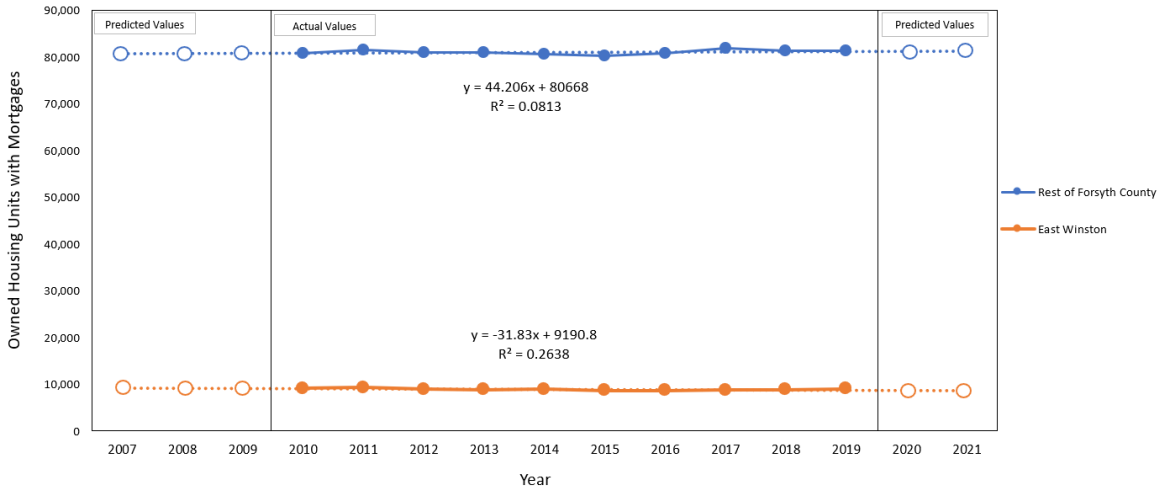
Figure A5 shows the count of foreclosures (by month) in East Winston and the Rest of Forsyth County. There are more foreclosures in the Rest of Forsyth County simply because there are nearly 6 times the number of homes there compared to East Winston. East Winston comprises 16 census tracts, while the Rest of Forsyth County comprises the remainder of the county's tracts (77 census tracts).

Figure A5. Foreclosures in East Winston and the Rest of Forsyth County, North Carolina, 2007-2011



To get a more accurate view of the state of foreclosures, we adjust the counts to better reflect the fact that one area is much larger than the other, and use the rate of foreclosures. To estimate this, we need an estimate of the total number of owned-occupied homes with mortgages. ACS microdata has such estimates at the census tract level, for each year between 2009 and 2019. Our foreclosure data is at the month level and was provided by MapForsyth, while the ACS data is annual. ACS data goes no earlier than 2009 and no later than 2019. So, we fit simple linear regression lines to the number of owned-occupied homes with mortgages in both East Winston and the Rest of Forsyth Countyand use the fitted equations to estimate the number of homes in 2007, 2008, 2020, and 2021. The method of estimating the number of homes is illustrated in Figure A6.

Figure A6. Estimating Housing Units with Mortgages in East Winston and the Rest of Forsyth County



Using the results from the method described above, we calculate the rate of foreclosures in both East Winston and the Rest of Forsyth County. The results of the calculations are shown in Table A9 and graphed in Figure A7.

Table A9. Predicting Foreclosure Rates in East Winston and the Rest of Forsyth County

	East Winston			Rest of Forsyth County		
Year	**Foreclosures**	**Units with Mortgages**	**Foreclosure Rate (%)**	**Foreclosures**	**Units with Mortgages**	**Foreclosure Rate (%)**
2008	262	9,127	2.87	823	80,756	1.02
2009	463	9,095	5.09	911	80,801	1.13
2010	361	9,141	3.95	1,102	80,887	1.36
2011	279	9,281	3.01	791	81,448	0.97
2012	266	8,926	2.98	982	80,976	1.21
2013	248	8,845	2.80	915	80,967	1.13
2014	194	8,935	2.17	727	80,583	0.90
2015	124	8,678	1.43	532	80,239	0.66
2016	110	8,690	1.27	466	80,749	0.58
2017	87	8,804	0.99	331	81,821	0.40
2018	71	8,901	0.80	260	81,372	0.32
2019	56	9,001	0.62	216	81,398	0.27
2020	25	8,745	0.29	79	81,287	0.10

Figure A7. Annual Foreclosure Rate Estimates in East Winston and the Rest of Forsyth County (2008 – 2020)