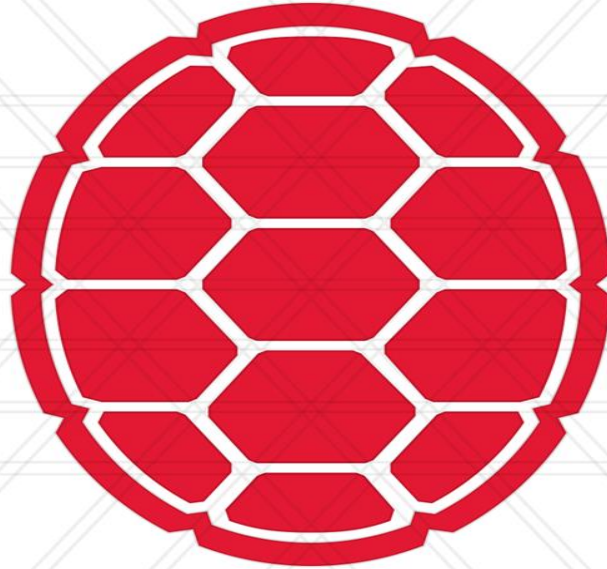


# Are Housing Markets Fairly Valued? A Fundamentals Analysis

Professor Clifford Rossi



December 16, 2021



UNIVERSITY OF  
MARYLAND

ROBERT H. SMITH  
SCHOOL OF BUSINESS

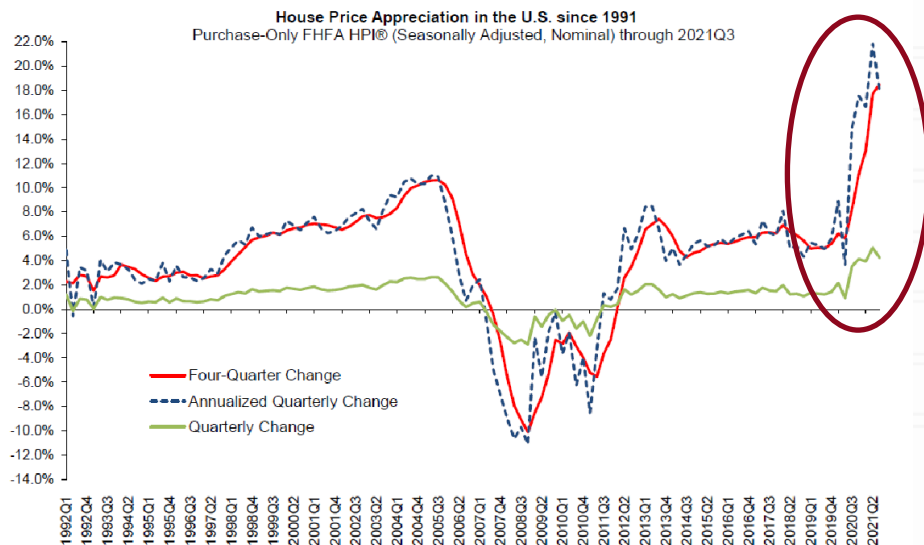
# Executive Summary

Home prices in U.S. metro areas have sharply risen over the last couple of years.

How much of this rise is due to the pandemic or other market factors such as supply constraints versus long-term market fundamentals is the focus of our analysis

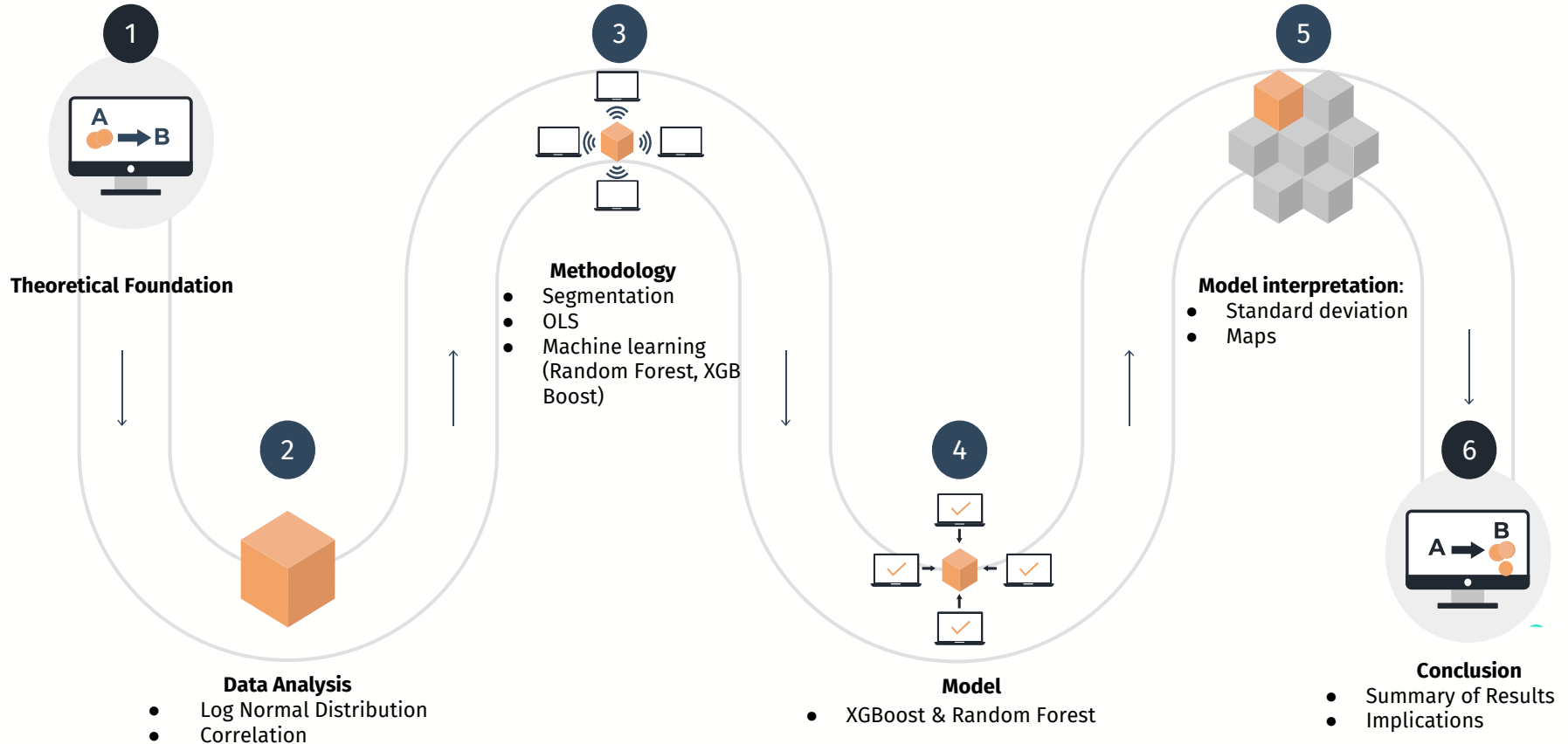
Highlights of this Analysis :

- Developed and tested several long-term fundamental statistical and machine learning models of home prices in US metro areas (MSAs)
- An XGB boost machine learning model proved superior because of the model performance diagnostics and consistency with economic across various economic regimes
- Some of the MSA results hinted at the possibility of COVID being a reason for the increase in house prices.



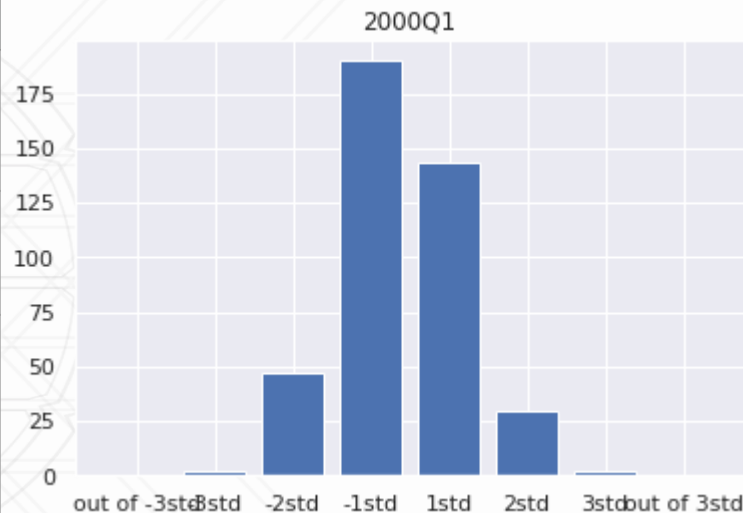
Source: FHFA

# Project Overview



# Normal Period: 2000 Q1

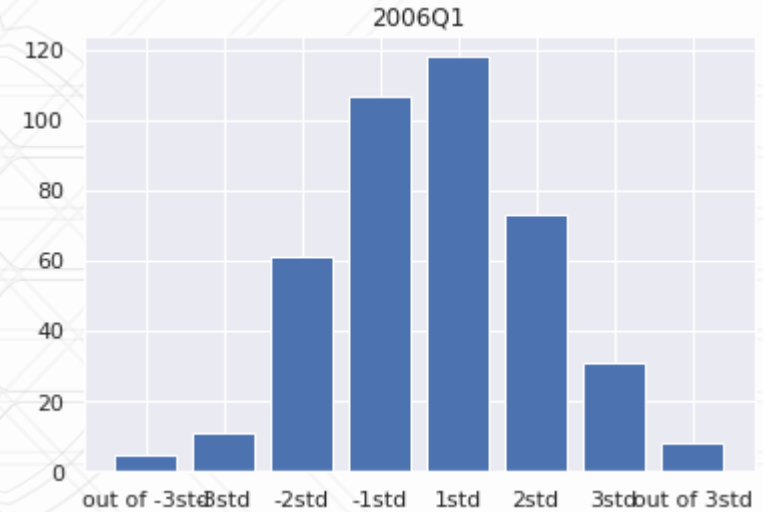
Valuation	%	MSA
Significantly Underpriced	0.48%	Albuquerque; Lewiston-Auburn
Underpriced	11.35%	Urban Honolulu; Buffalo-Cheektowaga-Niagara Falls; Morgantown, WV; Hanford-Corcoran, CA
Normal priced	80.43%	Boston; Chicago-Naperville-Arlington Heights; Dallas-Plano-Irving; Los Angeles-Long Beach-Glendale; Fort Lauderdale-Pompano Beach; Washington-Arlington-Alexandria; New York-Newark-Jersey City
Overpriced	7.25%	Los Angeles-Long Beach-Anaheim; Phoenix-Mesa-Scottsdale; Denver-Aurora-Lakewood; Kansas City
Significantly Overpriced	0.48%	Detroit-Warren-Dearborn; Youngstown-Warren-Boardman



\* See Appendix for full list of MSAs

# Boom Period: 2006 Q1

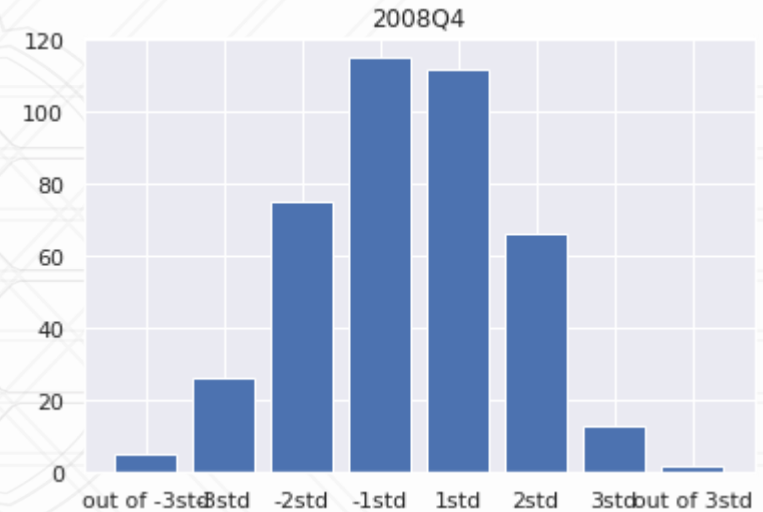
Valuation	%	MSA
Significantly Underpriced	3.86%	Seattle-Tacoma-Bellevue; New Orleans - Metairie; Lancaster, PA; Memphis; Urban Honolulu
Underpriced	14.73%	Denver-Aurora-Lakewood; Spartanburg, SC; Milwaukee-Waukesha-West Allis
Normal priced	54.35%	Charlotte-Concord-Gastonia; Wilmington, NC; Indianapolis; Houston-The Woodlands-Sugar Land; Washington-Arlington-Alexandria
Overpriced	17.63%	New York-Newark-Jersey City; Miami-Fort Lauderdale-West Palm Beach; Virginia Beach-Norfolk-Newport News
Significantly Overpriced	9.42%	Los Angeles-Long Beach-Anaheim; Cape Coral-Fort Myers; Riverside-San Bernardino-Ontario; Tampa-St. Petersburg-Clearwater



\* See Appendix for full list of MSAs

# Bust Period: 2008 Q4

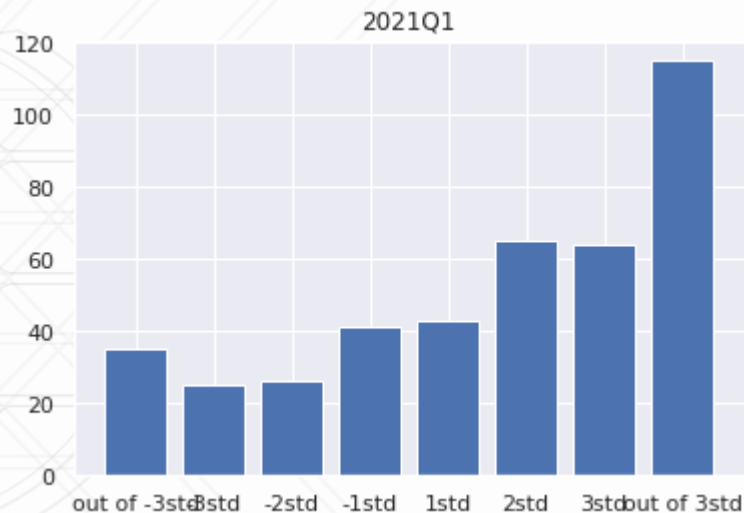
Valuation	%	MSA
Significantly Underpriced	7.49%	Burlington, NC; Detroit-Warren-Dearborn; Las Vegas-Henderson-Paradise; Urban Honolulu
Underpriced	18.12%	Nashville-Davidson-Murfreesboro-Franklin; Seattle-Tacoma-Bellevue; Raleigh
Normal priced	54.83%	Los Angeles-Long Beach-Anaheim; Miami-Fort Lauderdale-West Palm Beach; Miami-Miami Beach-Kendall; Wilmington, NC; Washington-Arlington-Alexandria
Overpriced	15.94%	Boston; San Francisco-Redwood City-South San Francisco; Atlanta-Sandy Springs-Roswell; Charleston-North Charleston; New York-Newark-Jersey City; Phoenix-Mesa-Scottsdale; Houston-The Woodlands-Sugar Land
Significantly Overpriced	3.62%	Virginia Beach-Norfolk-Newport; Tampa-St. Petersburg-Clearwater; Colorado Spring



\* See Appendix for full list of MSAs

# 2021 Q1

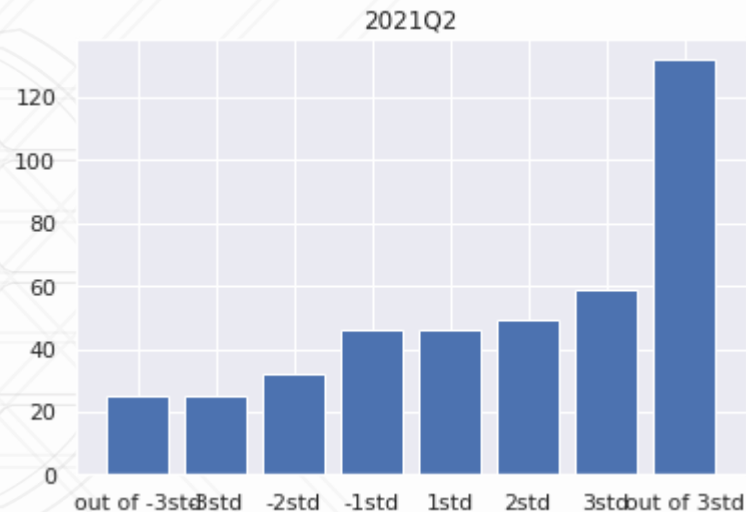
Valuation	%	MSA
Significantly Underpriced	14.49%	Greensboro-High Point, NC; Roanoke, VA; Albuquerque, NM
Underpriced	6.28%	Chicago-Naperville-Arlington Heights; Hot Springs, AR
Normal priced	20.29%	Washington-Arlington-Alexandria; San Francisco-Oakland-Hayward; Seattle-Tacoma-Bellevue; Colorado Springs
Overpriced	15.70%	El Paso, TX; Richmond, VA
Significantly Overpriced	43.24%	New York-Newark-New Jersey; Los Angeles-Long Beach-Glendale; Boston; Fort Lauderdale-Pompano Beach-Deerfield Beach; Miami; San Francisco



\* See Appendix for full list of MSAs

# 2021 Q2

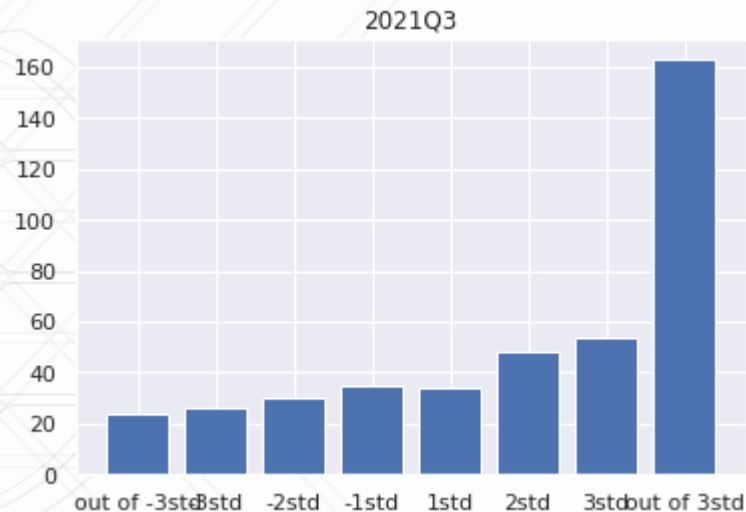
Valuation	%	MSA
Significantly Underpriced	12.08%	Chicago-Naperville-Arlington Heights; Charlotte-Concord-Gastonia; Huntsville, AL
Underpriced	7.73%	Spartanburg, SC; Knoxville, TN; Urban Honolulu
Normal priced	22.22%	San Francisco-Oakland-Hayward; Nashville-Davidson-Murfreesboro-Franklin; Las Vegas-Henderson-Paradise; New York- Jersey City-White Plains
Overpriced	11.84%	Columbia, SC; Sacramento-Roseville-Arden- Arcade
Significantly Overpriced	46.14%	Fort Lauderdale-Pompano Beach-Deerfield Beach; San Francisco-Redwood City-South San Francisco; Nassau County-Suffolk County; Miami



\* See Appendix for full list of MSAs

# 2021 Q3

Valuation	%	MSA
Significantly Underpriced	12.08%	Colorado Springs; Atlanta-Sandy Springs-Roswell; Green Bay, WI
Underpriced	7.25%	Charlotte-Concord-Gastonia; Knoxville, TN; Toledo, OH
Normal priced	16.67%	Reno, NV; Wilmington, NC;
Overpriced	11.59%	Boston-Cambridge-Newton; Nashville-Davidson-Murfreesboro-Franklin; Napa, CA
Significantly Overpriced	52.42%	Fort Lauderdale-Pompano Beach-Deerfield Beach; Washington-Arlington-Alexandria; San Francisco-Redwood City-South San Francisco; Nassau County-Suffolk County

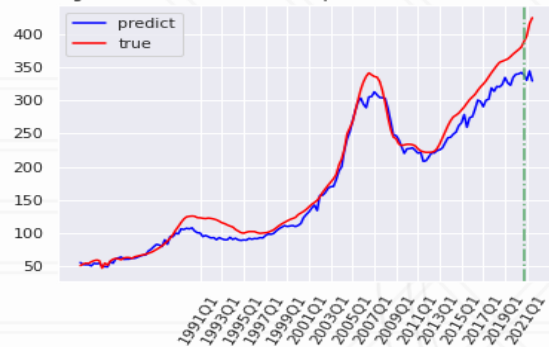


\* See Appendix for full list of MSAs

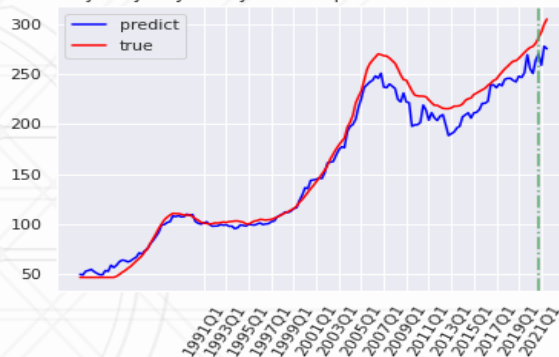
MSA	2000Q1	2006Q1	2008Q4	2020Q4	2021Q1	2021Q2	2021Q3
New York - New Jersey - Newark	Normal	Overvalued	Overvalued	Overvalued	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued
Los Angeles-LongBeach-Anaheim	Normal	Significantly Overvalued	Normal	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued
San Francisco-Redwood City-South San Francisco	Normal	Normal	Overvalued	Normal	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued
Miami-Fort Lauderdale-West Palm Beach	Normal	Overvalued	Normal	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued
Boston-Cambridge-Newton	Undervalued	Undervalued	Normal	Normal	Normal	Normal	Overvalued
Dallas-Fort Worth-Arlington	Normal	Normal	Normal	Normal	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued
Washington-Arlington-Alexandria	Normal	Normal	Normal	Significantly Undervalued	Normal	Normal	Overvalued
Seattle-Bellevue-Everett	Normal	Undervalued	Normal	Normal	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued
San Diego-Carlsbad	Normal	Normal	Normal	Normal	Normal	Significantly Overvalued	Significantly Overvalued
Chicago-Naperville-Elgin	Undervalued	Normal	Normal	Normal	Significantly Overvalued	Significantly Overvalued	Significantly Overvalued

# Top MSAs Validation - part 2

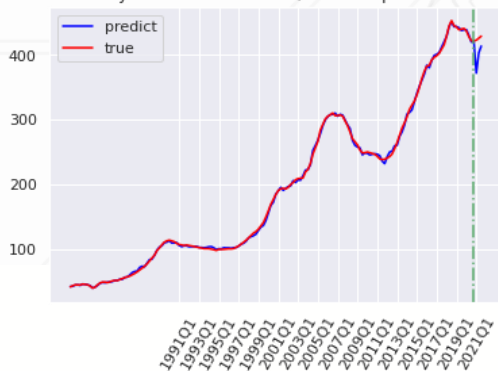
Los Angeles-Long Beach-Anaheim, CA Metropolitan Statistical Area house price index



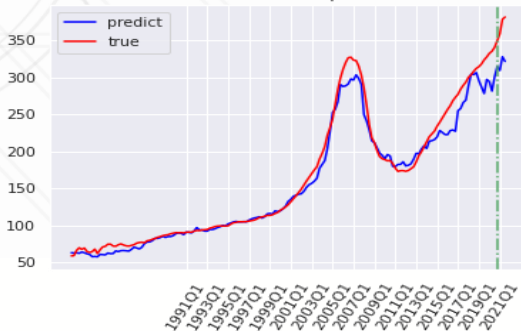
New York-Newark-Jersey City, NY-NJ-PA Metropolitan Statistical Area house price index



San Francisco-Redwood City-South San Francisco, CA Metropolitan Division house price index

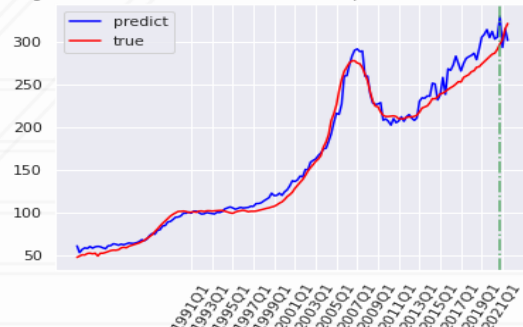
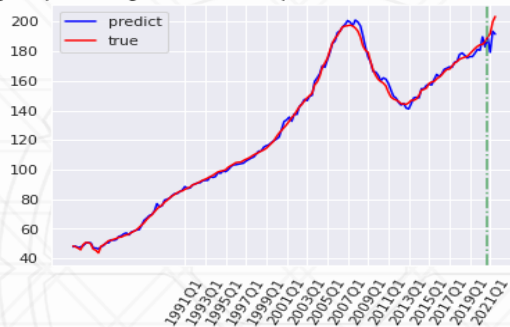
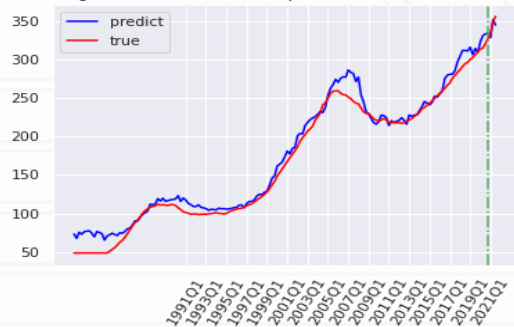


Miami-Fort Lauderdale-West Palm Beach, FL Metropolitan Statistical Area house price index

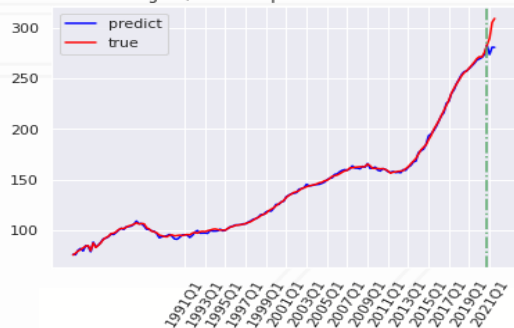


# Top MSAs Validation - part 3

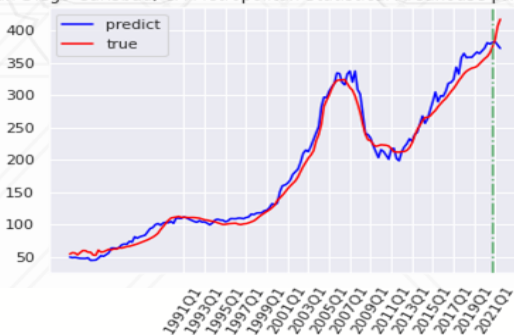
Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Areahouse | Chicago-Naperville-Elgin, IL-IN-WI Metropolitan Statistical Areahouse | Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area



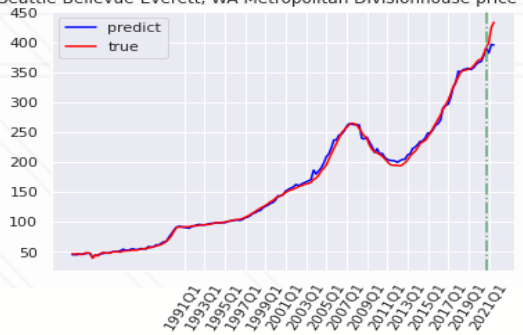
Dallas-Fort Worth-Arlington, TX Metropolitan Statistical Areahouse price



San Diego-Carlsbad, CA Metropolitan Statistical Areahouse price

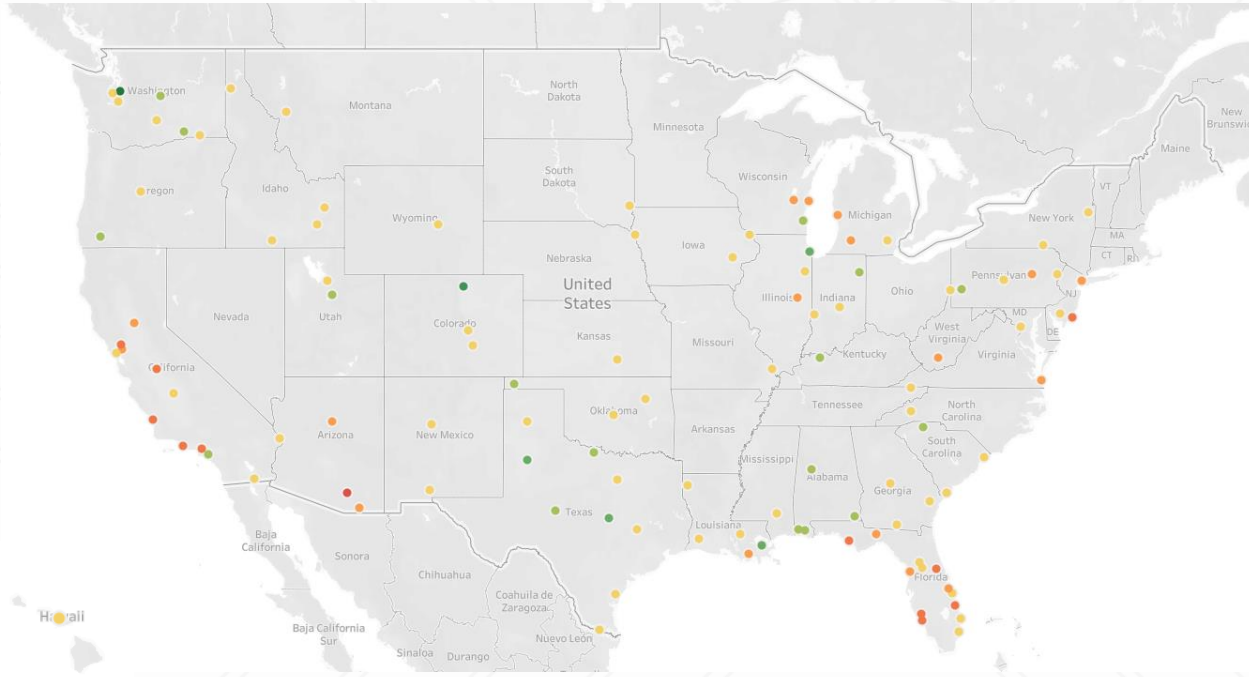


Seattle-Bellevue-Everett, WA Metropolitan Divisionhouse price index

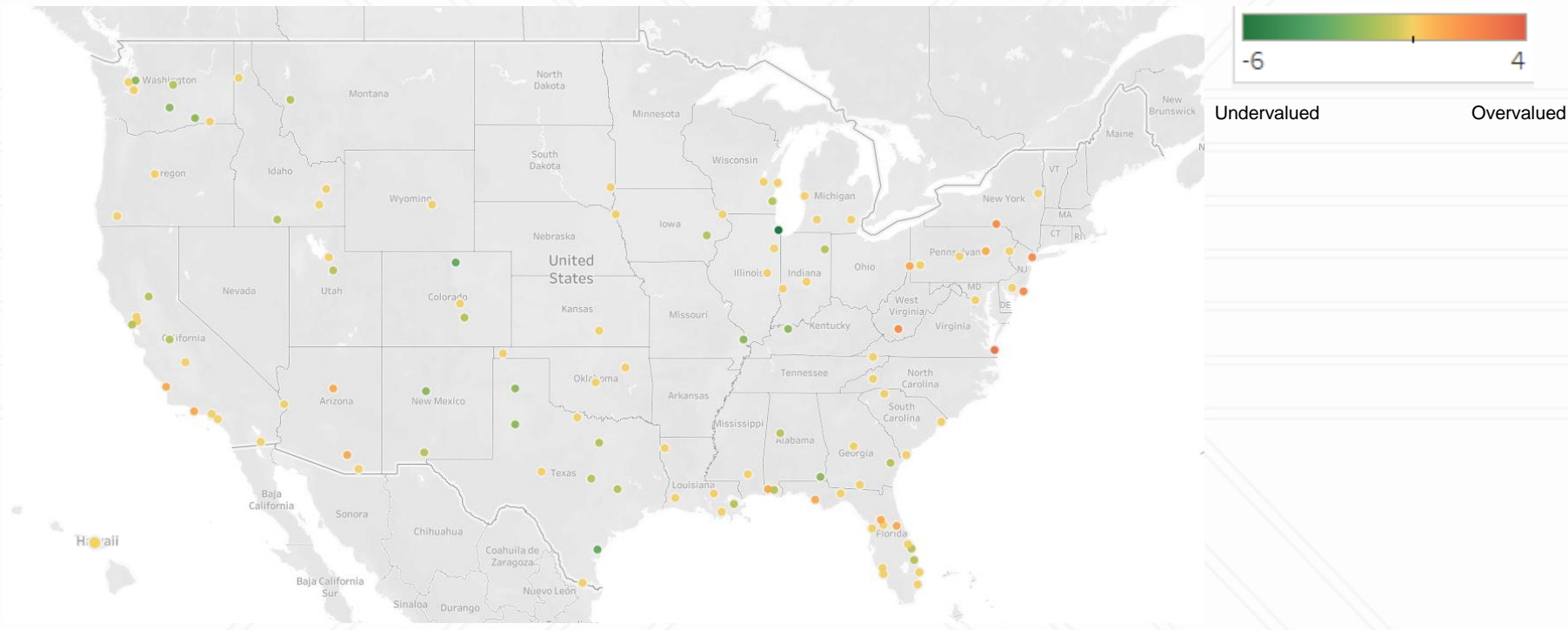


The map displays the spatial distribution of the 'undervalued' variable across the United States. The color scale ranges from -2 (green) to 3 (red). The majority of the country is colored green, indicating undervaluation. A few red dots are visible in the Midwest (Michigan, Indiana) and the South (Alabama, Georgia). The legend on the right shows the color scale and labels 'Undervalued' and 'Overvalued'.

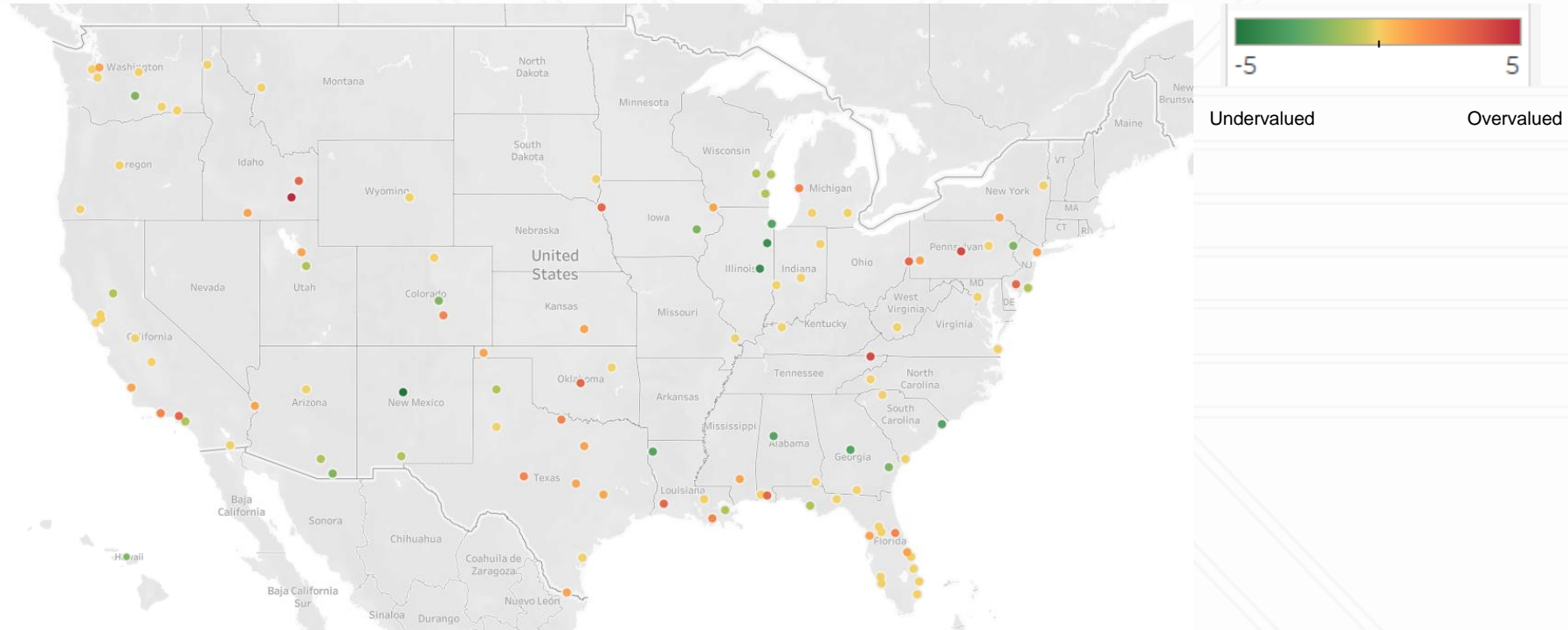
# 2006Q1



# 2008Q2



# 2020Q4



# Appendix: Significantly Underpriced in 2000 Q1

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MSA	Standard Deviation	Valuation
Albuquerque, NM Metropolitan Statistical Area	-2.1706	Significantly Undervalued
Lewiston-Auburn, ME Metropolitan Statistical Area	-2.1734	Significantly Undervalued

# Appendix: Underpriced in 2000 Q1

MSA	Standard Deviation
Albany-Schenectady-Troy, NY Metropolitan Statistical Area	-1.1256
Allentown-Bethlehem-Easton, PA-NJ Metropolitan Statistical Area	-1.6452
Bakersfield, CA Metropolitan Statistical Area	-1.7819
Baltimore-Columbia-Towson, MD Metropolitan Statistical Area	-1.1992
Bloomington, IL Metropolitan Statistical Area	-1.2697
Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Area	-1.4085
Buffalo-Cheektowaga-Niagara Falls, NY Metropolitan Statistical Area	-1.1587
Burlington-South Burlington, VT Metropolitan Statistical Area	-1.3972
Cambridge-Newton-Framingham, MA Metropolitan Division	-1.7382
Columbus, IN Metropolitan Statistical Area	-1.0605
Cumberland, MD-WV Metropolitan Statistical Area	-1.3217
Dutchess County-Putnam County, NY Metropolitan Division	-1.1136
El Paso, TX Metropolitan Statistical Area	-1.2302
Fayetteville, NC Metropolitan Statistical Area	-1.0559
Florence-Muscle Shoals, AL Metropolitan Statistical Area	-1.0162
Gary, IN Metropolitan Division	-1.1076
Glens Falls, NY Metropolitan Statistical Area	-1.4862
Hanford-Corcoran, CA Metropolitan Statistical Area	-1.5505
Harrisburg-Carlisle, PA Metropolitan Statistical Area	-1.3865
Indianapolis-Carmel-Anderson, IN Metropolitan Statistical Area	-1.2600
Kahului-Wailuku-Lahaina, HI Metropolitan Statistical Area	-1.0737
Kankakee, IL Metropolitan Statistical Area	-1.0183
Kennewick-Richland, WA Metropolitan Statistical Area	-1.8411
Lancaster, PA Metropolitan Statistical Area	-1.4825
Lebanon, PA Metropolitan Statistical Area	-1.3414

Morgantown, WV Metropolitan Statistical Area	-1.1333
Mount Vernon-Anacortes, WA Metropolitan Statistical Area	-1.0008
New York-Jersey City-White Plains, NY-NJ Metropolitan Division	-1.5238
Olympia-Tumwater, WA Metropolitan Statistical Area	-1.2579
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metropolitan Statistical Area	-1.6792
Port St. Lucie, FL Metropolitan Statistical Area	-1.0745
Portland-South Portland, ME Metropolitan Statistical Area	-1.0873
Reading, PA Metropolitan Statistical Area	-1.5921
San Angelo, TX Metropolitan Statistical Area	-1.0037
San Rafael, CA Metropolitan Division	-1.2608
Silver Spring-Frederick-Rockville, MD Metropolitan Division	-1.6693
Spokane-Spokane Valley, WA Metropolitan Statistical Area	-1.9261
Springfield, IL Metropolitan Statistical Area	-1.5402
Springfield, MO Metropolitan Statistical Area	-1.8953
Staunton-Waynesboro, VA Metropolitan Statistical Area	-1.1642
Syracuse, NY Metropolitan Statistical Area	-1.2067
Trenton, NJ Metropolitan Statistical Area	-1.2988
Urban Honolulu, HI Metropolitan Statistical Area	-1.3598
Utica-Rome, NY Metropolitan Statistical Area	-1.5588
Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Division	-1.2008
York-Hanover, PA Metropolitan Statistical Area	-1.6808
Yuba City, CA Metropolitan Statistical Area	-1.2409

# Appendix: Overpriced in 2000 Q1

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Overpriced Column 1	Overpriced Column 2
Detroit-Dearborn-Livonia, MI Metropolitan Division	Los Angeles-Long Beach-Anaheim, CA Metropolitan Statistical Area
Akron, OH Metropolitan Statistical Area	Lawrence, KS Metropolitan Statistical Area
Alexandria, LA Metropolitan Statistical Area	Minneapolis-St. Paul-Bloomington, MN-WI Metropolitan Statistical Area
Appleton, WI Metropolitan Statistical Area	Monroe, LA Metropolitan Statistical Area
Boulder, CO Metropolitan Statistical Area	Muskegon, MI Metropolitan Statistical Area
Davenport-Moline-Rock Island, IA-IL Metropolitan Statistical Area	Omaha-Council Bluffs, NE-IA Metropolitan Statistical Area
Denver-Aurora-Lakewood, CO Metropolitan Statistical Area	Phoenix-Mesa-Scottsdale, AZ Metropolitan Statistical Area
Evansville, IN-KY Metropolitan Statistical Area	Portland-Vancouver-Hillsboro, OR-WA Metropolitan Statistical Area
Gadsden, AL Metropolitan Statistical Area	Rochester, MN Metropolitan Statistical Area
Grand Rapids-Wyoming, MI Metropolitan Statistical Area	Rome, GA Metropolitan Statistical Area
Gulfport-Biloxi-Pascagoula, MS Metropolitan Statistical Area	St. Joseph, MO-KS Metropolitan Statistical Area
Hickory-Lenoir-Morganton, NC Metropolitan Statistical Area	Toledo, OH Metropolitan Statistical Area
Jackson, MI Metropolitan Statistical Area	Tulsa, OK Metropolitan Statistical Area
Kalamazoo-Portage, MI Metropolitan Statistical Area	Weirton-Steubenville, WV-OH Metropolitan Statistical Area
Kansas City, MO-KS Metropolitan Statistical Area	Worcester, MA-CT Metropolitan Statistical Area

# Appendix: Significantly Overpriced in 2000 Q1

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MSA	Standard Deviation	Valuation
Detroit-Warren-Dearborn, MI Metropolitan Statistical Area	2.0469	Significantly Overvalued
Youngstown-Warren-Boardman, OH-PA Metropolitan Statistical Area	2.6511	Significantly Overvalued

# Appendix: Significantly Underpriced in 2006 Q1

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Significantly Undervalued
Chicago-Naperville-Arlington Heights, IL Metropolitan Division
Erie, PA Metropolitan Statistical Area
Florence-Muscle Shoals, AL Metropolitan Statistical Area
Fort Collins, CO Metropolitan Statistical Area
Urban Honolulu, HI Metropolitan Statistical Area
Jackson, MS Metropolitan Statistical Area
Killeen-Temple, TX Metropolitan Statistical Area
Lancaster, PA Metropolitan Statistical Area
Lafayette-West Lafayette, IN Metropolitan Statistical Area
Lubbock, TX Metropolitan Statistical Area
Memphis, TN-MS-AR Metropolitan Statistical Area
Mount Vernon-Anacortes, WA Metropolitan Statistical Area
New Orleans-Metairie, LA Metropolitan Statistical Area
Providence-Warwick, RI-MA Metropolitan Statistical Area
St. George, UT Metropolitan Statistical Area
Seattle-Tacoma-Bellevue, WA Metropolitan Statistical Area

# Appendix: Underpriced in 2006 Q1

MSA:		
Albany, GA Metropolitan Statistical Area	Dothan, AL Metropolitan Statistical Area	Pittsburgh, PA Metropolitan Statistical Area
Allentown-Bethlehem-Easton, PA-NJ Metropolitan Statistical Area	Elmira, NY Metropolitan Statistical Area	Provo-Orem, UT Metropolitan Statistical Area
Altoona, PA Metropolitan Statistical Area	Fayetteville, NC Metropolitan Statistical Area	Raleigh, NC Metropolitan Statistical Area
Anaheim-Santa Ana-Irvine, CA Metropolitan Division	Fort Smith, AR-OK Metropolitan Statistical Area	Roanoke, VA Metropolitan Statistical Area
Augusta-Richmond County, GA-SC Metropolitan Statistical Area	Fort Wayne, IN Metropolitan Statistical Area	Rochester, NY Metropolitan Statistical Area
Bellingham, WA Metropolitan Statistical Area	Grants Pass, OR Metropolitan Statistical Area	Rocky Mount, NC Metropolitan Statistical Area
Birmingham-Hoover, AL Metropolitan Statistical Area	Greenville, NC Metropolitan Statistical Area	Salem, OR Metropolitan Statistical Area
Bloomington, IL Metropolitan Statistical Area	Hartford-West Hartford-East Hartford, CT Metropolitan Statistical Area	San Angelo, TX Metropolitan Statistical Area
Boise City, ID Metropolitan Statistical Area	Jackson, TN Metropolitan Statistical Area	San Antonio-New Braunfels, TX Metropolitan Statistical Area
Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Area	Kennewick-Richland, WA Metropolitan Statistical Area	Seattle-Bellevue-Everett, WA Metropolitan Division
Bowling Green, KY Metropolitan Statistical Area	Lakeland-Winter Haven, FL Metropolitan Statistical Area	Spartanburg, SC Metropolitan Statistical Area
Burlington, NC Metropolitan Statistical Area	Laredo, TX Metropolitan Statistical Area	Spokane-Spokane Valley, WA Metropolitan Statistical Area
California-Lexington Park, MD Metropolitan Statistical Area	Lawton, OK Metropolitan Statistical Area	Springfield, IL Metropolitan Statistical Area
Cedar Rapids, IA Metropolitan Statistical Area	Lebanon, PA Metropolitan Statistical Area	Springfield, MO Metropolitan Statistical Area
Cleveland-Elyria, OH Metropolitan Statistical Area	Logan, UT-ID Metropolitan Statistical Area	Springfield, OH Metropolitan Statistical Area
Columbia, MO Metropolitan Statistical Area	Milwaukee-Waukesha-West Allis, WI Metropolitan Statistical Area	Tuscaloosa, AL Metropolitan Statistical Area
Dallas-Plano-Irving, TX Metropolitan Division	Mobile, AL Metropolitan Statistical Area	Visalia-Porterville, CA Metropolitan Statistical Area
Daphne-Fairhope-Foley, AL Metropolitan Statistical Area	Montgomery, AL Metropolitan Statistical Area	Wenatchee, WA Metropolitan Statistical Area
Dayton, OH Metropolitan Statistical Area	Newark, NJ-PA Metropolitan Division	Wichita Falls, TX Metropolitan Statistical Area
Decatur, IL Metropolitan Statistical Area	Ogden-Clearfield, UT Metropolitan Statistical Area	
Denver-Aurora-Lakewood, CO Metropolitan Statistical Area	Owensboro, KY Metropolitan Statistical Area	

# Appendix: Overpriced in 2006 Q1

Overpriced Column 1	Overpriced Column2	Overpriced Column3
Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Division	Gulfport-Biloxi-Pascagoula, MS Metropolitan Statistical Area	Ocean City, NJ Metropolitan Statistical Area
Akron, OH Metropolitan Statistical Area	Hagerstown-Martinsburg, MD-WV Metropolitan Statistical Area	Omaha-Council Bluffs, NE-IA Metropolitan Statistical Area
Albany-Schenectady-Troy, NY Metropolitan Statistical Area	Houma-Thibodaux, LA Metropolitan Statistical Area	Orlando-Kissimmee-Sanford, FL Metropolitan Statistical Area
Alexandria, LA Metropolitan Statistical Area	Homosassa Springs, FL Metropolitan Statistical Area	Palm Bay-Melbourne-Titusville, FL Metropolitan Statistical Area
Bakersfield, CA Metropolitan Statistical Area	Huntington-Ashland, WV-KY-OH Metropolitan Statistical Area	Portland-Vancouver-Hillsboro, OR-WA Metropolitan Statistical Area
Bay City, MI Metropolitan Statistical Area	Ithaca, NY Metropolitan Statistical Area	Rapid City, SD Metropolitan Statistical Area
Beckley, WV Metropolitan Statistical Area	Jackson, MI Metropolitan Statistical Area	Redding, CA Metropolitan Statistical Area
Blacksburg-Christiansburg-Radford, VA Metropolitan Statistical Area	Janesville-Beloit, WI Metropolitan Statistical Area	Richmond, VA Metropolitan Statistical Area
Bloomsburg-Berwick, PA Metropolitan Statistical Area	Jacksonville, NC Metropolitan Statistical Area	Rome, GA Metropolitan Statistical Area
Brunswick, GA Metropolitan Statistical Area	Joplin, MO Metropolitan Statistical Area	Saginaw, MI Metropolitan Statistical Area
Burlington-South Burlington, VT Metropolitan Statistical Area	Kalamazoo-Portage, MI Metropolitan Statistical Area	Santa Maria-Santa Barbara, CA Metropolitan Statistical Area
Carson City, NV Metropolitan Statistical Area	Kingston, NY Metropolitan Statistical Area	Santa Cruz-Watsonville, CA Metropolitan Statistical Area
Chambersburg-Waynesboro, PA Metropolitan Statistical Area	La Crosse-Onalaska, WI-MN Metropolitan Statistical Area	Sebring, FL Metropolitan Statistical Area
Champaign-Urbana, IL Metropolitan Statistical Area	Lexington-Fayette, KY Metropolitan Statistical Area	Sheboygan, WI Metropolitan Statistical Area
Chico, CA Metropolitan Statistical Area	Little Rock-North Little Rock-Conway, AR Metropolitan Statistical Area	Sierra Vista-Douglas, AZ Metropolitan Statistical Area
Columbia, SC Metropolitan Statistical Area	Louisville/Jefferson County, KY-IN Metropolitan Statistical Area	South Bend-Mishawaka, IN-MI Metropolitan Statistical Area
Danville, IL Metropolitan Statistical Area	Lawrence, KS Metropolitan Statistical Area	St. Louis, MO-IL Metropolitan Statistical Area
Davenport-Moline-Rock Island, IA-IL Metropolitan Statistical Area	Madera, CA Metropolitan Statistical Area	Staunton-Waynesboro, VA Metropolitan Statistical Area
Eau Claire, WI Metropolitan Statistical Area	Medford, OR Metropolitan Statistical Area	Sumter, SC Metropolitan Statistical Area
Elizabethtown-Fort Knox, KY Metropolitan Statistical Area	Miami-Fort Lauderdale-West Palm Beach, FL Metropolitan Statistical Area	Tallahassee, FL Metropolitan Statistical Area
Farmington, NM Metropolitan Statistical Area	Modesto, CA Metropolitan Statistical Area	Vallejo-Fairfield, CA Metropolitan Statistical Area
Flagstaff, AZ Metropolitan Statistical Area	Monroe, LA Metropolitan Statistical Area	Virginia Beach-Norfolk-Newport News, VA-NC Metropolitan Statistical Area
Fond du Lac, WI Metropolitan Statistical Area	Muskegon, MI Metropolitan Statistical Area	Yuba City, CA Metropolitan Statistical Area
Gainesville, FL Metropolitan Statistical Area	Naples-Immokalee-Marco Island, FL Metropolitan Statistical Area	
Grand Island, NE Metropolitan Statistical Area	New York-Newark-Jersey City, NY-NJ-PA Metropolitan Statistical Area	

# Appendix: Significantly Overpriced in 2006 Q1

Significantly Overvalued Column 1	Significantly Overvalued Column 2
Atlantic City-Hammonton, NJ Metropolitan Statistical Area	Pensacola-Ferry Pass-Brent, FL Metropolitan Statistical Area
Auburn-Opelika, AL Metropolitan Statistical Area	Phoenix-Mesa-Scottsdale, AZ Metropolitan Statistical Area
Baltimore-Columbia-Towson, MD Metropolitan Statistical Area	Port St. Lucie, FL Metropolitan Statistical Area
Bangor, ME Metropolitan Statistical Area	Punta Gorda, FL Metropolitan Statistical Area
Barnstable Town, MA Metropolitan Statistical Area	Racine, WI Metropolitan Statistical Area
Cape Coral-Fort Myers, FL Metropolitan Statistical Area	Riverside-San Bernardino-Ontario, CA Metropolitan Statistical Area
Chattanooga, TN-GA Metropolitan Statistical Area	Rochester, MN Metropolitan Statistical Area
Crestview-Fort Walton Beach-Destin, FL Metropolitan Statistical Area	Salinas, CA Metropolitan Statistical Area
Deltona-Daytona Beach-Ormond Beach, FL Metropolitan Statistical Area	Savannah, GA Metropolitan Statistical Area
Fresno, CA Metropolitan Statistical Area	San Luis Obispo-Paso Robles-Arroyo Grande, CA Metropolitan Statistical Area
Kansas City, MO-KS Metropolitan Statistical Area	St. Cloud, MN Metropolitan Statistical Area
Los Angeles-Long Beach-Anaheim, CA Metropolitan Statistical Area	St. Joseph, MO-KS Metropolitan Statistical Area
Mankato-North Mankato, MN Metropolitan Statistical Area	Stockton-Lodi, CA Metropolitan Statistical Area
Manhattan, KS Metropolitan Statistical Area	Tampa-St. Petersburg-Clearwater, FL Metropolitan Statistical Area
Merced, CA Metropolitan Statistical Area	Toledo, OH Metropolitan Statistical Area
Minneapolis-St. Paul-Bloomington, MN-WI Metropolitan Statistical Area	Topeka, KS Metropolitan Statistical Area
Napa, CA Metropolitan Statistical Area	Tucson, AZ Metropolitan Statistical Area
North Port-Sarasota-Bradenton, FL Metropolitan Statistical Area	Waterloo-Cedar Falls, IA Metropolitan Statistical Area
Oxnard-Thousand Oaks-Ventura, CA Metropolitan Statistical Area	Yuma, AZ Metropolitan Statistical Area
Panama City, FL Metropolitan Statistical Area	

# Appendix: Significantly Underpriced in 2008 Q4

Significantly Underpriced Column 1	Significantly Underpriced Column 2
Chicago-Naperville-Arlington Heights, IL Metropolitan Division	Urban Honolulu, HI Metropolitan Statistical Area
Elgin, IL Metropolitan Division	Jackson, TN Metropolitan Statistical Area
Augusta-Richmond County, GA-SC Metropolitan Statistical Area	Jonesboro, AR Metropolitan Statistical Area
Bowling Green, KY Metropolitan Statistical Area	Kennewick-Richland, WA Metropolitan Statistical Area
Burlington, NC Metropolitan Statistical Area	Kokomo, IN Metropolitan Statistical Area
Carbondale-Marion, IL Metropolitan Statistical Area	Lancaster, PA Metropolitan Statistical Area
Detroit-Warren-Dearborn, MI Metropolitan Statistical Area	Lafayette-West Lafayette, IN Metropolitan Statistical Area
Dothan, AL Metropolitan Statistical Area	Las Vegas-Henderson-Paradise, NV Metropolitan Statistical Area
Erie, PA Metropolitan Statistical Area	Mansfield, OH Metropolitan Statistical Area
Evansville, IN-KY Metropolitan Statistical Area	Midland, MI Metropolitan Statistical Area
Fort Collins, CO Metropolitan Statistical Area	Modesto, CA Metropolitan Statistical Area
Fort Smith, AR-OK Metropolitan Statistical Area	Mount Vernon-Anacortes, WA Metropolitan Statistical Area
Gainesville, GA Metropolitan Statistical Area	Muncie, IN Metropolitan Statistical Area
Greeley, CO Metropolitan Statistical Area	Owensboro, KY Metropolitan Statistical Area
Greensboro-High Point, NC Metropolitan Statistical Area	Springfield, MO Metropolitan Statistical Area
Greenville, NC Metropolitan Statistical Area	

# Appendix: Underpriced in 2008 Q4

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Underpriced Column 1	Underpriced Column 2
Lubbock, TX Metropolitan Statistical Area	St. George, UT Metropolitan Statistical Area
Madera, CA Metropolitan Statistical Area	Seattle-Tacoma-Bellevue, WA Metropolitan Statistical Area
Merced, CA Metropolitan Statistical Area	Santa Fe, NM Metropolitan Statistical Area
Milwaukee-Waukesha-West Allis, WI Metropolitan Statistical Area	Springfield, OH Metropolitan Statistical Area
Nashville-Davidson-Murfreesboro-Franklin, TN Metropolitan Statistical Area	Spokane-Spokane Valley, WA Metropolitan Statistical Area
New Orleans-Metairie, LA Metropolitan Statistical Area	Springfield, IL Metropolitan Statistical Area
Ogden-Clearfield, UT Metropolitan Statistical Area	Stockton-Lodi, CA Metropolitan Statistical Area
Pittsburgh, PA Metropolitan Statistical Area	Staunton-Waynesboro, VA Metropolitan Statistical Area
Provo-Orem, UT Metropolitan Statistical Area	Valdosta, GA Metropolitan Statistical Area
Port St. Lucie, FL Metropolitan Statistical Area	Vallejo-Fairfield, CA Metropolitan Statistical Area
Pueblo, CO Metropolitan Statistical Area	Sebastian-Vero Beach, FL Metropolitan Statistical Area
Raleigh, NC Metropolitan Statistical Area	Visalia-Porterville, CA Metropolitan Statistical Area
Roanoke, VA Metropolitan Statistical Area	Warner Robins, GA Metropolitan Statistical Area
Rochester, NY Metropolitan Statistical Area	Winchester, VA-WV Metropolitan Statistical Area
Rocky Mount, NC Metropolitan Statistical Area	Yuba City, CA Metropolitan Statistical Area
Santa Rosa, CA Metropolitan Statistical Area	

# Appendix: Overpriced in 2008 Q4

Overpriced Column 1	Overpriced Column 2	Overpriced Column 3
Boston, MA Metropolitan Division	Eau Claire, WI Metropolitan Statistical Area	Morgantown, WV Metropolitan Statistical Area
Camden, NJ Metropolitan Division	Farmington, NM Metropolitan Statistical Area	Morristown, TN Metropolitan Statistical Area
Oakland-Hayward-Berkeley, CA Metropolitan Division	Fresno, CA Metropolitan Statistical Area	Myrtle Beach-Conway-North Myrtle Beach, SC-NC Metropolitan Statistical Area
San Francisco-Redwood City-South San Francisco, CA Metropolitan Division	Gadsden, AL Metropolitan Statistical Area	Naples-Immokalee-Marco Island, FL Metropolitan Statistical Area
Tacoma-Lakewood, WA Metropolitan Division	Gainesville, FL Metropolitan Statistical Area	New York-Newark-Jersey City, NY-NJ-PA Metropolitan Statistical Area
Albany-Schenectady-Troy, NY Metropolitan Statistical Area	Glens Falls, NY Metropolitan Statistical Area	Niles-Benton Harbor, MI Metropolitan Statistical Area
Anchorage, AK Metropolitan Statistical Area	Grand Island, NE Metropolitan Statistical Area	Norwich-New London, CT Metropolitan Statistical Area
Atlantic City-Hammonton, NJ Metropolitan Statistical Area	Grand Junction, CO Metropolitan Statistical Area	Ocala, FL Metropolitan Statistical Area
Atlanta-Sandy Springs-Roswell, GA Metropolitan Statistical Area	Hagerstown-Martinsburg, MD-WV Metropolitan Statistical Area	Omaha-Council Bluffs, NE-IA Metropolitan Statistical Area
Bangor, ME Metropolitan Statistical Area	Houma-Thibodaux, LA Metropolitan Statistical Area	Phoenix-Mesa-Scottsdale, AZ Metropolitan Statistical Area
Barnstable Town, MA Metropolitan Statistical Area	Houston-The Woodlands-Sugar Land, TX Metropolitan Statistical Area	Pittsfield, MA Metropolitan Statistical Area
Blacksburg-Christiansburg-Radford, VA Metropolitan Statistical Area	Ithaca, NY Metropolitan Statistical Area	Providence-Warwick, RI-MA Metropolitan Statistical Area
Bloomsburg-Berwick, PA Metropolitan Statistical Area	Jacksonville, FL Metropolitan Statistical Area	Rapid City, SD Metropolitan Statistical Area
Brunswick, GA Metropolitan Statistical Area	Jacksonville, NC Metropolitan Statistical Area	Riverside-San Bernardino-Ontario, CA Metropolitan Statistical Area
Chico, CA Metropolitan Statistical Area	Kansas City, MO-KS Metropolitan Statistical Area	Rochester, MN Metropolitan Statistical Area
Charleston-North Charleston, SC Metropolitan Statistical Area	Kingsport-Bristol-Bristol, TN-VA Metropolitan Statistical Area	Tallahassee, FL Metropolitan Statistical Area
Cleveland, TN Metropolitan Statistical Area	Kingston, NY Metropolitan Statistical Area	The Villages, FL Metropolitan Statistical Area
Columbus, GA-AL Metropolitan Statistical Area	La Crosse-Onalaska, WI-MN Metropolitan Statistical Area	Topeka, KS Metropolitan Statistical Area
Columbia, SC Metropolitan Statistical Area	Lewiston, ID-WA Metropolitan Statistical Area	Tucson, AZ Metropolitan Statistical Area
Cumberland, MD-WV Metropolitan Statistical Area	Lexington-Fayette, KY Metropolitan Statistical Area	Waterloo-Cedar Falls, IA Metropolitan Statistical Area
Deltona-Daytona Beach-Ormond Beach, FL Metropolitan Statistical Area	Manhattan, KS Metropolitan Statistical Area	Winston-Salem, NC Metropolitan Statistical Area
Des Moines-West Des Moines, IA Metropolitan Statistical Area	Mobile, AL Metropolitan Statistical Area	Yuma, AZ Metropolitan Statistical Area

# Appendix: Significantly Overpriced in 2008 Q4

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Significantly Overpriced
Auburn-Opelika, AL Metropolitan Statistical Area
Colorado Springs, CO Metropolitan Statistical Area
Gulfport-Biloxi-Pascagoula, MS Metropolitan Statistical Area
Hot Springs, AR Metropolitan Statistical Area
Mankato-North Mankato, MN Metropolitan Statistical Area
Minneapolis-St. Paul-Bloomington, MN-WI Metropolitan Statistical Area
Ocean City, NJ Metropolitan Statistical Area
Portland-South Portland, ME Metropolitan Statistical Area
St. Cloud, MN Metropolitan Statistical Area
St. Joseph, MO-KS Metropolitan Statistical Area
St. Louis, MO-IL Metropolitan Statistical Area
Tampa-St. Petersburg-Clearwater, FL Metropolitan Statistical Area
Virginia Beach-Norfolk-Newport News, VA-NC Metropolitan Statistical Area
Worcester, MA-CT Metropolitan Statistical Area
Youngstown-Warren-Boardman, OH-PA Metropolitan Statistical Area

# Appendix:

## Significantly Underpriced in 2020 Q4

Significantly Underpriced Column 1	Significantly Underpriced Column 2	Significantly Underpriced Column 3
Cambridge-Newton-Framingham, MA Metropolitan Division	Homosassa Springs, FL Metropolitan Statistical Area	Kokomo, IN Metropolitan Statistical Area
Chicago-Naperville-Arlington Heights, IL Metropolitan Division	Killeen-Temple, TX Metropolitan Statistical Area	Lansing-East Lansing, MI Metropolitan Statistical Area
Dallas-Plano-Irving, TX Metropolitan Division	Laredo, TX Metropolitan Statistical Area	Las Vegas-Henderson-Paradise, NV Metropolitan Statistical Area
Fort Worth-Arlington, TX Metropolitan Division	Lawton, OK Metropolitan Statistical Area	Macon-Bibb County, GA Metropolitan Statistical Area
Lake County-Kenosha County, IL-WI Metropolitan Division	Logan, UT-ID Metropolitan Statistical Area	Midland, MI Metropolitan Statistical Area
Montgomery County-Bucks County-Chester County, PA Metropolitan Division	Longview, WA Metropolitan Statistical Area	Montgomery, AL Metropolitan Statistical Area
New York-Jersey City-White Plains, NY-NJ Metropolitan Division	Las Cruces, NM Metropolitan Statistical Area	Mount Vernon-Anacortes, WA Metropolitan Statistical Area
Albany, OR Metropolitan Statistical Area	Dutchess County-Putnam County, NY Metropolitan Division	Myrtle Beach-Conway-North Myrtle Beach, SC-NC Metropolitan Statistical Area
Albuquerque, NM Metropolitan Statistical Area	Elgin, IL Metropolitan Division	New Bern, NC Metropolitan Statistical Area
Alexandria, LA Metropolitan Statistical Area	Lake County-Kenosha County, IL-WI Metropolitan Division	New Haven-Milford, CT Metropolitan Statistical Area
Allentown-Bethlehem-Easton, PA-NJ Metropolitan Statistical Area	Newark, NJ-PA Metropolitan Division	Ogden-Clearfield, UT Metropolitan Statistical Area
Albany, GA Metropolitan Statistical Area	Wilmington, DE-MD-NJ Metropolitan Division	Orlando-Kissimmee-Sanford, FL Metropolitan Statistical Area
Ames, IA Metropolitan Statistical Area	Albuquerque, NM Metropolitan Statistical Area	Peoria, IL Metropolitan Statistical Area
Anniston-Oxford-Jacksonville, AL Metropolitan Statistical Area	Albany, GA Metropolitan Statistical Area	Pittsfield, MA Metropolitan Statistical Area
Athens-Clarke County, GA Metropolitan Statistical Area	Burlington, NC Metropolitan Statistical Area	Raleigh, NC Metropolitan Statistical Area
Bay City, MI Metropolitan Statistical Area	Chambersburg-Waynesboro, PA Metropolitan Statistical Area	Redding, CA Metropolitan Statistical Area
Beaumont-Port Arthur, TX Metropolitan Statistical Area	Cedar Rapids, IA Metropolitan Statistical Area	Richmond, VA Metropolitan Statistical Area
Bellingham, WA Metropolitan Statistical Area	Champaign-Urbana, IL Metropolitan Statistical Area	Roanoke, VA Metropolitan Statistical Area
Bloomington, IL Metropolitan Statistical Area	Charlotte-Concord-Gastonia, NC-SC Metropolitan Statistical Area	Rockford, IL Metropolitan Statistical Area
Bremerton-Silverdale, WA Metropolitan Statistical Area	Cleveland-Elyria, OH Metropolitan Statistical Area	Salem, OR Metropolitan Statistical Area
Cedar Rapids, IA Metropolitan Statistical Area	Columbus, GA-AL Metropolitan Statistical Area	San Francisco-Oakland-Hayward, CA Metropolitan Statistical Area
Charlottesville, VA Metropolitan Statistical Area	Columbia, MO Metropolitan Statistical Area	Salisbury, MD-DE Metropolitan Statistical Area
Cincinnati, OH-KY-IN Metropolitan Statistical Area	Colorado Springs, CO Metropolitan Statistical Area	Santa Maria-Santa Barbara, CA Metropolitan Statistical Area
Clarksville, TN-KY Metropolitan Statistical Area	Durham-Chapel Hill, NC Metropolitan Statistical Area	Santa Fe, NM Metropolitan Statistical Area
Columbus, OH Metropolitan Statistical Area	East Stroudsburg, PA Metropolitan Statistical Area	Shreveport-Bossier City, LA Metropolitan Statistical Area
Dayton, OH Metropolitan Statistical Area	Fayetteville, NC Metropolitan Statistical Area	Sierra Vista-Douglas, AZ Metropolitan Statistical Area
Decatur, AL Metropolitan Statistical Area	Fairbanks, AK Metropolitan Statistical Area	Spokane-Spokane Valley, WA Metropolitan Statistical Area
Durham-Chapel Hill, NC Metropolitan Statistical Area	Florence, SC Metropolitan Statistical Area	Trenton, NJ Metropolitan Statistical Area
East Stroudsburg, PA Metropolitan Statistical Area	Goldsboro, NC Metropolitan Statistical Area	Tuscaloosa, AL Metropolitan Statistical Area
El Centro, CA Metropolitan Statistical Area	Green Bay, WI Metropolitan Statistical Area	Tyler, TX Metropolitan Statistical Area
Elizabethtown-Fort Knox, KY Metropolitan Statistical Area	Greenville, NC Metropolitan Statistical Area	Visalia-Porterville, CA Metropolitan Statistical Area
Elmira, NY Metropolitan Statistical Area	Hartford-West Hartford-East Hartford, CT Metropolitan Statistical Area	Warner Robins, GA Metropolitan Statistical Area
Fayetteville, NC Metropolitan Statistical Area	Hinesville, GA Metropolitan Statistical Area	Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area
Fayetteville-Springdale-Rogers, AR-MO Metropolitan Statistical Area	Urban Honolulu, HI Metropolitan Statistical Area	Wausau, WI Metropolitan Statistical Area
Flint, MI Metropolitan Statistical Area	Iowa City, IA Metropolitan Statistical Area	Winston-Salem, NC Metropolitan Statistical Area
Florence-Muscle Shoals, AL Metropolitan Statistical Area	Kahului-Wailuku-Lahaina, HI Metropolitan Statistical Area	Yakima, WA Metropolitan Statistical Area
Harrisonburg, VA Metropolitan Statistical Area	Kankakee, IL Metropolitan Statistical Area	York-Hanover, PA Metropolitan Statistical Area
Hinesville, GA Metropolitan Statistical Area	Knoxville, TN Metropolitan Statistical Area	

# Appendix: Underpriced in 2020 Q4

MSA Underpriced Column 1	MSA Underpriced Column 2	MSA Underpriced Column 3
Abilene, TX Metropolitan Statistical Area	Huntsville, AL Metropolitan Statistical Area	Providence-Warwick, RI-MA Metropolitan Statistical Area
Allentown-Bethlehem-Easton, PA-NJ Metropolitan Statistical Area	Jacksonville, FL Metropolitan Statistical Area	Provo-Orem, UT Metropolitan Statistical Area
Amarillo, TX Metropolitan Statistical Area	Johnstown, PA Metropolitan Statistical Area	Reading, PA Metropolitan Statistical Area
Anaheim-Santa Ana-Irvine, CA Metropolitan Division	Jonesboro, AR Metropolitan Statistical Area	Reno, NV Metropolitan Statistical Area
Atlantic City-Hammonton, NJ Metropolitan Statistical Area	Lafayette-West Lafayette, IN Metropolitan Statistical Area	Rocky Mount, NC Metropolitan Statistical Area
Barnstable Town, MA Metropolitan Statistical Area	Laredo, TX Metropolitan Statistical Area	Scranton-Wilkes-Barre-Hazleton, PA Metropolitan Statistical Area
Bowling Green, KY Metropolitan Statistical Area	Las Cruces, NM Metropolitan Statistical Area	Sheboygan, WI Metropolitan Statistical Area
California-Lexington Park, MD Metropolitan Statistical Area	Lawton, OK Metropolitan Statistical Area	St. George, UT Metropolitan Statistical Area
Charleston, WV Metropolitan Statistical Area	Madison, WI Metropolitan Statistical Area	Tucson, AZ Metropolitan Statistical Area
Dover, DE Metropolitan Statistical Area	Memphis, TN-MS-AR Metropolitan Statistical Area	Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Division
Erie, PA Metropolitan Statistical Area	Milwaukee-Waukesha-West Allis, WI Metropolitan Statistical Area	Wilmington, NC Metropolitan Statistical Area
Eugene, OR Metropolitan Statistical Area	Montgomery County-Bucks County-Chester County, PA Metropolitan Division	Winchester, VA-WV Metropolitan Statistical Area
Fond du Lac, WI Metropolitan Statistical Area	Naples-Immokalee-Marco Island, FL Metropolitan Statistical Area	Yuba City, CA Metropolitan Statistical Area
Gary, IN Metropolitan Division	Nashville-Davidson-Murfreesboro-Franklin, TN Metropolitan Statistical Area	
Great Falls, MT Metropolitan Statistical Area	New Orleans-Metairie, LA Metropolitan Statistical Area	
Greensboro-High Point, NC Metropolitan Statistical Area	Norwich-New London, CT Metropolitan Statistical Area	
Greenville-Anderson-Mauldin, SC Metropolitan Statistical Area	Oshkosh-Neenah, WI Metropolitan Statistical Area	
Hagerstown-Martinsburg, MD-WV Metropolitan Statistical Area	Panama City, FL Metropolitan Statistical Area	

# Appendix: Overpriced in 2020 Q4

MSA Overpriced Column 1	MSA Overpriced Column 2	MSA Overpriced Column 3
Albany-Schenectady-Troy, NY Metropolitan Statistical Area	Killeen-Temple, TX Metropolitan Statistical Area	Springfield, MA Metropolitan Statistical Area
Anchorage, AK Metropolitan Statistical Area	La Crosse-Onalaska, WI-MN Metropolitan Statistical Area	St. Joseph, MO-KS Metropolitan Statistical Area
Bangor, ME Metropolitan Statistical Area	Lafayette, LA Metropolitan Statistical Area	St. Louis, MO-IL Metropolitan Statistical Area
Binghamton, NY Metropolitan Statistical Area	Lake Havasu City-Kingman, AZ Metropolitan Statistical Area	Texarkana, TX-AR Metropolitan Statistical Area
Boise City, ID Metropolitan Statistical Area	Lewiston-Auburn, ME Metropolitan Statistical Area	Twin Falls, ID Metropolitan Statistical Area
Charleston-North Charleston, SC Metropolitan Statistical Area	Lexington-Fayette, KY Metropolitan Statistical Area	Wichita, KS Metropolitan Statistical Area
Charlottesville, VA Metropolitan Statistical Area	Lima, OH Metropolitan Statistical Area	Worcester, MA-CT Metropolitan Statistical Area
Clarksville, TN-KY Metropolitan Statistical Area	Little Rock-North Little Rock-Conway, AR Metropolitan Statistical Area	Yuma, AZ Metropolitan Statistical Area
Cleveland, TN Metropolitan Statistical Area	Logan, UT-ID Metropolitan Statistical Area	
College Station-Bryan, TX Metropolitan Statistical Area	Longview, WA Metropolitan Statistical Area	
Columbus, IN Metropolitan Statistical Area	Madera, CA Metropolitan Statistical Area	
Denver-Aurora-Lakewood, CO Metropolitan Statistical Area	McAllen-Edinburg-Mission, TX Metropolitan Statistical Area	
Dubuque, IA Metropolitan Statistical Area	Monroe, MI Metropolitan Statistical Area	
Elkhart-Goshen, IN Metropolitan Statistical Area	New York-Newark-Jersey City, NY-NJ-PA Metropolitan Statistical Area	
Enid, OK Metropolitan Statistical Area	Ocean City, NJ Metropolitan Statistical Area	
Flint, MI Metropolitan Statistical Area	Palm Bay-Melbourne-Titusville, FL Metropolitan Statistical Area	
Florence-Muscle Shoals, AL Metropolitan Statistical Area	Philadelphia, PA Metropolitan Division	
Fort Smith, AR-OK Metropolitan Statistical Area	Pittsburgh, PA Metropolitan Statistical Area	
Fort Worth-Arlington, TX Metropolitan Division	Prescott, AZ Metropolitan Statistical Area	
Gainesville, FL Metropolitan Statistical Area	Salt Lake City, UT Metropolitan Statistical Area	
Harrisonburg, VA Metropolitan Statistical Area	San Antonio-New Braunfels, TX Metropolitan Statistical Area	
Hattiesburg, MS Metropolitan Statistical Area	San Jose-Sunnyvale-Santa Clara, CA Metropolitan Statistical Area	
Hickory-Lenoir-Morganton, NC Metropolitan Statistical Area	San Luis Obispo-Paso Robles-Arroyo Grande, CA Metropolitan Statistical Area	
Homosassa Springs, FL Metropolitan Statistical Area	Seattle-Tacoma-Bellevue, WA Metropolitan Statistical Area	
Hot Springs, AR Metropolitan Statistical Area	Sebring, FL Metropolitan Statistical Area	

# Appendix: Significantly Overpriced in 2020 Q4

MSA Significantly Overpriced Column 1	MSA Significantly Overpriced Column 2	MSA Significantly Overpriced Column 3
Alexandria, LA Metropolitan Statistical Area	Longview, TX Metropolitan Statistical Area	South Bend-Mishawaka, IN-MI Metropolitan Statistical Area
Ames, IA Metropolitan Statistical Area	Los Angeles-Long Beach-Anaheim, CA Metropolitan Statistical Area	St. Cloud, MN Metropolitan Statistical Area
Athens-Clarke County, GA Metropolitan Statistical Area	Manhattan, KS Metropolitan Statistical Area	State College, PA Metropolitan Statistical Area
Bismarck, ND Metropolitan Statistical Area	Mankato-North Mankato, MN Metropolitan Statistical Area	Tampa-St. Petersburg-Clearwater, FL Metropolitan Statistical Area
Bloomington, IN Metropolitan Statistical Area	Miami-Fort Lauderdale-West Palm Beach, FL Metropolitan Statistical Area	Topeka, KS Metropolitan Statistical Area
Carson City, NV Metropolitan Statistical Area	Midland, TX Metropolitan Statistical Area	Utica-Rome, NY Metropolitan Statistical Area
Daphne-Fairhope-Foley, AL Metropolitan Statistical Area	Monroe, LA Metropolitan Statistical Area	Victoria, TX Metropolitan Statistical Area
Deltona-Daytona Beach-Ormond Beach, FL Metropolitan Statistical Area	Morgantown, WV Metropolitan Statistical Area	Vineland-Bridgeton, NJ Metropolitan Statistical Area
Fargo, ND-MN Metropolitan Statistical Area	Muskegon, MI Metropolitan Statistical Area	Waco, TX Metropolitan Statistical Area
Gadsden, AL Metropolitan Statistical Area	North Port-Sarasota-Bradenton, FL Metropolitan Statistical Area	Waterloo-Cedar Falls, IA Metropolitan Statistical Area
Grand Forks, ND-MN Metropolitan Statistical Area	Odessa, TX Metropolitan Statistical Area	Watertown-Fort Drum, NY Metropolitan Statistical Area
Grand Island, NE Metropolitan Statistical Area	Oklahoma City, OK Metropolitan Statistical Area	Weirton-Steubenville, WV-OH Metropolitan Statistical Area
Grand Rapids-Wyoming, MI Metropolitan Statistical Area	Omaha-Council Bluffs, NE-IA Metropolitan Statistical Area	Wheeling, WV-OH Metropolitan Statistical Area
Houma-Thibodaux, LA Metropolitan Statistical Area	Oxnard-Thousand Oaks-Ventura, CA Metropolitan Statistical Area	Wichita Falls, TX Metropolitan Statistical Area
Houston-The Woodlands-Sugar Land, TX Metropolitan Statistical Area	Parkersburg-Vienna, WV Metropolitan Statistical Area	Williamsport, PA Metropolitan Statistical Area
Idaho Falls, ID Metropolitan Statistical Area	Pensacola-Ferry Pass-Brent, FL Metropolitan Statistical Area	Youngstown-Warren-Boardman, OH-PA Metropolitan Statistical Area
Ithaca, NY Metropolitan Statistical Area	Phoenix-Mesa-Scottsdale, AZ Metropolitan Statistical Area	
Jefferson City, MO Metropolitan Statistical Area	Pocatello, ID Metropolitan Statistical Area	
Johnson City, TN Metropolitan Statistical Area	Pueblo, CO Metropolitan Statistical Area	
Joplin, MO Metropolitan Statistical Area	Rapid City, SD Metropolitan Statistical Area	
Kansas City, MO-KS Metropolitan Statistical Area	Riverside-San Bernardino-Ontario, CA Metropolitan Statistical Area	
Kingsport-Bristol-Bristol, TN-VA Metropolitan Statistical Area	Rochester, MN Metropolitan Statistical Area	
Lake Charles, LA Metropolitan Statistical Area	San Angelo, TX Metropolitan Statistical Area	
Lawrence, KS Metropolitan Statistical Area	Santa Cruz-Watsonville, CA Metropolitan Statistical Area	
Lewiston, ID-WA Metropolitan Statistical Area	Sherman-Denison, TX Metropolitan Statistical Area	
Lincoln, NE Metropolitan Statistical Area	Sioux City, IA-NE-SD Metropolitan Statistical Area	

# Appendix: Top MSA in selected periods

	2001Q1	2006Q1	2008Q4	2020Q4	2021Q1	2021Q2	2021Q3
Seattle-Bellevue-Everett, WA Metropolitan Division	-0.399006	-1.150284	0.876840	0.389297	3.057290	5.026906	6.779899
Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Area	-1.463113	-1.189868	-0.218419	-0.741849	0.623805	-0.283342	1.203509
Chicago-Naperville-Elgin, IL-IN-WI Metropolitan Statistical Area	-1.283211	-0.749817	-0.793717	0.156168	5.050818	2.591169	4.870772
Dallas-Fort Worth-Arlington, TX Metropolitan Statistical Area	-0.223483	-0.339862	0.171753	-0.004072	4.743055	7.328047	8.593203
Los Angeles-Long Beach-Anaheim, CA Metropolitan Statistical Area	0.485767	2.164108	-0.205095	3.251754	4.304581	4.585408	6.127742
Miami-Fort Lauderdale-West Palm Beach, FL Metropolitan Statistical Area	-0.232842	1.684740	0.293965	2.512533	3.563535	3.651269	4.338025
New York-Newark-Jersey City, NY-NJ-PA Metropolitan Statistical Area	-0.223598	1.833839	1.222989	1.496351	2.999017	2.002515	2.709494
San Francisco-Oakland-Hayward, CA Metropolitan Statistical Area	0.418420	-0.740849	-0.276043	-2.040812	-0.732325	-0.714539	0.939047
San Diego-Carlsbad, CA Metropolitan Statistical Area	-0.749650	-0.871340	-0.727051	-0.643758	0.278825	2.514335	3.899584
Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area	-0.769842	0.979107	-0.192965	-3.173509	0.929646	-0.027922	1.930697



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