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Finance and Factory-Built Housing

By

Maris Lane Jensen

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Professor David Sraer, Chair
Professor Christine Parlour
Professor Carolina Reid

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Abstract

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Factory-built housing is the largest source of unsubsidized affordable housing in the United States, but the production of homes built in factories has fallen from more than fifty percent of single-family housing starts in the mid-1970s to under ten percent today. This is surprising, given the myriad advantages of factory production - the economies of scale, increased production capacity, more consistent quality control, and more efficient use of resources - and given that the US is experiencing what government officials refer to as a "housing affordability crisis" (Maxine Waters 2023). Affordable housing is where factory-built housing has the comparative advantage. Larger, higher-end homes offer site-built developers higher profit margins and the ability to spread fixed costs, but factories can profitably build small. The average factory-built home is around half the size of the average site-built home, and approximately half the price per square foot. The disappearance of homes built in factories hence has a disproportionate effect on low-income homeowners and renters, and an impact on long-term economic growth and inequality.

This dissertation explores the economic and social phenomena that might explain the decades-long stagnation of factory-built housing at ten percent of housing starts, many of which involve finance. Housing and finance are inextricably linked. For all but the wealthiest, buying a home requires financing, and a home is usually the most expensive thing a household owns. Housing is especially important for households in the bottom half of the wealth distribution - those households most likely to be considering factory-built homes. Real estate constitutes more than

half of their aggregate portfolio holdings.

In Chapter 1, I place the starter home, and then the manufactured home in particular, in historical context. I discuss the various rounds of federal involvement in housing finance, and the subsequent dominance of a loan product that is distinctly American: the 30-year, fixed rate mortgage. I survey the relevant research on housing affordability and the construction shortage, and update previous studies to show the growing deficit in entry-level housing supply. I detail the rise and fall of factory-built housing in the US, and the disproportionate effect on renters and low-income homeowners. I review the grocery list of common explanations for the disappearance of manufactured homes; I use new data to refute some arguments, and propose others. I show that Home Mortgage Disclosure Act (HMDA) data are not representative of the universe of manufactured home loans - that the actual number of manufactured home loans in a given year and state can be over 50 percent greater than the number of reported HMDA loans, with primarily chattel loans going unreported.

In Chapter 2, I focus on inventory financing, and the vertical relationships between manufacturers, lenders, and retailers. Using publicly claimed security interests and the movement reported on oversize trip permits, I follow each manufactured home in Texas from factory to dealership to buyer, as it transforms from finished goods to wholesale collateral to consumer collateral, to show that the restriction in factory-built housing supply is consistent with market foreclosure. Upstream manufacturers extend "floor plan" financing to downstream retailers buying homes for their lots, and restrict output in the downstream market. Floor plan financing acts as the vertical restraint a manufacturer needs, during two decades of a growing housing shortage, to distort competition closer to the inefficient monopoly outcome.

In Chapter 3, I detail the manufactured housing data gathered and merged for this dissertation, and place it within the relevant regulation and wider context. I discuss the potential problems with each data source, and my solutions.

To my parents

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Chapter 1

The Starter Home in Context

1.1 Homeownership and the American Dream

A high homeownership rate - the proportion of homes that are owner-occupied - is considered an indicator that a country's economic system is working effectively for the average family.[1] Owning a home reflects stability and financial success; it implies that a family is earning enough not just to cover day-to-day expenses, but to save enough for a down payment and to maintain monthly mortgage costs. A high homeownership rate also suggests that a country's housing market is reasonably accessible - that homes are sustainably affordable. Figure 1.1 shows the historical homeownership rate in the US.

At the beginning of the 20th century, less than half of households in the US owned their homes. And though the next forty years saw sweeping change - including the introduction and widespread household adoption of the automobile, and a shift from a mostly rural population to a mostly urban one - the homeownership rate remained stable at around 47 percent through 1930. Through all this, there was little federal involvement in housing.[2]

High unemployment rates during the Great Depression, and the failure of more than a third of the banks then in existence, led to the expansion of the role of government in residential housing as almost a quarter of homeowners lost their homes to foreclosure. A slew of initiatives aimed at mortgage liberalization were

[1] Layton (2021)

[2] Exceptions include land grants and commercial bank regulation, but as the National Banking Act (1864) severely limited the loans national banks could make on land or housing, commercial banks did not become dominant mortgage lenders until after World War II.

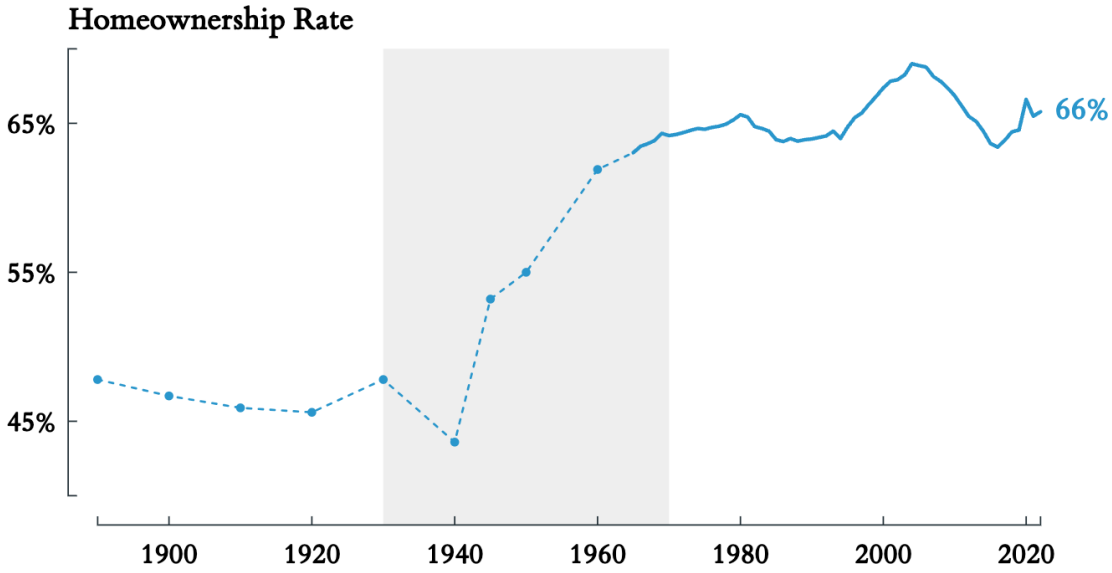

FIGURE 1.1 - HOMEOWNERSHIP IN THE US

Notes: This figure shows the proportion of households that are owner-occupied in the US.

Data: Decennial estimates from 1890-1960
US Census Bureau, Historical Census of Housing Tables

November 1945 estimate
US Census Bureau, Historical Statistics of the United States, 1789 - 1945

Quarterly estimates from 1965-2022
US Census Bureau, Housing Vacancies and Homeownership

enacted as part of Franklin D. Roosevelt's New Deal:

The Home Owners' Loan Act of 1933 provided emergency relief for homeowners through the Home Owners' Loan Corporation (HOLC), which bought and refinanced existing mortgages at risk of default, and reduced the amount of principal debt owed. Nearly 20 percent of mortgages in the US were eventually owned by the HOLC (Blinder 2008). Prior to the 1930s, mortgages were generally adjustable-rate, non-amortizing, and short-term - five years or less - with down

payment requirements above 50 percent.[3] The creation of the Federal Housing Authority (FHA) in 1934, which insured long-term, fixed-rate, fully amortizing mortgages with smaller down payments, reduced the mortgage market's dependence on annual mortgage renegotiations and marked the government's first initiative to help low- and moderate-income buyers enter the housing market. The Federal Reserve Act was amended in 1935 to increase the maximum loan-to-value ratio for non-farm loans to 60 percent, and to lengthen the maximum loan term to ten years. And in 1938, the Federal National Mortgage Association (Fannie Mae) was created to provide liquidity in the mortgage market by purchasing mortgages insured by the FHA.

Together, these legislative and policy efforts helped propel the US homeownership rate from 45 percent in the 1930s to above 53 percent in 1945 (Chambers, Garriga, and Schlagenhauf 2014). Homeownership became a cornerstone of the American Dream,[4] and the fixed-rate, 20- to 30-year mortgage with a high loan-to-value ratio became the status quo. Figure 1.2 shows the increase in the average loan-to-value ratios of mortgage loans made by various types of financial institutions on one- to four- family houses from 1920 through the Second World War, using data assembled by Grebler, Blank, and Winnick (1956).

The government intervened in the mortgage market again with the Servicemen's Readjustment Act (1944) - more commonly known as the G.I. Bill - which led to a major expansion of the middle class. Under the Veterans Administration (VA) loan program, veterans could purchase homes with low interest rates and zero down payment. From 1949 through 1953, veterans' mortgages accounted for an average 24 percent of home loans (Chambers, Garriga, and Schlagenhauf 2014). The US homeownership rate jumped again - to 62 percent in 1960. Fetter (2010) estimated that veterans' housing benefits can explain ten percent of the increase in aggregate homeownership from 1940 through 1960.

This period of time, the boom in homeownership following the Second World War, also saw the transformation of the federal income tax from a tax only paid by the rich - there were fewer than two million individual income tax returns in 1932 - to a tax paid by everyone. Property tax deductions and mortgage-interest deductions, a carryover from the first modern income tax created in 1894 (Lowenstein 2006), became increasingly relevant as the real average household income tripled

[3]Commercial bank mortgage loans were effectively one year loans until the McFadden Act (1927) increased the allowable term on nonfarm mortgages to five years from one.

[4]Roosevelt told the special war conference of the US Savings and Loan League in 1942 that "a nation of homeowners, of people who own a real share in their land, is unconquerable."

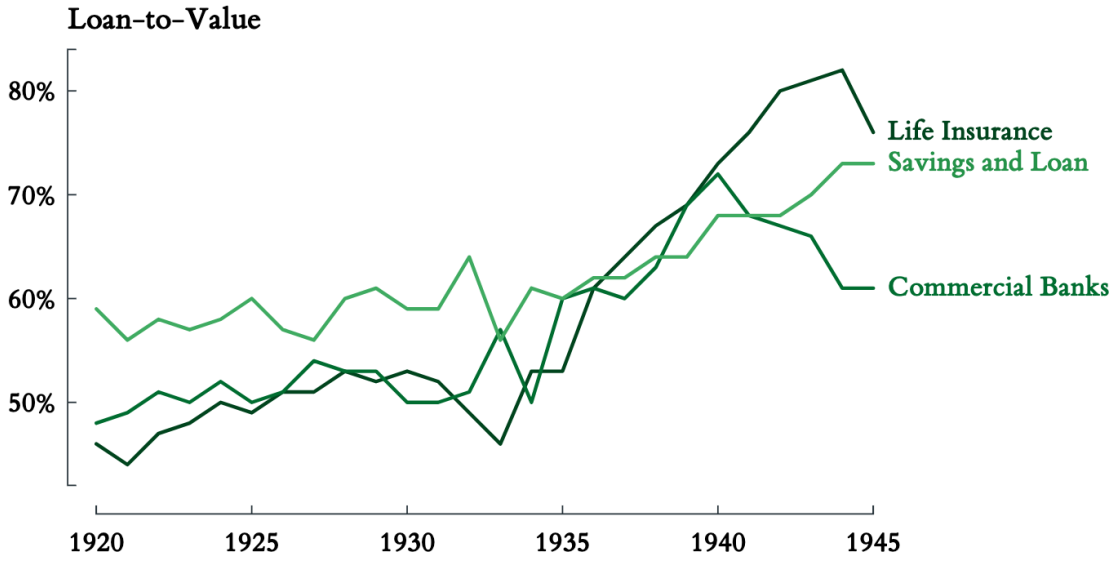

FIGURE 1.2 - AVERAGE LOAN-TO-VALUE RATIOS OF MORTGAGE LOANS

Notes: This figure shows the weighted average loan-to-value ratios of mortgage loans made by life insurance companies, commercial banks, and savings and loan associations on one-to-four family homes from 1920 through 1945.

Data: Grebler, Blank, and Winnick (1956)

between 1940 and 1965. H. S. Rosen and K. T. Rosen (1980) attribute one-fourth of the increase in homeownership from 1949 through 1974 to the implicit subsidies in the federal personal income tax.

The postwar boom in homeownership reshaped America: the share of the US population living in suburbs grew from 13 percent before the war to more than 30 percent in 1960.[5] The single-family home, far from the city, and complete with a surrounding yard, became emblematic of the American Dream.

The first mortgage-backed security (MBS) was issued by the Government National Mortgage Assocation (Ginnie Mae) in 1970. Securitization revolutionized the mortgage market. Previously, nearly all mortgages were held on balance sheet,

[5]US Census Bureau, Decennial Census of Population via Hobbs and Stoops (2002)

with profit coming only from the spread between the cost of funds and interest paid on mortgages. Securitization allowed lenders to free up capital that could be reinvested in new loans by pooling and selling off their mortgages to investors, with Ginnie Mae guaranteeing timely payment of principal and interest. The Federal Home Loan Corporation (Freddie Mac) joined Ginnie Mae in selling MBS in 1971, and a decade later, Fannie Mae followed. The mortgage market expanded as the MBS market surged (Mian and Sufi 2009) to more than one trillion in the late 1990s, three trillion by 2003, and nine trillion by 2010. And the US mortgage market is now dominated by the 30-year, fixed-rate, fully amortizing, fully prepayable mortgage - a loan product that is distinctly American.

The homeownership rate in the US spiked again in 2005, likely thanks to policies in the 1990s and early 2000s that introduced new mortgage products and relaxed credit standards, particularly for lower-income and minority households (Reid 2014), before falling back to its long-term average in the aftermath of the Great Recession - a reversion attributed to tight credit conditions, student loan debt, and a shift in attitudes toward homeownership (Goodman and Mayer 2018). Today, the US homeownership rate is about 65 percent: almost exactly where it was half a century ago, and 40 years ago, and 30 years ago.

This history of homeownership rates in the US - their surprising stability over many decades, with the exclusion of the postwar boom shaded in Figure 1.1 - suggests what former Freddie Mac CEO Donald Layton has called a "natural equilibrium rate" of homeownership produced by the socioeconomic system of a country.[6]

1.1.1 The Benefits and Dividends of Homeownership

Homeownership, in the current socioeconomic system, is designed to benefit Americans. Goodman and Mayer (2018) show that the internal rate of return to homeownership since 2002 is favorable compared to alternative investments - that owning a home serves as a measure of financial security and allows families to build wealth. In addition to the unquantifiable benefits homeownership can provide, like a more informed citizenry (DiPasquale 1999) and a sense of stability, predictability, and community belonging, owning a home is a form of forced savings: monthly

[6] Layton (2021) distinguishes between "macro" changes in the homeownership rate's general range - "65 percent give or take two percentage points" - and "micro" changes of one or one-half percentage points within that macro-level range.

mortgage payments build home equity. And while nationally, owner-occupied housing offers close to no capital gains for long-term investors, the implicit dividends - the daily flow of housing services - are untaxed. Shiller (2015) gives the example: "If one swapped houses with one's neighbor living in an identical house and each paid rent to the other (so that the rent received would cancel out the rent paid), the transaction would be virtually meaningless from an economic standpoint, but it would incur taxes, since the rent received would be taxable, while the rent paid would not be deductible. For this reason, most people are well advised to buy rather than rent the homes they live in."

Moreover, when a homeowner sells his home, no taxes are paid on capital gains up to $500,000 ($250,000 if single).[7] When a rental property is sold, the owner generally pays capital gains taxes.[8] Other income tax benefits of homeownership in the US are well understood: homeowners can deduct mortgage interest and property taxes from their taxable income,[9] which lowers the overall cost of homeownership. The moral hazard inherent in renting - a renter has less incentive to properly care for a home than its owner - further increases the relative cost of renting (Benjamin, Lusht, and Shilling 1998). Of course, there are costs specific to homeownership as well, such as property taxes, appliance repair, electrical problems, plumbing issues, broker fees, and closing costs. But these costs will typically be capitalized by the landlord in rent.

Given the benefits and dividends of homeownership in the US, the government's many efforts to boost the homeownership rate since it stalled in 1970 are no surprise. In 1977, Congress passed the Community Reinvestment Act (CRA), which required banks to reinvest in the communities in which they operate by helping to meet their credit needs - for example, by providing loans for affordable housing and retail banking services for local residents, especially low- and moderate-income families. In 1992, Congress mandated Affordable Housing Goals, requiring Fannie Mae and Freddie Mac to purchase a certain fraction of their loans in underserved census tracts. Various state and federal government programs offer assistance to first-time home buyers, including lenient credit requirements, reduced interest rates, grants to help cover closing costs or down payments, tax credits, and loan forgiveness. The FHA, the VA, the US Department of Agriculture (USDA), Ginnie Mae, Fannie Mae, and Freddie Mac are subsidized to make

[7] IRS Code Section 121

[8] Investors can reduce their capital gains taxes through tax-loss harvesting and like-kind exchanges via IRS Code Section 1031, but this implicit benefit is not built-in.

[9] IRS Code Sections 163 and 164

credit more available, and homes more affordable. But the share of homes that are owner-occupied has remained sticky, hovering around 65 percent for 50 years.

1.1.2 Homeownership in Other Countries

The current homeownership rate in the US is comparable to other developed countries, but growth in the homeownership rate is below average. Figure 1.3 shows homeownership rates in 1990 and 2022 for various countries that publish housing statistics.[10] The US homeownership rate has barely changed since 1990, while in most other developed countries, the rate has significantly increased. In 1990, the US rate was slightly higher than the mean; by 2022, the US had dropped well below the 20-country average homeownership rate of 72 percent. Goodman and Mayer (2018) report a similar mean homeownership rate of 74 percent using a broader sample of 44 countries with reliable data in 2015; the US rate was then almost ten percentage points below the mean.

Comparing homeownership rates between different countries is not apples-to-apples, as each country has its own combination of policies, infrastructure, and demographics. Home equity as a form of retirement savings might matter less in countries with strong public pension systems like the Netherlands and Denmark, while government housing finance and tax policy can either subsidize or penalize homeownership. Countries like Switzerland and Germany have strong rental markets with extensive tenant protections and restrictions on rent increases and eviction, and hence strong renting cultures less inclined toward homeownership (Tillmann, Voorpostel, and Farago 2018). By contrast, extensive government interventions in the housing markets in Romania and Singapore have facilitated homeownership rates exceeding 90 percent. Spain and Italy also have high homeownership rates, currently around 75 percent, reflecting the Mediterranean cultural inclination towards property ownership, often driven by familial wealth accumulation and intergenerational property transfers (Gentili and Hoekstra 2021). But the prevalence of homeownership in almost all countries - not just in the US - suggests that most households view homeownership as desirable. And the increasing homeownership rate in other countries - but not in the US - suggests barriers specific to the US.

[10] Homeownership rates in the United Kingdom - 65 percent in 1990 and 64 percent in 2022 - were dropped because they overlapped too closely with the United States and Canada.

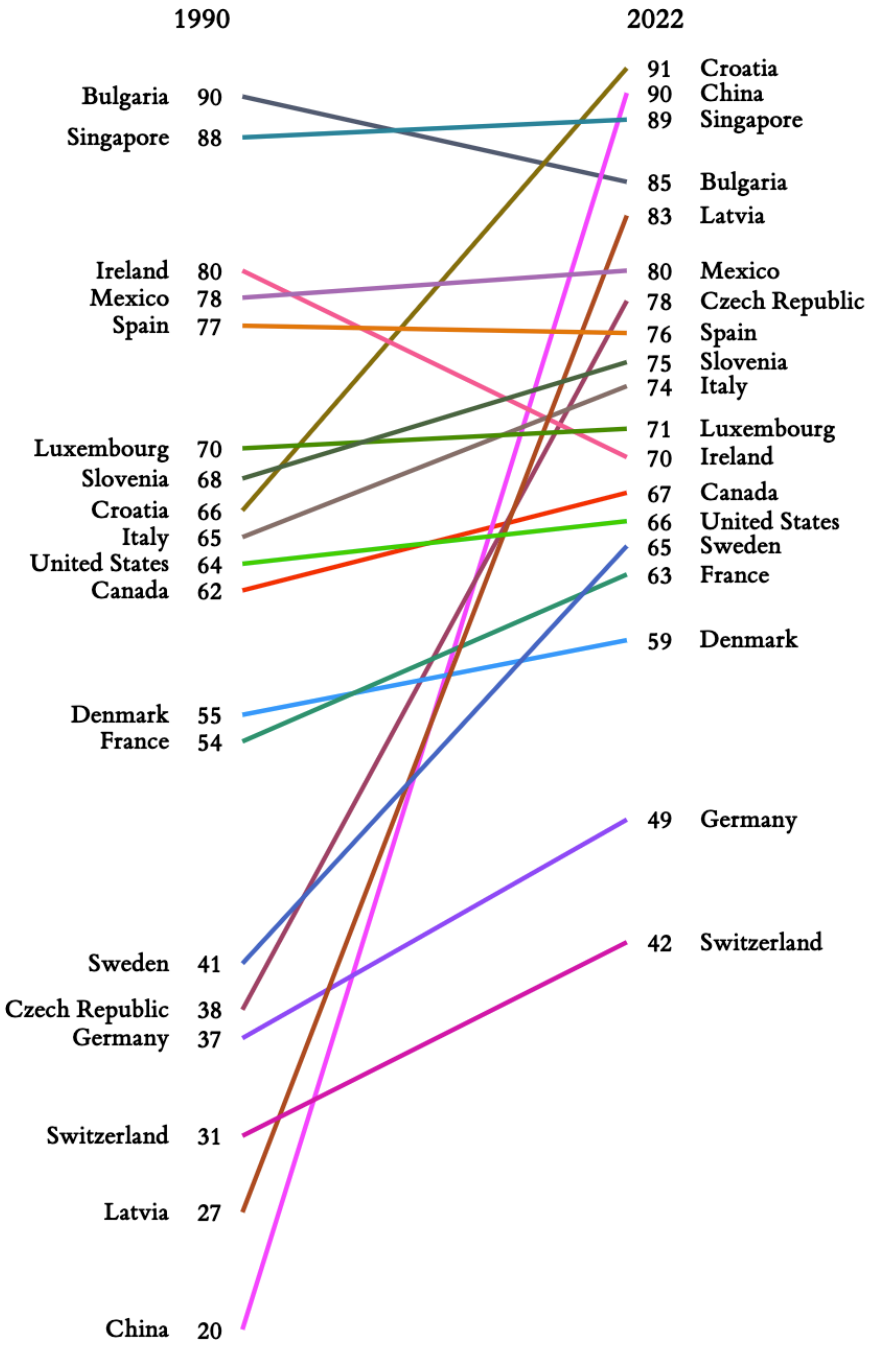

FIGURE 1.3 - HOMEOWNERSHIP RATES BY COUNTRY, 1990 AND 2022

Notes: This figure shows the percentages of households that are owner-occupied.

Data: Eurostat (2023); Goodman and Mayer (2018); Yi and Huang (2014)

1.2 Supply and Demand

Figure 1.4 shows that the number of new homes being constructed in the US is not keeping pace with population growth: housing starts as a share of population has been decreasing since the 1970s.[11] The New Democrat Coalition (2018) estimated a cumulative shortfall of over five million homes in 2018. Freddie Mac (2021) estimated the housing shortage to be 3.8 million units in 2020. Zillow re-

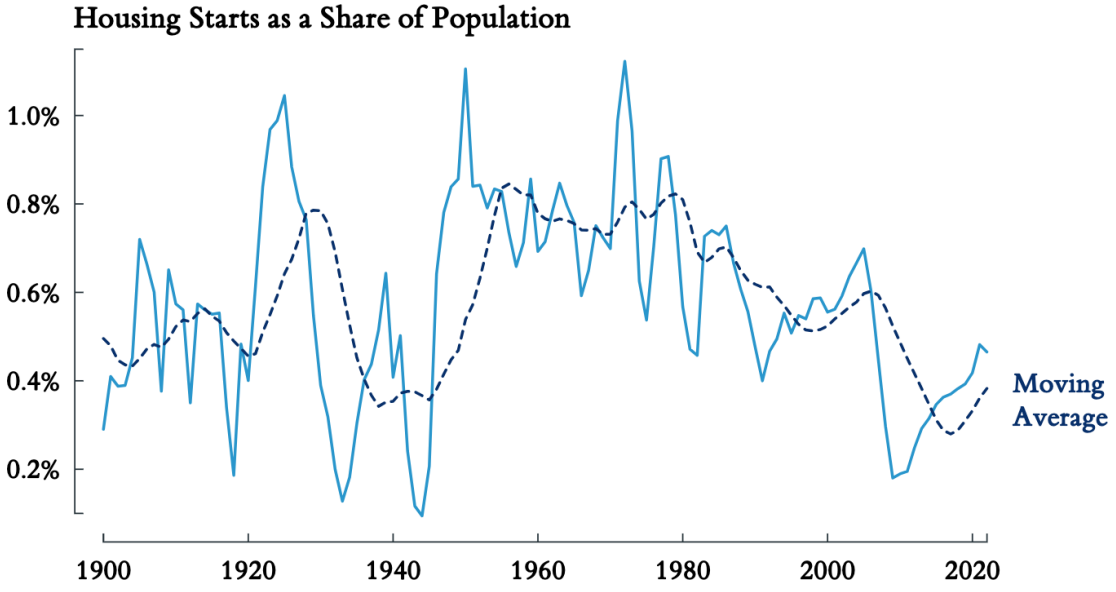

Figure 1.4 - Housing Production and Population

Notes: This figure shows total housing starts/total population in the US, along with the 10-year moving average (dashed line).

Data: New residential construction from 1900-1958
US Census Bureau, Historical Statistics of the US, Colonial Times to 1970

New residential construction from 1959-2022
US Census Bureau and US Department of Housing and Urban Development

Population estimates from 1900-2022
US Census Bureau via Shiller (2015)

[11] See Moura, Smith, and Belzer (2015) for more details about housing starts through 1958.

ported eight million "missing" households in 2021,[12] but only 3.7 million homes for rent or for sale: a deficit of 4.3 million homes (Divounguy 2023). Rosen Consulting Group (2021) reported a shortfall of 5.5 million units in 2021. The National Low Income Housing Coalition (2023) estimated a shortage of 7.3 million affordable rental homes for low-income renters in 2023: only 33 available homes for every 100 renter households. The estimates vary, but there is widespread agreement:

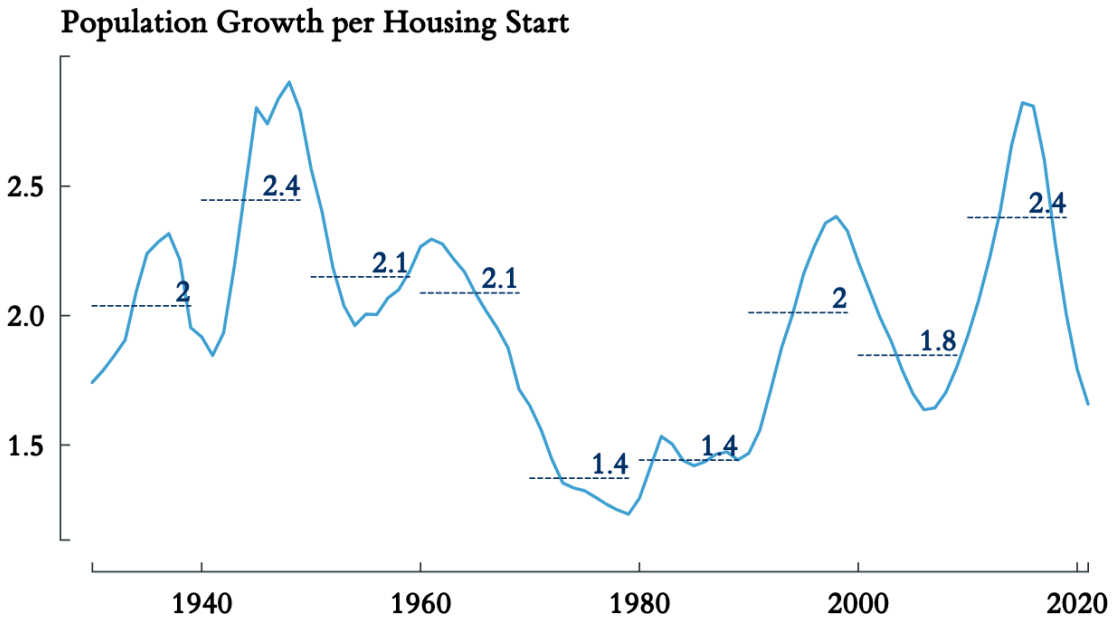

Figure 1.5 - Housing Production and Population Growth

Notes: This figure plots 10-year cumulative total population growth as a share of 10-year cumulative total housing starts, along with the average for each decade.

Data: New residential construction from 1930-1958
US Census Bureau, Historical Statistics of the US, Colonial Times to 1970

New residential construction from 1959-2022
US Census Bureau and US Department of Housing and Urban Development

Population estimates from 1900-2022
US Census Bureau via Shiller (2015)

[12] "Missing households" are individuals or families living in another family's home - individuals or families likely in need of their own homes.

new housing supply remains at recession levels.

Figure 1.5 compares 10-year cumulative total population growth and 10-year cumulative total housing starts. Throughout the 1970s and the 1980s, 1.4 net people were added to the population for every housing start. The ratio has risen since then. Even during the 2000s boom in construction, only one home was started for every 1.8 people added to the US population. And from 2010 through 2020, the ratio was 2.4 people added per housing start: less relative residential construction activity than the decade including the Great Depression, and a ratio not seen since World War II.

This construction shortfall looks more severe given trends in household size. See Figure 1.6. The average number of people residing in each household has steadily decreased - from 5.79 people per household in 1790[13] to 2.5 today. A de-

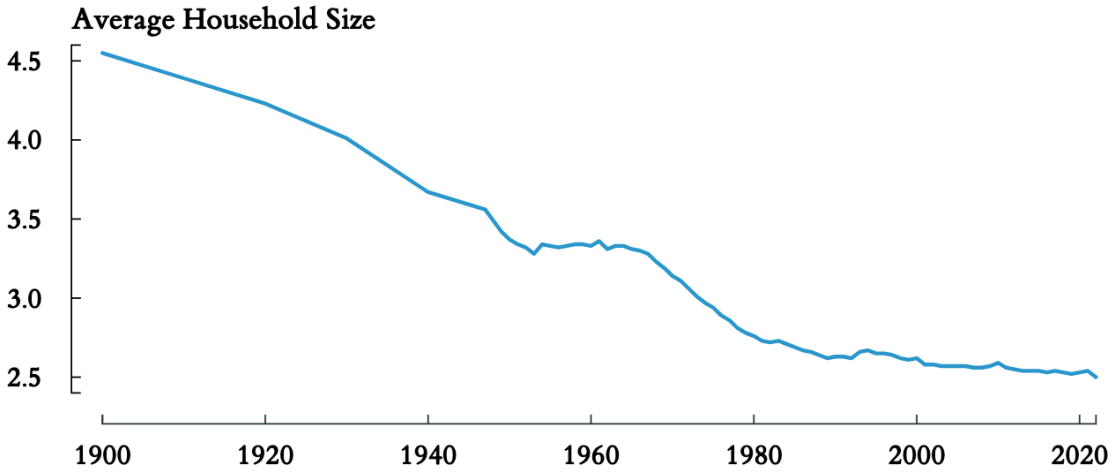

Figure 1.6 - Population in Households

Notes: This figure shows the average number of people per household in the US.

Data: Decennial estimates through 1940
US Census Bureau, Historical Statistics of the United States: Millenial Edition

Annual estimates from 1947-2022
US Census Bureau, Current Population Survey

[13] US Census Bureau (2006)

clining household size increases the demand for housing.

Note that an efficient housing market requires not only occupied homes, but a steady supply of vacant homes for sale and for rent - Freddie Mac (2021) sets the target vacancy rate at 13 percent - and that new homes are not added permanently to the housing stock. According to the National Association of Realtors, 1.7 million older housing units were demolished between 2009 and 2016. Vacancy rates are at historic lows.[14]

The low levels of housing production are oft attributed to an increase in the cost of building materials, a shortage of skilled labor, burdensome federal regulations, local land use policies that restrict construction, and resident opposition to new development (Joint Center for Housing Studies of Harvard University 2022b, Glaeser and Gyourko 2018, Freddie Mac 2017, Freddie Mac 2018, Freddie Mac 2021). The home-building industry lost about 1.5 million workers during the Great Recession, and that loss has been permanent. Lumber, land, and labor are more expensive. Construction productivity has not increased. Post-crisis, construction financing is also less available (Federal Deposit Insurance Corporation 2017).[15] Local and state governments levy development fees that further inflate costs.[16]

In his 2023 testimony before the US Senate Committee on Banking, Housing, and Urban Affairs, National Association of Home Builders (NAHB) Chief Economist Robert Dietz said: "Traditional demand-side housing analyses are insufficient to explain these market conditions. The lack of building is rooted in a set of supply-side headwinds that limit home construction in expanding markets ... The five L's: lack of labor, lots/land, lumber/materials, lending for builders, and laws/regulatory burdens."[17]

Of course, this lack of building means higher prices. Dietz called it "the paradox of declining inventory, rising home prices, and underperforming single-family construction."

Any policy effort aimed at increasing the homeownership rate in the US, and enabling new buyers to enter the housing market, will simultaneously fuel the demand for housing. Without more construction, any such subsidy is likely to push housing prices even higher.

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[14] US Census Bureau, Homeowner Vacancy Rate in the US

[15] The Federal Deposit Insurance Corporation's inspector general cited the rapid growth in loans to finance the acquisition, development, and construction of real estate (ADC loans) as "at the root of the problem that banks would experience during the crisis."

[16] In California, residential "impact fees" charged by local governments for accessory dwelling units (ADUs) can top $50,000 per unit (Raetz, Garcia, Decker, Kneebone, Reid, and Galante 2019).

[17] Testimony of Dr. Robert Dietz On Behalf of the National Association of Home Builders

1.2.1 Real Home Prices

Figure 1.7 shows inflation-adjusted home prices and construction costs in the US since 1900, as calculated in Shiller (2015).[18] During the 20th century, real home prices barely increased. The average annual price increase for US homes from 1900 to 2000 was less than 0.3 percent.

Home prices surged in the late 1990s and early 2000s, during the lead-up to the financial crisis. It was an upswing that, at the time, had only one historical comparable: the boom years immediately following World War II. The subsequent swift decline starting in 2007 was similarly anomalous, though it looks in the context of

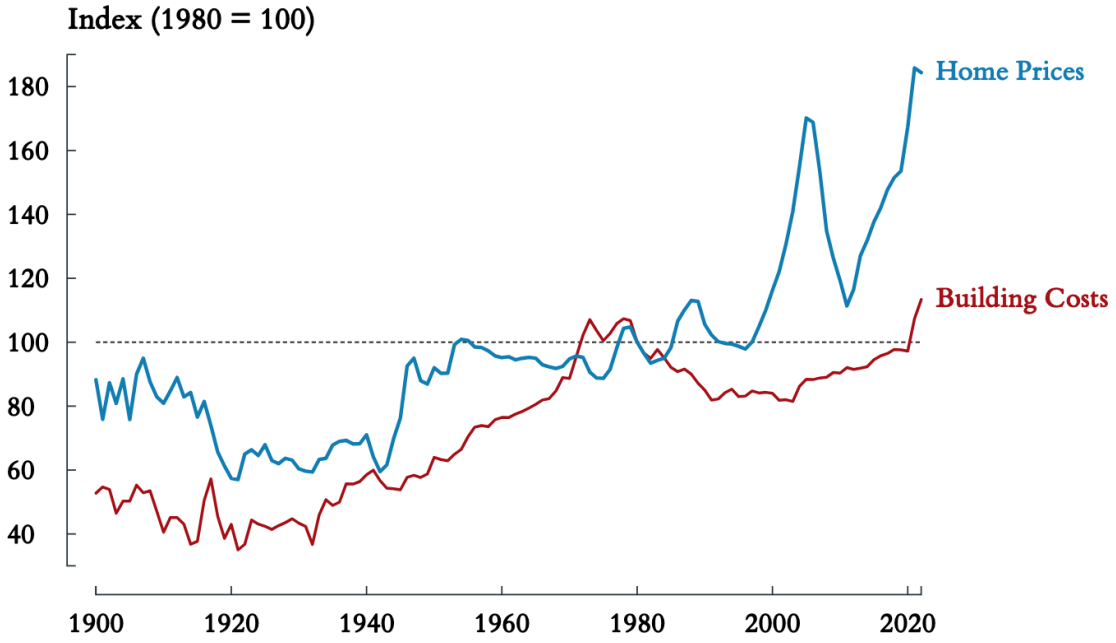

Figure 1.7 - Real Home Prices and Construction Costs

Notes: This figure shows the inflation-adjusted housing price and building cost indices calculated by Robert Shiller, here normalized to 100 in 1980.

Data: Shiller (2015)

[18] For the median price of new houses sold in the US by Census Region, see Figure A.1 in the Appendix. For inflation-adjusted car prices alongside home prices, see Figure A.2 in the Appendix.

history like mean reversion. The years of soaring prices since then, however, have seen the biggest price jump in history: home prices increased 45 percent from December 2019 to June 2022 (the 30 months following the start of the coronavirus pandemic).[19]

While interest rate cuts clearly contributed to the recent run-up in prices, the Federal Reserve has cut interest rates many times without prompting a house price boom. Even during the boom and bust of the Stock Market Crash of 1929 - the Roaring Twenties, the Great Depression, and the subsequent lowering of the discount rate to 1.5 percent - real home prices remained stable. Shiller (2015) points out that "the drop in nominal home prices, when mortgage debt was not indexed to inflation, gave many homeowners negative equity in their homes and an incentive to default on their mortgages ... But we should not mistake the housing crisis of the early 1930s for a decline in real home prices."

And as Figure 1.7 makes clear, home prices cannot be explained by construction costs, which are roughly the same today as they were in 1980. This is consistent with previous research, which shows that real physical construction costs have not risen much over time (Davis and Heathcote 2007, Gyourko and Molloy 2015).[20] In fact, the median price per square foot of floor area for new housing has remained remarkably stable in current prices since at least 1969.[21] See Figure 1.8. The median price per square foot of new floor area from 1969 through 2022 is $115; the long-term average is $116.

The pandemic-induced material and labor shortages,[22] and societal shift in demand to goods from services - and the low interest rates during the pandemic and accompanying inflationary pressures - are visible in the skyrocketing price per square foot in 2021 and 2022. The price of inputs to new residential construction (excluding capital, labor, and imports) was up 20 percent year over year in February 2022, a sizable increase from the 14 percent year-over-year increase in February 2021 (Joint Center for Housing Studies of Harvard University 2022b, Joint Center for Housing Studies of Harvard University 2021). The surprising consistency in the median price per square foot of new floor area through that point, however, suggests that new homes today are much more expensive, in part, because they are

[19] Shiller (2022)

[20] Of course, construction costs do vary across markets, according to geography and regulation (Rosenthal and Strange 2008, Saiz 2010). But the variance of construction costs is small in comparison to the heterogeneity of housing prices (Gyourko and Saiz 2006).

[21] Prior to 1969, the Census Bureau included the value of the improved lot - and hence highly variant land values - in all price per square foot of floor area estimations.

[22] Figure A.3 in the Appendix shows the sharp increase in construction job openings in 2021 and 2022.

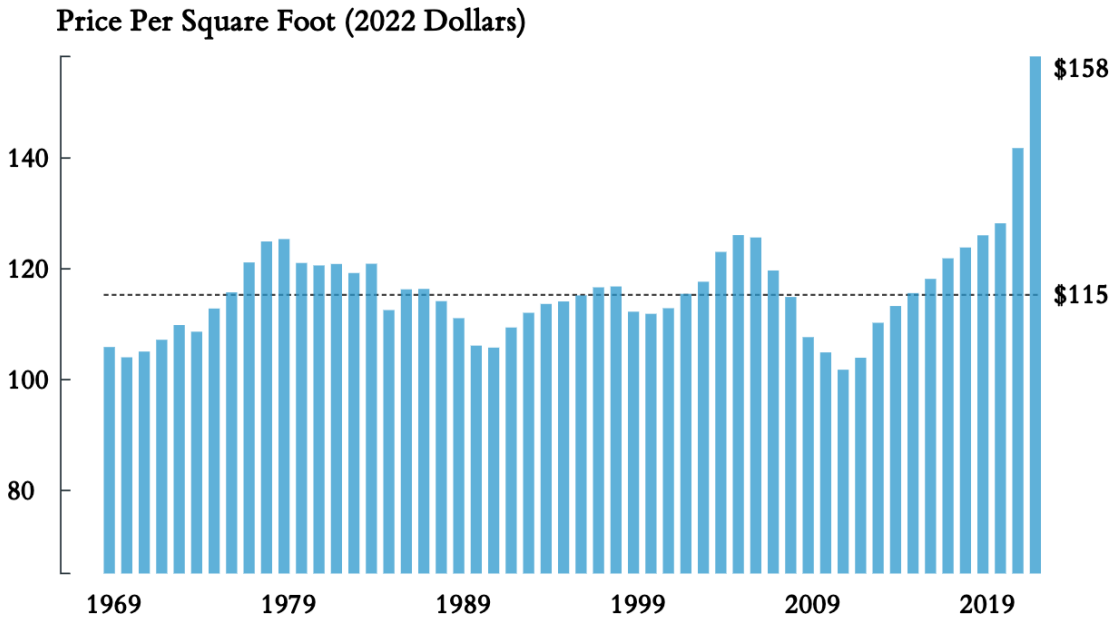

FIGURE 1.8 - MEDIAN PRICE OF NEW HOUSING

Notes: This figure shows the median price per square foot of floor area for new homes in the US, excluding the value of the improved lot, in 2022 dollars. The median of the medians from 1969 through 2022 is $115.

Data: Median prices from 1969-1984
US Census Bureau, Characteristics of New One-Family Homes

Median prices from 1984-2022
US Census Bureau, Characteristics of New Housing

much bigger.

1.2.2 DEFICIT IN ENTRY-LEVEL HOUSING SUPPLY

Figure 1.9 illustrates the average and median sizes of new single-family houses sold in the US. The average square feet of floor area has risen from under 1,200 square feet in 1940 to 2,600 square feet in 2022. Despite the consistent decline in

household size, the average size of a new house has more than doubled. And as evident in Figure 1.10, this shift is not regional: all four Census Regions show the same upward trend.

The rise of McMansions has been attributed to consumer preferences - the American idea that "bigger is better" (Bellet 2017) - but the economics of the housing market, and the local rules that shape it, play a significant role. Single-family zoning laws often allow for the construction of large homes, but not multi-family units or smaller homes (Glaeser and Gyourko 2018). And in some municipalities, the property tax structure incentivizes the construction of larger homes, as larger

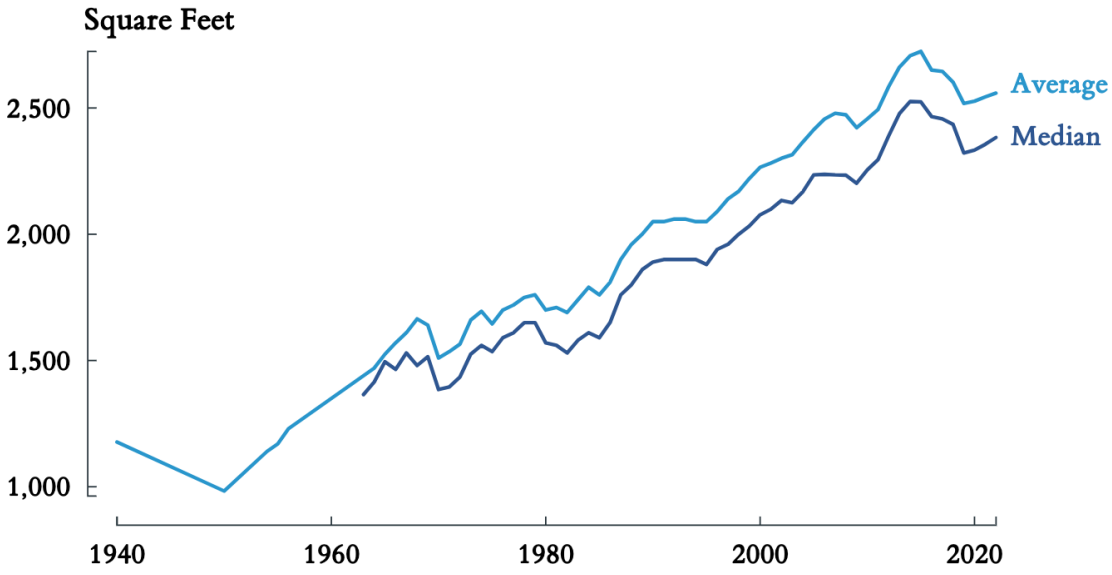

Figure 1.9 - Size of New Houses Sold in the US

Notes: This figure shows the square feet of floor area in new single-family houses sold.

Data: Square feet from 1940, 1950, and 1954-1956
Bureau of Labor Statistics, New Housing and its Materials 1940-1956

Square feet from 1963-1977
US Census Bureau, Characteristics of New One-Family Homes

Square feet from 1978-2022
US Census Bureau, Characteristics of New Housing

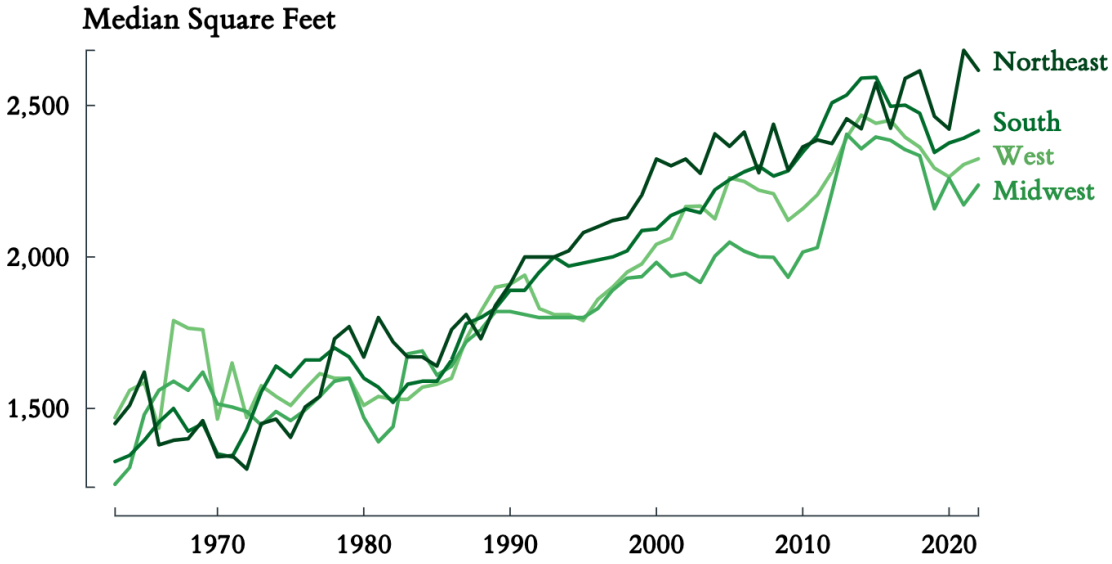

FIGURE 1.10 - MEDIAN SIZE OF NEW HOUSES SOLD BY CENSUS REGION

Notes: This figure shows the median square feet of floor area in new single-family houses sold by Census Region.

Data: Square feet from 1963-1977
US Census Bureau, Characteristics of New One-Family Homes

Square feet from 1978-2022
US Census Bureau, Characteristics of New Housing

homes have higher assessed values, and higher-value properties generate more tax revenue for local governments. Local land-use policies might include minimum square footage requirements, or other stipulations that indirectly encourage the construction of larger homes (Gyourko and Molloy 2015). In Connecticut, for example, 81 percent of residential land requires at least one acre to build a house; 49 percent requires at least two acres (Bronin 2023).

Developers also have an incentive to build bigger, as larger, higher-end homes typically offer higher profit margins. *The New York Times* cites Jerry Konter, the chairman of the National Association of Home Builders (NAHB), as saying "It's not that I don't want to build entry-level homes. It's that I can't produce one

that I can make a profit on and sell to that potential purchaser."[23]

And as homes in the US grow, the pathway to homeownership for the next generation shrinks. Figure 1.11 illustrates the decline in the share of new single-family homes sold in the US that are entry-level - with entry-level and starter homes here defined as small homes under 1,200 or 1,400 square feet. In 1954, over

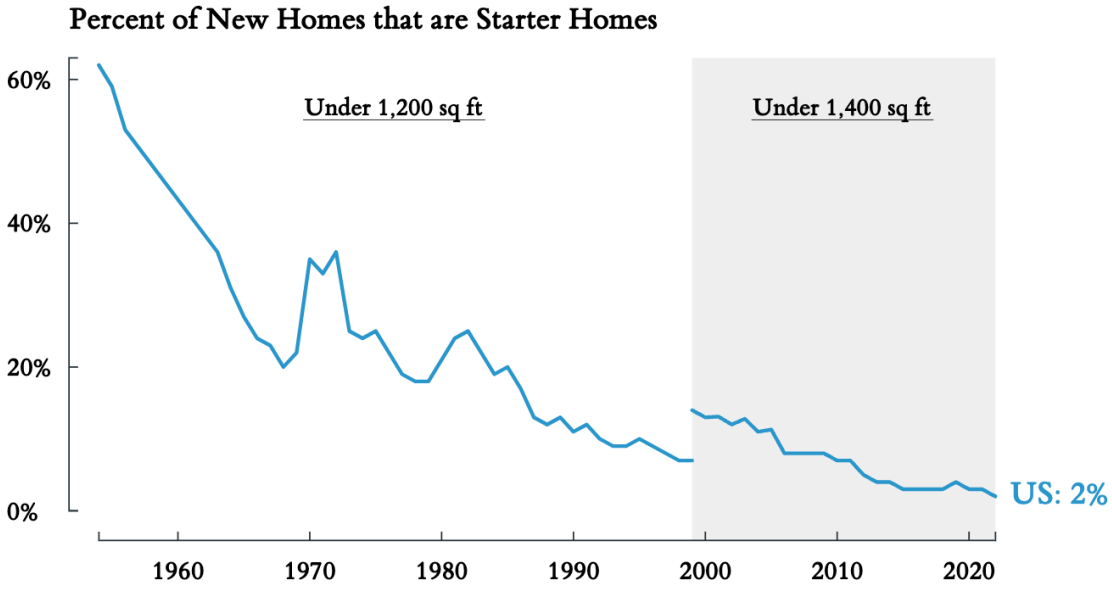

Figure 1.11 - Entry-Level Supply

Notes: This figure shows the share of new single-family homes sold that were under 1,200 or 1,400 square feet of floor area for the US.

Data: Square feet from 1954-1956
Bureau of Labor Statistics, New Housing and its Materials 1940-1956

Square feet from 1963-1977
US Census Bureau, Characteristics of New One-Family Homes

Square feet from 1978-2022
US Census Bureau, Characteristics of New Housing

[23] Badger (2022)

60 percent of new homes were under 1,200 square feet. In 1999, only seven percent of new homes were under 1,200 square feet. In the early 2000s, the US Census Bureau stopped tracking homes under 1,200 square feet; the starter home increased in size to 1,400 square feet. Today, less than two percent of new homes are under 1,400 square feet. This decline is consistent across Census Regions, with the share of new homes that are starter homes peaking in the Midwest at four percent (Figure 1.12).

If entry-level homes are categorized by price, rather than size, the same pat-

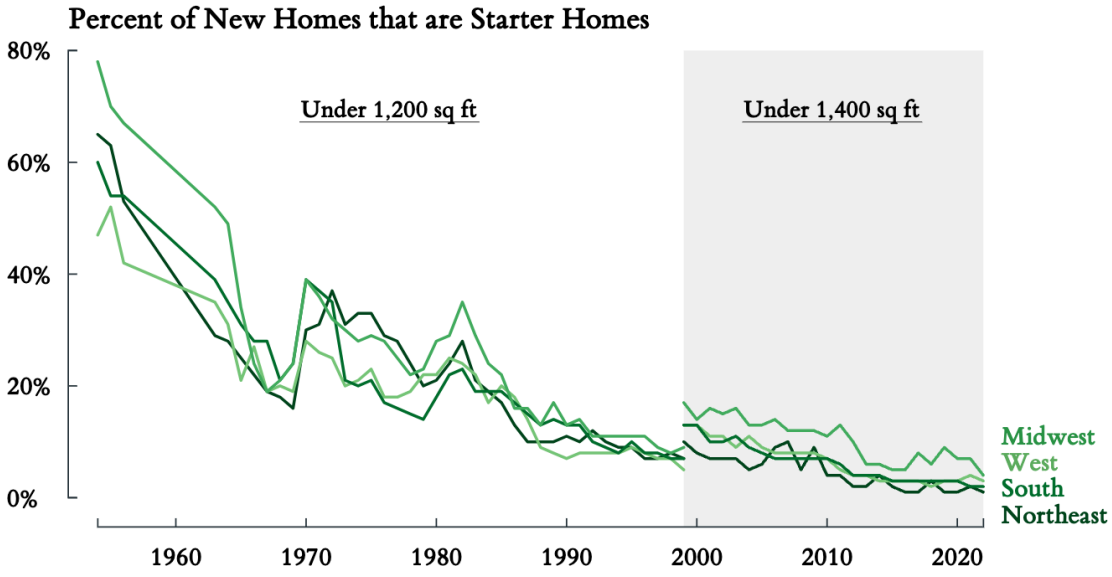

Figure 1.12 - Entry-Level Supply by Census Region

Notes: This figure shows the share of new single-family homes sold that were under 1,200 or 1,400 square feet of floor area by Census Region.

Data: Square feet from 1954-1956
Bureau of Labor Statistics, New Housing and its Materials 1940-1956

Square feet from 1963-1977
US Census Bureau, Characteristics of New One-Family Homes

Square feet from 1973-2022
US Census Bureau, Characteristics of New Housing

terns hold. Figure 1.13 shows the distribution of new single-family homes sold in the US by price. In 2002, 55 percent of new homes sold were under $200,000. In 2022, less than half a percent of new homes sold were under $200,000. If the upper bound for a starter home is pushed up to $300,000, the share of new homes sold that are starter homes drops from 80 percent in 2002 to 9.7 percent in 2022.

Meanwhile, the median asking rent nationwide in 2022 was $1,322,[24] while affordable rent for the median renter would have been $600 (Joint Center for Housing Studies of Harvard University 2022a). By any measure, there is a growing dearth of affordable, entry-level homes. The housing shortage is concentrated at the low end; its impact is disproportionately felt by the low-income renters and homeowners hoping to buy small, economical homes.

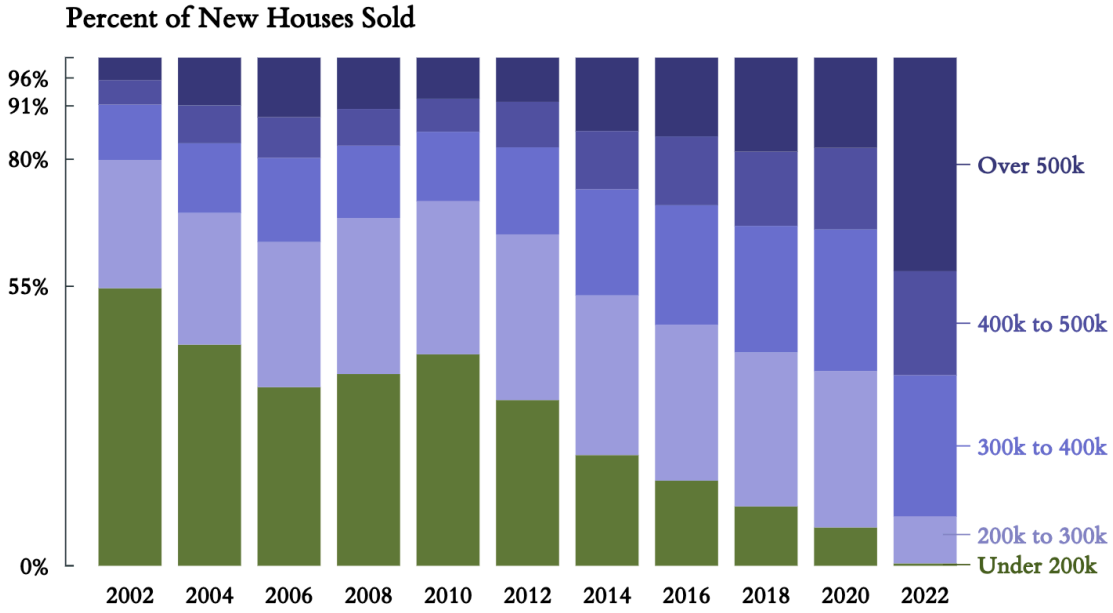

Figure 1.13 - New Home Sales by Price

Notes: This figure shows the share of new single-family homes sold by price in the US.

Data: US Census Bureau, New Residential Sales

[24] Housing Vacancy Survey data from the US Census Bureau

1.3 The Affordability Crisis

For most of the 20th century, the US has promoted homeownership as a policy goal, through subsidized borrowing and significant tax perks. Homeownership is the primary means of wealth-building for American households: home equity is the principal source of savings, and there is little evidence of another comparably effective savings strategy, particularly for low-to-moderate income households (Goodman and Mayer 2018). But the people who are priced out of homeownership are not receiving these benefits, which overwhelmingly accrue to the wealthy, and further inflate house prices. As shown in Figure 1.14, the median home price-to-income ratio is at an all-time high.

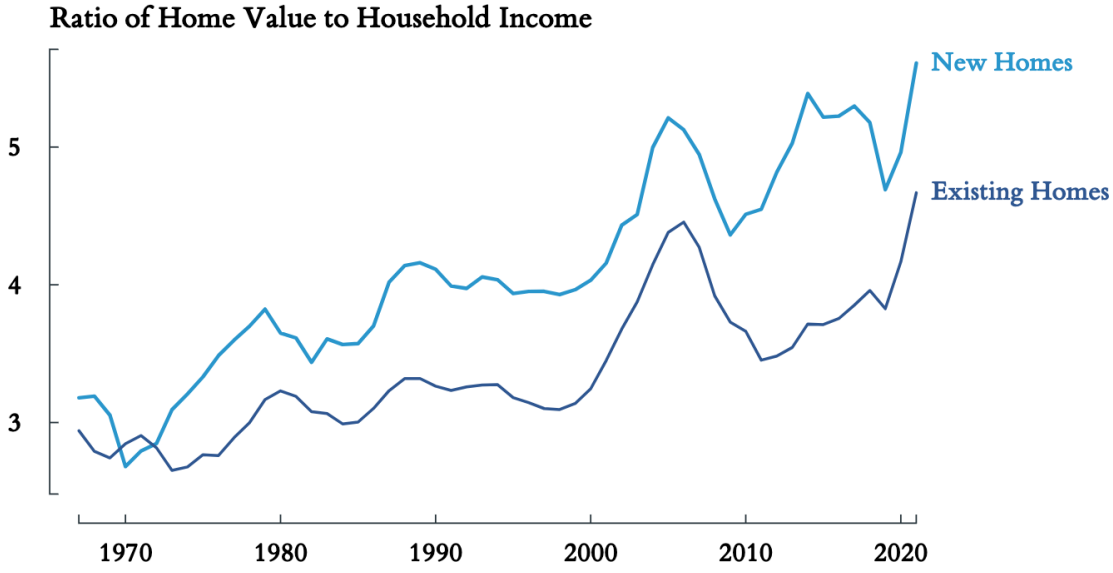

Figure 1.14 - Median Home Price-to-Income Ratio

Notes: This figure shows the ratio of the median home price to the median household income in the US.

Data: US Census Bureau, Income in the United States

US Census Bureau, New Residential Sales

Existing home prices from DQYDJ

Certain policies like the mortgage interest deduction are not just regressive, they are what Layton (2022) calls "doubly" regressive: higher-income families have higher-priced homes and larger interest payments to deduct - and they also have a higher marginal tax rate. In 2018, taxpayers earning under $50,000 per year received under one percent of the mortgage interest deduction tax benefits, while taxpayers earning over $200,000 received 60 percent (Joint Committee on Taxation 2018).

"America's national housing policy gives affluent homeowners large benefits; middle-class homeowners, smaller benefits; and most renters, who are disproportionately poor, nothing," Desmond (2017) writes. "It is difficult to think of another social policy that more successfully multiplies America's inequality in such a sweeping fashion." Substantial financial advantages are offered to those who least need them, while the most vulnerable citizens are left behind.

The US Department of Housing and Urban Development (HUD) defines affordable housing as housing for which the occupant is paying no more than 30 percent of gross income for housing costs, including utilities,[25] and cost burdened households as those who pay more than 30 percent for housing - and hence may have difficulty affording basic needs like food, clothing, healthcare, and transportation. Households paying more than half of their household income for housing are considered severely cost burdened.

In 2020, an estimated 30 percent of households nationwide were cost burdened, and 14 percent were severely burdened (Joint Center for Housing Studies of Harvard University 2022b). Those shares increase on filtering down to low-income households. As illustrated in Figure 1.15, more than half of households with incomes under $30,000 had severe cost burdens - they spent more than half of their incomes on housing - and more than 70 percent spent more than 30 percent. In other words, less than 30 percent of low-income households had affordable housing.

The shares for renter households, alone, are also disproportionately high: in 2020, nearly half of renters had cost burdens. In the 1960s, less than a quarter of renters had cost burdens (Joint Center for Housing Studies of Harvard University 2011). The share of renters with affordability problems has doubled.

[25]The maximum affordable rent for federally subsidized housing was set at 20 percent of income in the 1940s, and rose to 25 percent of income in 1969, and 30 percent of income in 1981. Housing affordability today is still measured against this 30 percent threshold, though it is widely acknowledged that at the lowest income levels, paying 30 percent of income for housing may not leave enough to pay for life's other basic needs (Herbert, Hermann, and McCue 2018).

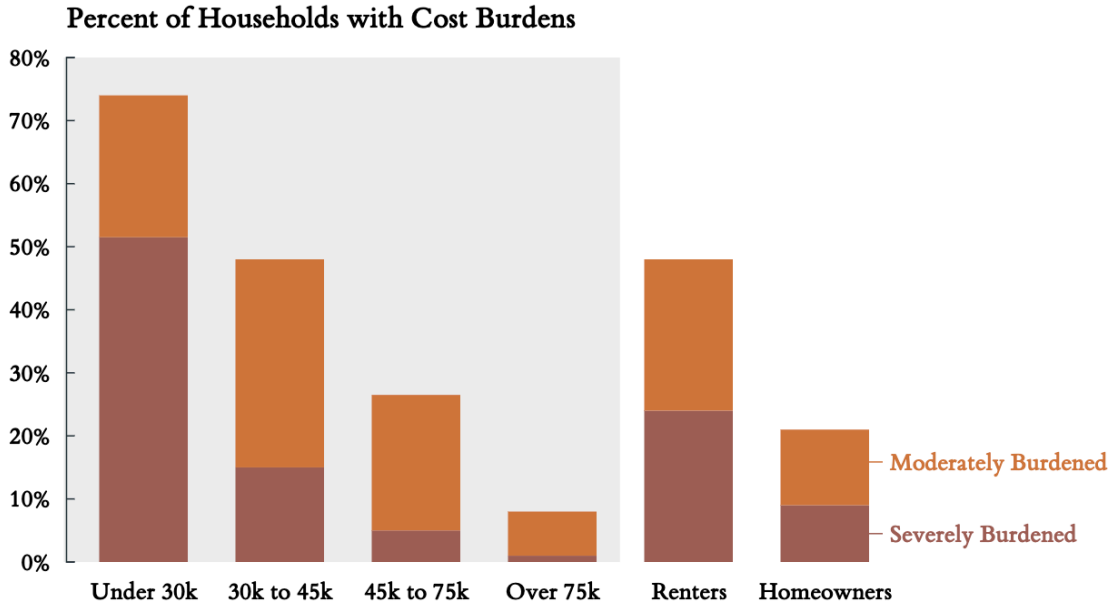

Figure 1.15 - Households with Cost Burdens

Notes: This figure shows the share of households in the US with cost burdens by household income and tenure, where households that are severely burdened spend more than 50 percent of their incomes on housing, and households that are moderately burdened spend more than 30 percent of their incomes on housing.

Data: Joint Center for Housing Studies of Harvard University (2022b) tabulations
US Census Bureau, 2020 American Community Survey Estimates

Any sustainable initiative to increase the homeownership rate in the US, and hence to widen access to the subsidized borrowing and tax perks granted to homeowners, will have to target these households - renters who are positioned to become homeowners - and match them with available and affordable entry-level homes. As the number of starter homes for sale dwindles, and housing becomes increasingly expensive, the share of renters who can afford to save enough for a potential down payment shrinks. New affordable homes are needed not just for new households, but to help clear the pileup of unmet demand from years of underbuilding.

1.3.1 The Old Starter Home

For nearly a century, homes built in factories have provided a low-cost alternative to conventional site-built construction in the US. See Figure 1.16 for an example of a manufactured home - the official term for any home built to the HUD-administered Manufactured Home Construction and Safety Standards, established in 1976 (and the successor to the mobile home and, before that, the trailer).

In the 1970s, one out of every two new homes in the US was built in a factory. Given the significant time and cost savings facilitated by factory production - the economies of scale, quality control, and more efficient use of resources and labor than traditional on-site construction methods - the share of new homes that were built in factories, rather than constructed entirely on site, was expected to increase (The New York Times 1972). But today, less than 10 percent of new homes are built in factories. This dramatic drop - from 50 percent to 10 percent - is limited to the US. In other countries, for example, Germany and Japan, growth in prefabricated construction has outpaced the growth of the overall housing market. In Finland, about 70 percent of new detached homes are prefabricated (Yle News 2019). In Sweden, more than 80 percent of the country's overall housing

Figure 1.16 - This is a Manufactured Home. Photo: Alabama.gov

market has prefabricated elements (Koones 2019).

Figure 1.17 compares the average square feet of floor area, and the average price per square foot, for new manufactured homes and new site-built, single-family homes in the US. As the top panel makes clear, manufactured homes are much smaller than site-built homes: approximately half the size. (The average manufactured home is 1,450 square feet; the average site-built, single-family home is 2,559 square feet.) This is not surprising, as manufactured home builders' greatest cost advantage over stick builders is in producing small homes. Schmitz (2020b) explains, "Not only can factory production methods produce houses at a fraction of the cost per square foot of traditional methods, factory methods are also able to 'go small.' That is, factory methods are able to economically produce homes of small sizes. What matters for the profitability of a factory in producing homes is the extent of capacity utilization, not the size of house. In contrast, with traditional methods, making houses one-at-a-time, the 'profitability' of the method requires that houses be above some size."

And as the bottom panel confirms, manufactured homes are indeed much less expensive than site-built homes: approximately half the price per square foot. (The average manufactured home costs $87.8 per square foot; the average site-built, single-family home - excluding land - costs $168.4 per square foot.)[26]

It follows that any change in the share or number of new homes that are manufactured has a disproportionate affect on the supply of affordable housing, and on low-income homeowners - the homeowners who would be buying these small, relatively affordable, entry-level homes.

Table 1.1 shows that while the majority of new homeowners in the US purchase single-family homes - over 81 percent across income levels in 2021 - the share of low-income buyers who do so is much lower than other buyers, primarily because a greater share of low-income buyers purchase manufactured homes. From 2015 through 2021, around 14 percent of low-income homeowners purchased manufactured homes, according to American Housing Survey (AHS) estimates. Only around seven percent of middle-income homeowners, and two percent of high-income homeowners, purchased manufactured homes. In 1997, more than 28 percent of new, low-income homeowners purchased manufactured homes, compared with 15 percent of middle-income and five percent of high-income buyers (Retsinas, Belsky, and University 2002).[27]

[26]The average manufactured home sells for $127,300; the average site-built, single-family home has a derived structure price, excluding land, of $430,808.

[27]In the South, in 1997, a full 40 percent of low-income buyers bought manufactured homes.

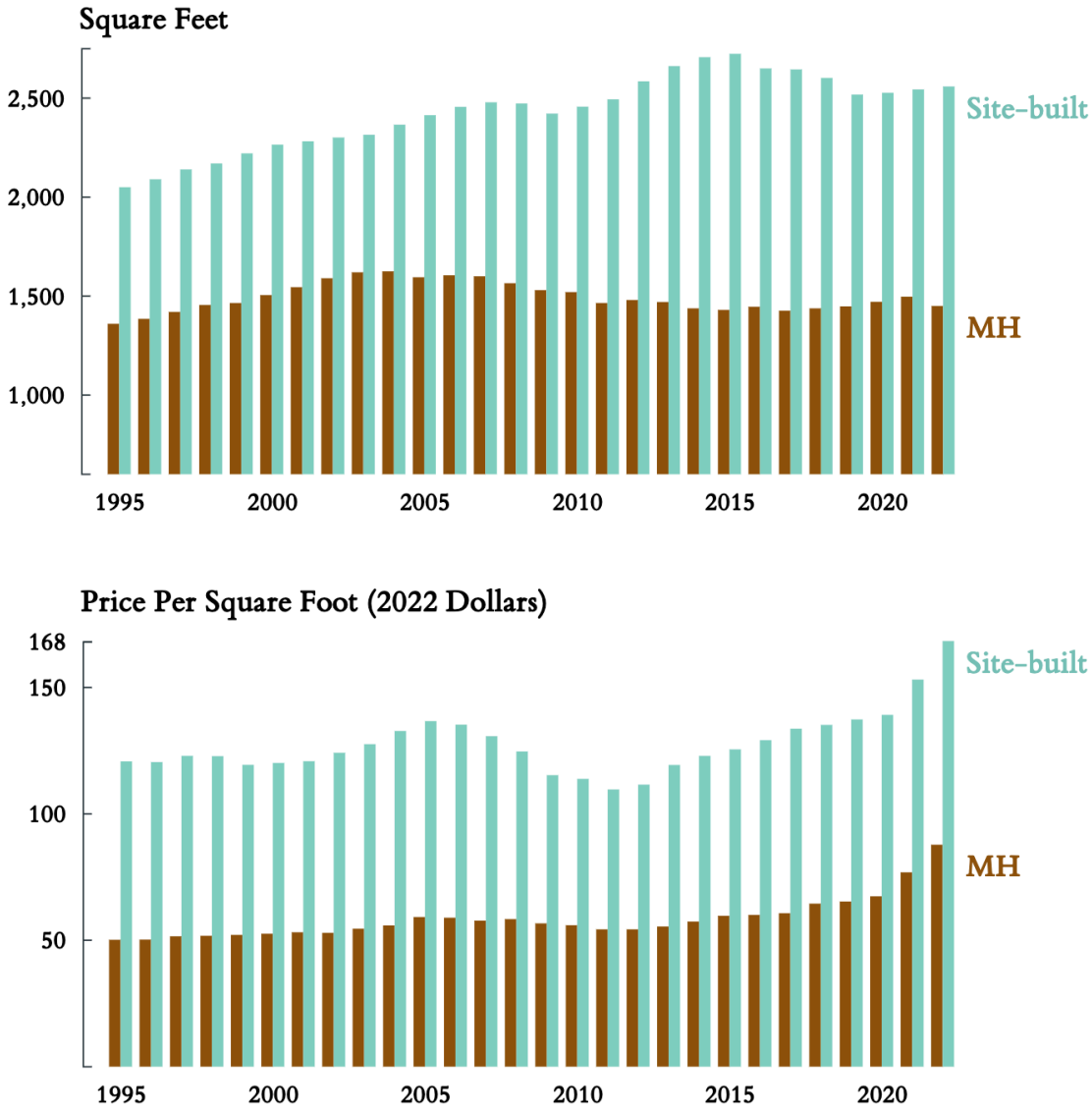

Figure 1.17 - Average Size and Price of New Housing

Notes: The top panel of this figure compares the average square feet of floor area for new manufactured homes and new site-built single-family homes. The bottom panel compares the average price per square foot of floor area.

Data: Manufactured Housing Survey, Cost and Size Comparison
US Census Bureau and US Department of Housing and Urban Development

Table 1.1
Housing Type by Income Class

	Single-family	Multi-family	Manufactured	Weighted sample	
	%	%	%	*n*	%
2021					
Low	82.0	4.7	13.3	18,573,994	22.5
Medium	89.7	3.5	6.8	22,786,681	27.6
High	93.2	4.5	2.3	41,115,511	49.9
2019					
Low	80.2	5.1	14.7	17,689,053	22.3
Medium	88.7	4.1	7.2	22,242,767	28.0
High	93.3	4.5	2.2	39,466,711	49.7
2017					
Low	81.7	4.9	13.4	17,898,877	23.1
Medium	88.2	3.8	8.0	22,393,625	28.9
High	93.4	4.5	2.1	37,184,928	48.0
2015					
Low	80.3	4.5	15.3	17,546,219	23.6
Medium	88.3	3.8	7.9	21,449,064	28.9
High	92.9	4.7	2.4	35,219,302	47.5

Notes: This table shows the estimated percent of homeowners who purchased each category of housing from 2015 through 2021. Low-income households earned under 200 percent of the federal poverty threshold. Middle-income households earned 201 to 400 percent of the federal poverty threshold. High-income households earned over 400 percent of the federal poverty threshold.

Data: US Census Bureau, American Housing Survey (AHS) estimates

Moreover, AHS estimates from 2015 through 2021 confirm that manufactured housing is, on average, more affordable for its residents than site-built housing, regardless of income class and tenure. Table 1.2 shows the estimated mean ratio of total housing costs to total household income for homeowners who purchased each category of housing. Without exception - across all AHS years, and for low-income, medium-income, and high-income households - manufactured housing is the most affordable option. In 2021, low-income manufactured home owners spent an estimated 33 percent of their income on housing, versus 39 percent for homeowners in single-family homes, and 45.6 percent for homeowners in condominiums. Table 1.3 shows the percent of homeowners with affordable housing - here defined as housing that costs under 30 percent of household income. Once again, without exception, manufactured housing is the most affordable option. In 2021, 54.4 percent of low-income manufactured home owners had affordable housing. Only 42.5 percent of low-income single-family home owners, and 28.4 percent of low-income condominium owners, had affordable housing.

Renters across housing categories spend a greater share of their income on housing, but as is evident in Tables 1.4 and 1.5, manufactured housing is the most affordable option for renters, as well. Table 1.4 shows that in 2021, renters in manufactured homes spent an estimated 42 percent of their household income on housing, versus 47.5 percent for renters in single-family homes, and 45.7 percent for renters in apartments or condominiums. Table 1.5 shows that in 2021, 30.6 percent of low-income manufactured home renters had affordable housing. Only 22.9 percent of low-income renters in single-family homes, and 26 percent of low-income renters in apartments or condominiums, had affordable housing.

Manufactured homes, and manufactured home builders, appear best positioned to meet demand at the low end. And as is evident in Figures 1.9 through 1.13, the construction shortfall today is concentrated at the low end - in entry-level homes, like manufactured homes, that the typical first-time home buyer would be considering.

While land cost is still a limiting factor here - sustainable affordable housing in many areas will require denser housing, not just cheaper construction - small homes require less land. The disappearance of factory-built housing in the US is a mystery. Despite the enormous emphasis on low-income, first-time homebuyers, and on policy efforts focused on opening mortgage markets for these buyers, thus far there has been little academic work in either economics or finance about the industry.

Table 1.2
Mean Ratio of Housing Costs to Income by Income Class for Owners

	Single-family	Multi-family	Manufactured	Weighted sample	
	%	%	%	*n*	%
2021					
Low	39.0	45.6	33.0	13,714,927	17.8
Medium	24.7	30.6	17.3	22,426,684	29.1
High	15.9	19.3	11.6	40,907,934	53.1
2019					
Low	38.6	45.6	30.4	13,380,818	17.9
Medium	24.4	30.9	17.2	22,017,878	29.5
High	16.0	19.6	10.5	39,310,279	52.6
2017					
Low	37.5	43.7	33.0	13,655,020	18.7
Medium	24.5	30.3	17.7	22,145,202	30.4
High	15.8	19.5	10.6	37,048,373	50.9
2015					
Low	38.6	43.6	30.9	13,585,555	19.4
Medium	25.0	29.2	17.3	21,249,137	30.4
High	16.5	19.3	10.7	35,065,706	50.2

Notes: This table shows the estimated mean ratio of total housing costs to total household income of homeowners who purchased each category of housing from 2015 through 2021. Low-income households earned under 200 percent of the federal poverty threshold. Middle-income households earned 201 to 400 percent of the federal poverty threshold. High-income households earned over 400 percent of the federal poverty threshold.

Data: US Census Bureau, American Housing Survey (AHS) estimates

Table 1.3
Share of Owners with Affordable Housing by Income Class

	Single-family	Multi-family	Manufactured	Weighted sample	
	%	%	%	*n*	%
2021					
Low	42.5	28.4	54.2	13,714,927	17.8
Medium	72.4	59.9	86.4	22,426,684	29.1
High	91.9	85.3	96.5	40,907,934	53.1
2019					
Low	42.9	28.2	60.7	13,380,818	17.9
Medium	73.1	55.9	87.3	22,017,878	29.5
High	91.4	82.3	96.9	39,310,279	52.6
2017					
Low	44.8	34.4	52.0	13,655,020	18.7
Medium	72.5	58.4	86.4	22,145,202	30.4
High	91.7	83.9	97.6	37,048,373	50.9
2015					
Low	42.9	29.6	58.7	13,585,555	19.4
Medium	71.6	61.0	89.2	21,249,137	30.4
High	90.9	86.0	97.2	35,065,706	50.2

Notes: This table shows the percent of homeowners for each category of housing with total housing costs under 30 percent of their total household income from 2015 through 2021. Low-income households earned under 200 percent of the federal poverty threshold. Middle-income households earned 201 to 400 percent of the federal poverty threshold. High-income households earned over 400 percent of the federal poverty threshold.

Data: US Census Bureau, American Housing Survey (AHS) estimates

Table 1.4
Ratio of Housing Costs to Income by Income Class for Renters

	Single-family	Multi-family	Manufactured	Weighted sample	
	%	%	%	*n*	%
2021					
Low	47.5	45.7	42.0	14,150,100	37.6
Medium	28.9	31.9	23.4	12,615,215	33.5
High	19.8	21.0	14.1	10,895,751	28.9
2019					
Low	45.3	44.3	41.0	14,258,356	38.8
Medium	28.2	29.6	21.4	11,825,717	32.2
High	19.9	20.2	11.2	10,689,355	29.1
2017					
Low	46.1	44.1	41.4	15,438,928	42.3
Medium	27.6	28.9	20.3	11,556,025	31.6
High	19.2	19.3	13.6	9,521,738	26.1
2015					
Low	46.0	44.1	41.8	16,318,240	45.1
Medium	28.0	28.4	20.0	10,994,244	30.4
High	19.1	19.7	11.5	8,897,297	24.6

Notes: This table shows the estimated mean ratio of total housing costs to total household income of renters living in each category of housing from 2015 through 2021. Low-income households earned under 200 percent of the federal poverty threshold. Middle-income households earned 201 to 400 percent of the federal poverty threshold. High-income households earned over 400 percent of the federal poverty threshold.

Data: US Census Bureau, American Housing Survey (AHS) estimates

Table 1.5
Share of Renters with Affordable Housing by Income Class

	Single-family	Multi-family	Manufactured	Weighted sample	
	%	%	%	*n*	%
2021					
Low	22.9	26.0	30.6	14,150,100	37.6
Medium	62.5	51.5	77.5	12,615,215	33.5
High	87.2	85.2	100.0	10,895,751	28.9
2019					
Low	26.3	26.1	35.4	14,258,356	38.8
Medium	64.1	58.5	84.1	11,825,717	32.2
High	86.6	86.5	100.0	10,689,355	29.1
2017					
Low	24.4	27.5	33.3	15,438,928	42.3
Medium	67.5	60.7	86.7	11,556,025	31.6
High	86.2	88.3	94.0	9,521,738	26.1
2015					
Low	24.0	26.8	33.9	16,318,240	45.1
Medium	66.3	63.5	89.7	10,994,244	30.4
High	88.3	87.7	100.0	8,897,297	24.6

Notes: This table shows the percent of renters in each category of housing with total housing costs under 30 percent of their total household income from 2015 through 2021. Low-income households earned under 200 percent of the federal poverty threshold. Middle-income households earned 201 to 400 percent of the federal poverty threshold. High-income households earned over 400 percent of the federal poverty threshold.

Data: US Census Bureau, American Housing Survey (AHS) estimates

1.4 Manufactured Homes

1.4.1 The Origin of the Manufactured Home

American cities in the 1920s were loud and dirty; upper class families would travel by train to the country to escape the soot, smoke, and horse manure, while the less fortunate stayed behind. As cars became increasingly available, more American families could enjoy weekend and vacation trips - but hotels in destination areas were still either prohibitively expensive, or nonexistent.

In 1929, Arthur G. Sherman, the president of a pharmaceutical manufacturing company in Detroit who wanted to take his wife and five children on vacation, built his family a camping unit that would be both more comfortable and easier to manage than a canvas tent. When this travel trailer turned out well - "the edifice aroused interest wherever it went" (Fortune 1937) - Sherman began building travel trailers via assembly line production in a factory.[28] By 1937, around 400 companies were building trailers. Trailer coach manufacturing was the fastest growing industry in the US. Trailers at this point in time were a luxury for the average family - a family that already had a car, and money enough to travel. Sherman told Fortune (1937): "What we're mostly trying to sell is a vacation." As the travel trailer became more popular, small towns on major highways boosted tourism by developing fee-based municipal campgrounds: trailer courts.

Then came the Great Depression. The ensuing financial hardship, wave of foreclosures, and lack of new construction pushed large segments of the population into trailers full-time: "Eating, sleeping, fighting, loving - all of the ordinary and extraordinary items of ordinary life that take place in the home, the pioneers discovered, could be done quite satisfactorily in a trailer. And surprisingly cheaply, too" (Fortune 1937). Economist Roger W. Babson estimated in *Travel Trailer Magazine* that within 30 years, half the population of the US would live year-round in trailers (Babson 1936). Trailer courts became trailer parks, and exclusionary zon-

[28] Sherman is credited with the first factory production of the trailer, though Fortune (1937) claims: "Nobody knows who built the first trailer. The idea seems to have been born in England, where it is recorded, the first motor caravan was built around 1909. In all events, quite a few of these caravans were ambling around rural England soon after the close of the War. Glenn Curtiss, the aeronautical engineer, appears to have built the first one in the US in 1917. Through the early 1920s various bodybuilders toyed with the idea: Bender Body Co. sold a luxurious house body mounted on a bus chassis. But the Ford of what is now called the trailer industry turned out to be a stubborn, middle-aged bacteriologist with a gray cowlick ... Arthur G. Sherman."

ing efforts began. The principal concern, back then, was the potential impact on the housing sector - that the decline in housing demand from permanent trailer residence would lead to a reduction in property values, and hence a reduction in property tax revenue.

These exclusionary efforts were relaxed during World War II. Trailers filled the functional need for housing near war-production plants, as Americans migrated to defense areas. The federal government purchased 1.6 million homes, 200,000 of them prefabricated, and built 8,550 trailer park pads (Wallis 1989). Private sales of trailers were prohibited by executive order. The government expected that after the war, these government trailers would be scrapped - to avoid wartime housing becoming ghost towns or slums - but instead a majority morphed into permanent housing for returning veterans on college campuses. According to Wallis (1989), 90 percent of trailers during the war and through the early 1950s were used for permanent housing. Before the war, 90 percent of trailers were used for vacationing.

Then came a period of incredible growth. As inflation in the 1960s pushed conventional housing costs up, and priced conventional homes out of the moderate income bracket, production increased by 500 percent. The trailer became the mobile home. State highway regulations that limited the size of homes being transported were relaxed, and mobile homes grew accordingly in size - from the industry standard 8 feet wide to 10 feet wide, then 12 feet wide, then 14 feet wide. Transportation costs also grew accordingly in size, so production decentralized; a plethora of manufacturing plants were built near areas where manufacturers expected homes to be placed.

By 1970, mobile homes were included in government housing production counts. Mobile homes constituted 50 percent of single-family housing starts. Figure 1.18 shows the share of new single-family homes in the US built in factories.

Tight monetary policy, and an increase in unemployment during the 1970s, led to a surge of delinquencies and repossessions as blue-collar workers were unable to maintain loan payments on their homes. The sudden demand drop, in a production system much more vulnerable to changes in demand than site-built housing, caused many manufacturers to file for bankruptcy. The HUD Code was adopted in 1976, and in 1980, the mobile home became the manufactured home.

In the 1990s, the market boomed again as credit standards for manufactured home loans weakened. As a dealer in Louisiana told Grissim (2006), "If you could make an X you could get a loan." The industry became increasingly consolidated,

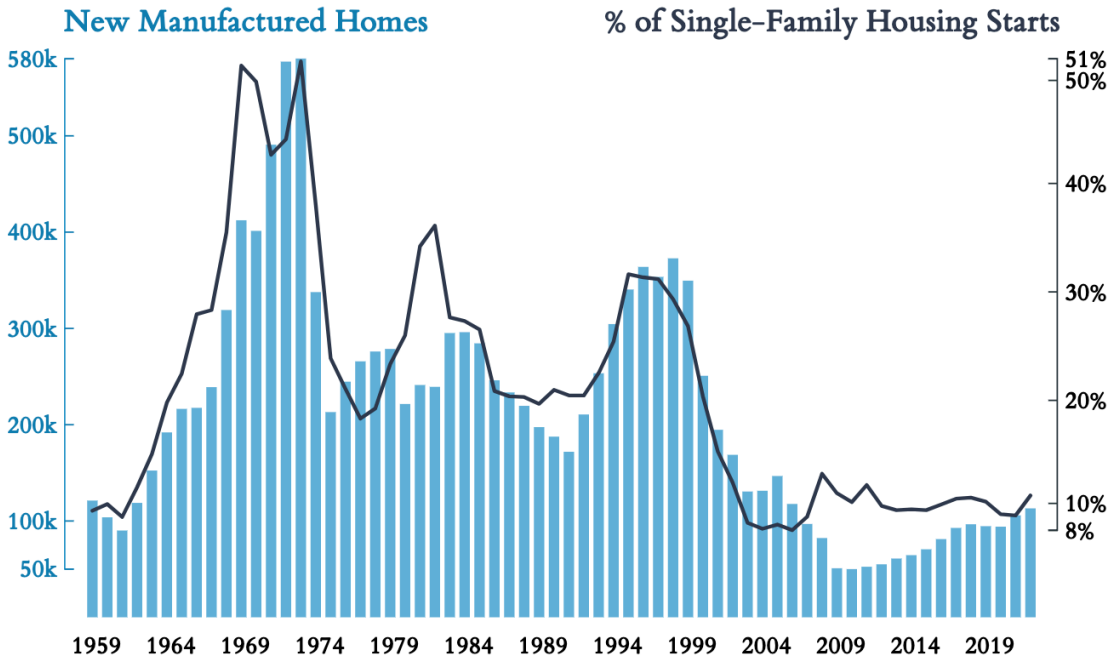

FIGURE 1.18 - MANUFACTURED HOMES AND HOUSING STARTS

Notes: This figure shows total shipments of new manufactured homes from monthly production reports (Form HUD-302) in blue, on the left, and the manufactured housing share of single-family housing starts in black, on the right. Start occurs when excavation begins for the footings or foundation of a building.

Data: US Census Bureau and US Department of Housing and Urban Development Manufactured Housing Survey; New Residential Construction

both horizontally and vertically - the top three manufacturers[29] commanded 50 percent of the industry, and the largest manufacturers began integrating into distribution - leading to increased production through economies of scale.

By the late 1990s, the industry was producing more homes than the market demanded, and the lax lending standards led to a spike in defaults. Many buyers found themselves in homes they could not afford, especially as interest rates began

[29] Clayton Homes, Fleetwood Homes, and Oakwood Homes

to rise. The repossession rate rose to 27 percent (Grissim 2006). The FHA Title I portfolio had default rates between 30 and 54 percent on manufactured home loans originated between 1995 and 2002 (Consumer Financial Protection Bureau 2014). Lenders became cautious, making it harder for potential buyers to secure financing for manufactured homes, further depressing sales. The largest manufactured home lenders began to exit the market. In 2002, one of the largest manufactured home lenders, Green Point Financial, liquidated its portfolio. Months later, Conseco Finance - the largest lender with 54 percent of manufactured home loan originations in 2000 - filed for bankruptcy. From 1999 through 2004, the industry saw a 65 percent contraction (Grissim 2006).

By 2006, the industry, and the players still remaining in it, seem to have settled. But the manufactured housing share of single-family housing starts has stagnated at around ten percent for the two decades since.

1.4.2 It Might be Stigma, but it's not Quality

Americans have historically been quick to judge homes built in factories. A *Fortune Magazine* story from 1937 on the nascent industry refers to trailer parks as "itinerant flophouses,"[30] and the term "trailer trash" - in reference to people living in factory-built homes - dates back to at least 1952 (Martin 1952). There is a perception that manufactured homes are structurally flimsy (Sutter and Poitras 2010), and that mere proximity to a manufactured home negatively affects the value of nearby homes (Wubneh and Shen 2004). Manufactured homes are also popularly associated with crime, though McCarty (2010) finds no significant difference in crime rates between blocks with manufactured home communities, and other blocks. These longstanding stereotypes persist, even while modern manufactured homes adhere to strict building codes, and manufactured home residents rate their structures and neighborhoods favorably.

T. Boehm and Schlottmann (2004) found that from 1993 through 2001, manufactured housing consistently scored higher in average quality rankings for low-income households, both in terms of neighborhood and structural aspects, than rental units.[31] This was true for both metropolitan and non-metropolitan areas

[30]The author adds that "certain minimum standards of living and sanitation conditions in trailer camps [are] a really pressing problem, since an epidemic couldn't get off to a more blazing start than in some of these crowded rookeries" (Fortune 1937).

[31]It is understandable that homeowners are more satisfied with their housing choices than renters,

- regardless of location. Moreover, the authors found no evidence that manufactured homes deteriorated more quickly than site-built homes. In Tables 1.6 through 1.9, I repeat their analysis using more recent American Housing Survey (AHS) data from 2015 through 2021 for households with income below 200 percent of the federal poverty threshold.

In every AHS year since 2015, low-income households asked to rank the quality of their homes and their neighborhoods on an ordinal scale from one to 10, with 10 being the best, ranked manufactured housing above rental housing. In 2021, manufactured housing received a 7.79; rental housing received a 7.64. This was true even with the rental subset limited to households renting single-family homes (7.77 in 2021). Households living in manufactured homes did tend to categorize their housing as "inadequate" more often than households living in site-built homes, but across all time periods, the percent of households in manufactured homes that considered their housing inadequate was under 3.2 percent. Moreover, households in manufactured homes were consistently less likely than households in site-built housing - single-family homes and multi-family site-built housing - to agree that their neighborhoods had a lot of serious crime.

Households that owned both a manufactured home and the underlying land ranked their homes and neighborhoods even higher. In every AHS year since 2015, manufactured home-and-land owners' rankings of their homes and neighborhoods were either comparable to or higher than the rankings of households in single-family homes. Recall from Tables 1.2 through 1.5 that over the same time period, and regardless of income or tenure type, manufactured housing was also the most affordable option. At least based on the opinions of households living in manufactured homes, buying a manufactured home appears to be a good deal.

One common refrain is that manufactured homes depreciate "just like cars." But the myriad factors that contribute to the rapid depreciation of cars - around 20 percent in the first year alone[32] - are absent in manufactured housing. Car manufacturers release new and updated models every year. As technology advances, the older models decline in value - depreciation that is compounded by technological obsolescence, differential maintenance expenditures, and fuel efficiencies between models (Purohit 1992, M. D. Pratt and Hoffer 1990). Unlike the car industry, the manufactured home industry does not have a standardized annual release cycle. A new model might be released to comply with new regulatory changes, or

as homeowners carried out a more intensive search, and renters might choose to spend less on housing in order to save for a down payment.

[32] Kelly Blue Book, How to Beat Car Depreciation

TABLE 1.6
2021 QUALITY OF HOUSING BY TENURE FOR LOW-INCOME HOUSEHOLDS

	Housing	Neighborhood	Inadequate (%)	Crime (%)
Single-family	8.41	8.32	2.2	9.4
Owned	8.7	8.54	1.7	6.9
Rented	7.77	7.84	2.5	15.4
Manufactured	7.79	8.04	3.8	5.8
Land Owned	8.16	8.4	3.3	4.7
Owned	7.79	7.79	3.5	6.4
Rented	7.21	7.73	4.0	8.0
Multi-family	7.65	7.67	3.1	15.3
Owned	8.34	8.19	2.8	6.8
Rented	7.6	7.64	3.1	15.9
Owned	8.59	8.47	2.0	6.7
Rented	7.64	7.7	3.0	15.4

Notes: This table shows quality of housing measures from the 2021 AHS by type of structure and tenure for households with income below 200 percent of the federal poverty threshold. In Columns 1 and 2, Housing and Neighborhood are ranked using an ordinal scale from one (the worst) to ten (the best). Column 3 shows the estimated percent of households that categorized their housing as severely inadequate. Column 4 shows the estimated percent of households that agreed with the statement "This neighborhood has a lot of serious crime."

Data: US Census Bureau, American Housing Survey (AHS) estimates

TABLE 1.7
2019 QUALITY OF HOUSING BY TENURE FOR LOW-INCOME HOUSEHOLDS

	Housing	Neighborhood	Inadequate (%)	Crime (%)
Single-family	8.37	8.32	1.9	8.1
Owned	8.63	8.49	1.6	6.6
Rented	7.75	7.93	2.5	11.3
Manufactured	7.78	8.01	2.5	6.3
Land Owned	8.23	8.43	1.6	4.4
Owned	7.66	7.83	3.3	7.6
Rented	7.18	7.4	3.2	7.9
Multi-family	7.68	7.66	2.3	13.7
Owned	8.62	8.45	1.5	7.7
Rented	7.62	7.61	2.4	14.1
Owned	8.53	8.44	1.7	6.5
Rented	7.64	7.69	2.4	13.0

Notes: This table shows quality of housing measures from the 2019 AHS by type of structure and tenure for households with income below 200 percent of the federal poverty threshold. In Columns 1 and 2, Housing and Neighborhood are ranked using an ordinal scale from one (the worst) to ten (the best). Column 3 shows the estimated percent of households that categorized their housing as severely inadequate. Column 4 shows the estimated percent of households that agreed with the statement "This neighborhood has a lot of serious crime."

Data: US Census Bureau, American Housing Survey (AHS) estimates

TABLE 1.8
2017 QUALITY OF HOUSING BY TENURE FOR LOW-INCOME HOUSEHOLDS

	Housing	Neighborhood	Inadequate (%)	Crime (%)
Single-family	8.28	8.23	1.7	8.8
Owned	8.6	8.45	1.2	6.5
Rented	7.65	7.74	2.4	13.6
Manufactured	7.76	7.97	3.2	7.5
Land Owned	8.06	8.27	1.2	6.5
Owned	7.84	7.95	3.9	6.1
Rented	7.24	7.52	5.4	10.7
Multi-family	7.68	7.66	2.6	14.0
Owned	8.31	8.11	0.6	9.0
Rented	7.64	7.63	2.6	14.2
Owned	8.49	8.39	1.4	6.5
Rented	7.62	7.67	2.7	13.8

Notes: This table shows quality of housing measures from the 2017 AHS by type of structure and tenure for households with income below 200 percent of the federal poverty threshold. In Columns 1 and 2, Housing and Neighborhood are ranked using an ordinal scale from one (the worst) to ten (the best). Column 3 shows the estimated percent of households that categorized their housing as severely inadequate. Column 4 shows the estimated percent of households that agreed with the statement "This neighborhood has a lot of serious crime."

Data: US Census Bureau, American Housing Survey (AHS) estimates

TABLE 1.9
2015 QUALITY OF HOUSING BY TENURE FOR LOW-INCOME HOUSEHOLDS

	Housing	Neighborhood	Inadequate (%)	Crime (%)
Single-family	8.2	8.14	1.9	9.6
Owned	8.54	8.37	1.9	7.1
Rented	7.56	7.68	1.9	14.1
Manufactured	7.85	7.97	3.3	9.5
Land Owned	8.14	8.17	2.4	10.0
Owned	7.98	8.09	4.8	8.2
Rented	7.32	7.49	2.9	10.4
Multi-family	7.56	7.51	2.8	14.8
Owned	8.31	8.14	1.4	8.3
Rented	7.51	7.47	2.9	15.2
Owned	8.45	8.32	2.1	7.6
Rented	7.52	7.55	2.5	14.6

Notes: This table shows quality of housing measures from the 2015 AHS by type of structure and tenure for households with income below 200 percent of the federal poverty threshold. In Columns 1 and 2, Housing and Neighborhood are ranked using an ordinal scale from one (the worst) to ten (the best). Column 3 shows the estimated percent of households that categorized their housing as severely inadequate. Column 4 shows the estimated percent of households that agreed with the statement "This neighborhood has a lot of serious crime."

Data: US Census Bureau, American Housing Survey (AHS) estimates

if there is a noticeable shift in consumer preferences - such as a demand for more energy-efficient features, or larger kitchens - but there is no fixed schedule, and older homes do not rapidly become obsolete. Cars today are orders of magnitude more complicated than they were 50 years ago; housing looks much the same.

The influx of cars coming off lease also contributes to their rapid depreciation: off-lease cars flood the market, pushing prices down - and off-lease cars tend to depreciate even faster than owner-operated vehicles.[33] This annual supply surge is not present in manufactured housing.

Indeed, a study using American Housing Survey data from 1985 to 1999 found that there was not a statistically significant difference between the average appreciation rate of site-built homes and manufactured homes on owned land (Consumers Union 2003). More recently, researchers at the Federal Housing Finance Agency (FHFA) created repeat-transactions house price indices for manufactured homes that also suggest manufactured homes appreciate much like site-built homes (Federal Housing Finance Agency 2018). From 1995 through 2018, prices rose by around 120 percent for manufactured homes, versus 140 percent for site-built homes. Since land is the key factor pushing up prices of site-built housing, Apgar, Calder, Collins, and Duda (2002) argue that manufactured housing should not increase in value faster than the rate of inflation, unless it is simultaneously owned with land. As in traditional real estate, however, location and quality play a significant role in the appreciation of manufactured homes. Well-maintained homes built with higher-quality materials, and homes in areas with rising property values, are more likely to see appreciation (Consumers Union 2003). Jason Blackburn, former owner of Lonestar Modular Homes and a longtime industry veteran, was quoted recently as saying, "Manufactured housing will last 80 plus years like a site-built home ... the materials used inside the home will dictate its shelf-like" (Rudolph 2023).

1.4.3 It's not Construction Productivity

If conventional home builders are becoming more efficient at converting materials inputs into output, relative to manufactured home builders - if it is getting progressively easier to build homes on site - the decline in factory-built housing might make sense.

[33] This is attributed to moral hazard; the drivers of corporate-owned business fleet or rental vehicles have less incentive to maintain the vehicle, as they do not bear all the costs (Dunham 2003)

Figure 1.19 compares productivity in single-family residential construction with productivity in durable goods manufacturing, with both series normalized to 100 in 1987. Durable goods manufacturing, which includes manufactured home manufacturing, shows a strong upward trend: productivity increased 250 percent. Despite this, and despite the clear growth in aggregate productivity for the US over the same time period, there is no evident trend in residential construction productivity - there is no productivity growth. Goolsbee and Syverson (2023) also note what they call "stunningly bad productivity performance for a major sector": while aggregate labor productivity and total factory productivity were 290 percent and 230 percent higher in 2020 than in 1950, the construction sector's labor productivity and total factor productivity in 2020 had both fallen below their values in 1950. Of course, this lagging productivity in residential construction means that

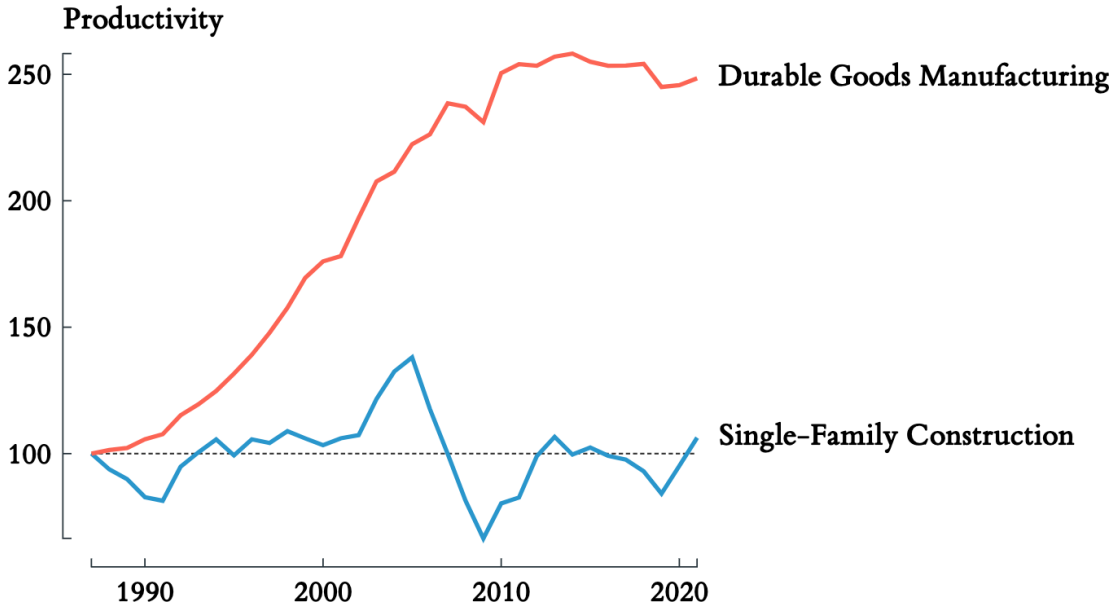

FIGURE 1.19 - PRODUCTIVITY GROWTH IN RESIDENTIAL CONSTRUCTION

Notes: This figure shows productivity in single-family residential construction in blue, versus productivity in durable goods manufacturing in red. Both series are normalized to 100 in 1987.

Data: US Census Bureau, Construction Labor Productivity
US Bureau of Labor Statistics, Productivity and Costs

the price of site-built, single-family homes has increased relative to the price of other goods.

The outsize productivity growth in durable goods manufacturing is understandable. Factory production allows for standardization, which can lead to economies of scale and better quality control; it becomes easier to monitor and maintain consistent conditions, and to identify inefficiencies. By contrast, site-built construction involves custom work that is unpredictable and subject to the whims of nature; delays and quality issues are common. As Gerry McCaughey, CEO of off-site construction company Entreka put it: "You wouldn't want a car dealership to ship your new car in parts to your driveway and have workers come by your house for weeks to put it together."

The decline in the share of new homes that are built in factories cannot be blamed on productivity. There is a potential argument that the efficiency gains from factory production might not scale: that it is relatively cost effective to produce a small home in a factory, but not a two-story home with a basement - and that housing is a mass customization market, not a mass production one. This is fair. But the homes that are "missing" and most in demand in the US today are the small ones: affordable, entry-level homes for the first-time buyer.

1.4.4 It Might Be Building Codes and Land Use Regulations

The national building code that regulates manufactured housing - the 1976 HUD Code, described in more detail in Chapter 3 - is widely believed to be advantageous to the industry, as it supersedes local and state building codes. Satisfying thousands of different local construction codes is easier for the site-built manufacturer, who builds homes one by one, than it is for the manufacturer who builds homes in factories.

Schmitz (2020b) points out, however, that many of the small towns and rural areas where manufactured homes are prevalent have no local building codes. In a report prepared for the National Commission on Urban Problems, Manvel (1968) showed that only 78.3 percent of local governments surveyed had any of the following: a building code, a housing code, a planning board, a zoning ordinance, subdivision regulation, or a local building permit system.[34] In other words, more

[34] 3,104 local governments were surveyed - a cross-section of around 18,000 governments. Nearly all municipalities in metropolitan areas had a local building code.

than 21.7 percent of local governments had no building code. The share of governments with no planning or building regulation activities was even higher - 25 percent - for governments outside metropolitan areas. Manvel (1968) adds: "Housing codes are reported for 85 percent of the municipalities of 50,000-plus, but for only about half those of five to 50 thousand, and for an even lesser proportion of smaller municipalities."

As the HUD Code applies only to manufactured housing, stick-built producers will have the clear advantage in areas with no building code. "It was in these local areas, of course, where the fiercest competition between stick-builders and factory builders took place," Schmitz (2020b) said, in reference to the years before the HUD Code was implemented, "Factory producers would locate to such areas, as [local building codes] were not working against them as they were in other areas."

Schmitz (2020b) also notes that the HUD Code requires manufactured homes to have a permanent chassis, even in those cases where the home is installed on a permanent foundation, whereas before the chassis would often be removed after transport - and that "the absurdity is evident." The presence of a chassis adds to the construction and installation costs of a manufactured home,[35] and allows municipalities with zoning regulations to easily and specifically target the manufactured home for exclusion. Because while the HUD Code eliminated the uncertainties and costs of constructing homes to unique state-level standards, it did not address the other regulatory barriers - like architectural design standards, and zoning ordinances and regulations - that govern the placement and installation of manufactured homes.

Zoning in the US is primarily a local government issue[36]; most municipalities have zoning ordinances to guide and restrict development within their borders. Land is separated into zoning districts - which usually fall into broader categories like residential, commercial, and industrial zones - and within each zone, rules dictate measures like density and height. Zoning requirements might limit the locations where manufactured housing is allowed, for example, a zoning restriction that prohibits manufactured homes in single-family zoning districts. Zoning can either apply without administrative or legislative review, as in the just-noted example, or require a discretionary review process.

Manufactured homes can be placed on owned land, or on land a homeowner

[35] Basements, for example, must be dug deeper.

[36] Only a few states have statutory zoning requirements, and those requirements are modest (Mandelker 2023).

rents in a manufactured home community. Figure 1.20 shows the location of new manufactured homes sold and placed for residential use in the US since 1981. In 2022, 59 percent of new homes were placed within land-leased communities or planned unit developments. Many local land use regulations restrict manufactured homes to rental pads in manufactured home communities, which are often in the least desirable areas. "Planners used strict zoning regulations to segregate the temporary work force in new marginal trailer parks," J. F. Hart (2003) recounts, "The 'better' citizens wanted no part of trailer parks, and one councilman expressed the

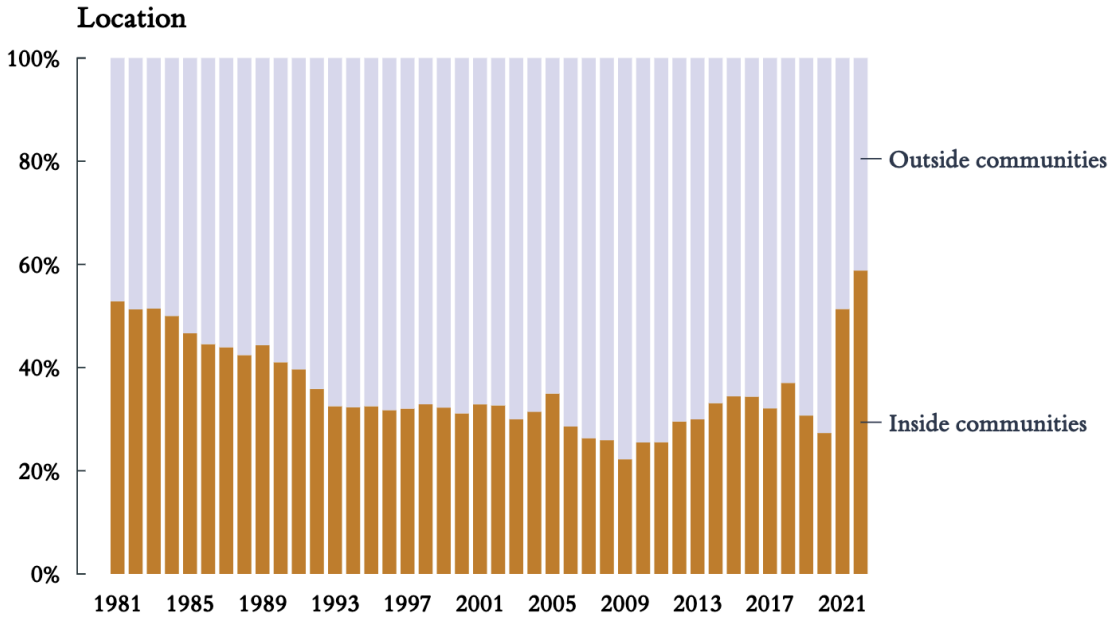

Figure 1.20 - Location of New Manufactured Homes

Notes: This figure plots the location of new manufactured homes sold and placed in the US for residential use. Homes inside communities refers to homes in land-leased communities and subdivision or planned unit developments. As of 2021, this category now contains homes located on private property within communities; prior to 2021, homes on private property were assumed to be located outside communities.

Data: Special Characteristics of New Manufactured Homes Sold and Placed
US Census Bureau and US Department of Housing and Urban Development

popular mood when, in response to a request for a zoning variance to develop a park next to a landfill site well outside of town, he opined that right next to the town dump seemed like the perfect place to put a trailer park."

Other local regulations designed to exclude manufactured homes might include minimum length-to-width ratios and floor area requirements, and restrictions on other features not covered by the HUD Code, like window size and style, or roof pitch. For example, many municipalities require a steep roof pitch, but roofs steeper than the conventional roof pitch of 4/12 (one foot of rise for every three horizontal feet) make manufactured homes difficult to transport because of height restrictions on highways (J. F. Hart 2003). Mandelker (2023) lists more examples of restrictive zoning requirements that create unequal treatment as they apply unequally to manufactured housing:

- Exclusion from a municipality
- Exclusion from all or some single-family zoning districts
- Exclusion based on the age of manufactured housing
- Limitation to specially designated zoning districts, such as rural and agricultural zoning districts
- Limitation to manufactured housing parks
- Minimum lot size requirements
- Requiring a special exception for manufactured housing in a single-family zoning district
- Refusing to approve a special exception for manufactured housing in a single-family zoning district
- Rejecting rezoning to a district where manufacture housing is permitted, when rezoning for other uses to a district where they are permitted is approved
- Refusing to approve a special exception, site plan approval, or certificate of appropriateness in an historic district for manufactured housing, when these approvals are granted for similar uses
- Refusing to approve a subdivision for manufactured housing when similar subdivisions for site-built housing are approved

- Minimum building size requirements that are not required for site-built housing
- Design standards limited to manufactured housing
- Denial of design approval for manufactured housing, when design approval is approved in similar circumstances for site-built housing
- Dimensional requirements
- Setback requirements
- Landscaping requirements
- Requiring elevation at grade level above a floodplain, excessive dormer lengths, storm shelters, and 300 square feet of public playground space for manufactured housing, when these requirements do not apply site-built housing

As mentioned, the HUD Code preempts local and state building codes, but not zoning. HUD considered zoning preemption in a 1997 Statement of Policy, but Mandelker (2023) argues for more extensive preemption: "The federal law should preempt zoning that prohibits or excessively restricts manufactured housing by requiring the equal treatment of manufactured housing in zoning ordinances, by requiring that manufactured housing should be designated as a permitted use in residential zones, by prohibiting special exceptions for manufactured housing in residential zones, and by prohibiting restrictive design review."

1.4.5 It Might Be Consumer Financing

If a manufactured home is permanently attached to real estate - to land that is owned or leased long-term - the landowner usually has the option of titling the manufactured home as real property, and financing it through a mortgage. In this case, the mortgage encumbers both the manufactured home and the underlying or intended land. But in most states in the US, manufactured homes are personal property by default,[37] and hence are financed through chattel loans - also known

[37]Fannie Mae (2018) lists the following 43 states: Alaska, Alabama, Arizona, California, Colorado, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada,

as home-only loans, or personal property loans - not mortgage loans.[38] Figure 1.21 shows the titling of new manufactured homes sold and placed for residential use in the US since 1989. In 2022, over 73 percent of new manufactured homes were

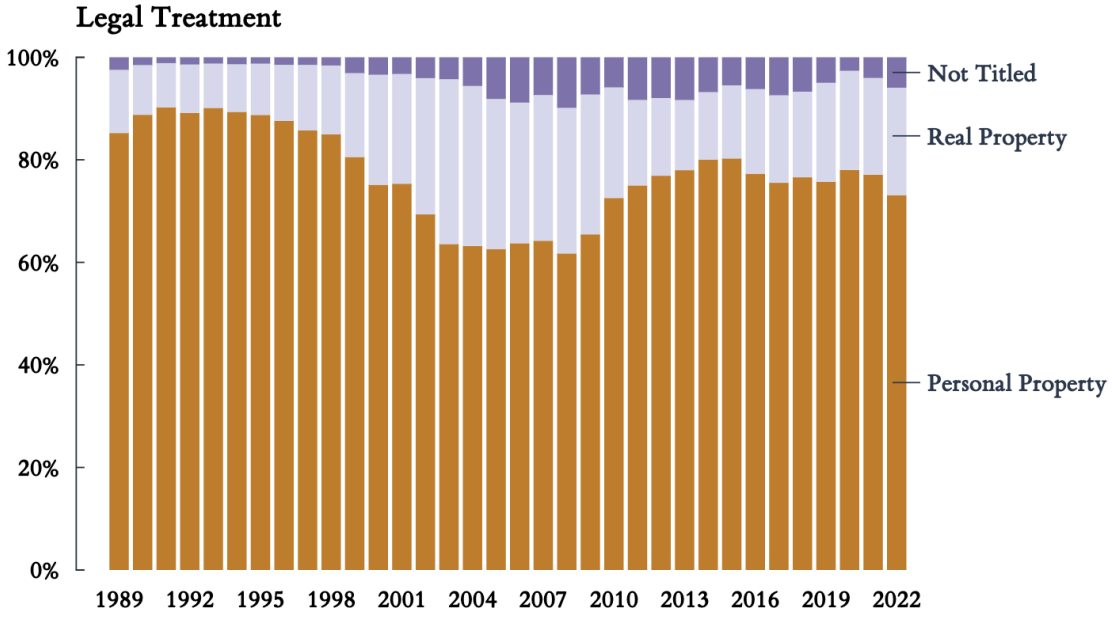

Figure 1.21 - Titling of New Manufactured Homes

Notes: This figure plots the titling of new manufactured homes sold and placed in the US for residential use. Homes that are personal property are eligible for chattel loans.

Data: Special Characteristics of New Manufactured Homes Sold and Placed
US Census Bureau and US Department of Housing and Urban Development

New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin and Wyoming.

[38]A mortgage loan here refers to a real property home loan. Mortgage loans and chattel loans both involve a promissory note and a security interest - though according to Fannie Mae (2018), a small minority of chattel loans are documented using retail installment contracts. A promissory note is a written agreement where the borrower promises to make determinate principal and interest payments to the lender. The borrower pledges an asset as collateral for the loan, and to secure the debt, the lender obtains a lien on or security interest in the collateral. Unlike real estate, manufactured homes titled as personal property do not undergo market-based appraisals; instead, the manufacturer's certified invoice generally substitutes for an appraisal (loan-to-invoice appraisals).

titled personal property, and hence eligible only for chattel loans. This share has remained relatively constant since 1989: the minimum share of new homes titled as personal property was 62 percent in 1999; the median over the same time period is 77 percent.

Chattel loans are not governed by the Real Estate Settlement Procedures Act (RESPA), which bans kickbacks and referral fees for brokers, and requires lenders and brokers to provide borrowers with detailed disclosures about settlement costs and mortgage servicing. The protections provided by the Home Ownership and Equity Protection Act (HOEPA), an amendment to the Truth in Lending Act of 1968 (TILA), are also less likely to apply to chattel loans, as loans are deemed "high cost" and hence subject to HOEPA disclosure requirements only if they meet certain points, fees, and interest rate triggers - and these triggers are higher for small chattel loans. The TILA-mandated closing disclosure for chattel loans in general is less than a page, versus the detailed, five-page closing disclosure required for loans secured by real property; and under TILA, no disclosure is required at the time of application for chattel loans, versus the multi-page loan estimate provided for mortgages. Furthermore, chattel loans require fewer state law origination disclosures. All else equal, chattel loans for manufactured homes have shorter loan terms, and are priced higher than comparable mortgage loans (Consumer Financial Protection Bureau 2014).[39]

The process a lender follows if a homeowner defaults is also different for chattel loans and mortgages. If the manufactured home is real property, the lender uses state foreclosure procedures, as with mortgages for conventional homes. After a lengthy legal process - 300 days to 1,020 days for power of sale foreclosures; 480 days to 1,230 days for judicial foreclosures (Burkhart 2018) - the lender takes ownership of the home. If the home is titled as personal property, the lender will repossess the home according to state law, usually after sending the debtor a notice of default. In self-help repossession, the lender can take ownership of the home without a court order, so long as he does not "breach the peace."[40] If the homeowner objects, or the lender prefers, the lender resorts to replevin: he files a lawsuit in court, then repossesses the home under the consequent court order. Both repossession processes for personal property are less complex and quicker

[39] In a study of 1-4 family, owner-occupied, first-lien properties that excluded open-end lines of credit, loan purchases between financial institutions, and loans designated primarily for a business or commercial purpose, Consumer Financial Protection Bureau (2014) found that chattel loans are priced between 50 and 500 basis points higher.

[40] Article 9, Section 609 of the Uniform Commercial Code (UCC)

than a foreclosure: under state law, repossession is typically resolved within 30 to 81 days (Fannie Mae 2018).

In 2022, 58 percent of originated manufactured home loans were mortgages, and 42 percent were chattel loans, according to Home Mortgage Disclosure Act (HMDA) loan applications. See Table 1.10, which shows the share of first lien, owner-occupied manufactured home purchase loans originated between 2018 and 2022 by legal treatment and loan type. The column on the right shows the percent of originated HMDA loans where land was owned, but the homeowner chose a chattel loan. In 2022, 16 percent of homeowners fell into this category: they could have converted their homes to real property and financed their homes with mortgages, but instead took out chattel loans on personal property. Table 1.11 shows the median reported interest rate over the same time period, and for the same subset of manufactured home loans. In 2022, the median interest rate for manufactured home mortgages was 5.5 percent; the median interest rate for chattel loans was much higher: 8 percent. When the homeowner was also a landowner, the median interest rate for chattel loans was slightly lower: 7.5 percent. These relative relationships hold across years.

The reported share of manufactured home loans that were chattel loans in the HMDA data is surprisingly low when compared with other manufactured housing data - under 46 percent from 2018 through 2022. Recall from Figure 1.21 that over the same time period, the share of new manufactured homes in the US titled as personal property did not drop below 73 percent. A noted limitation of HMDA data is that HMDA reporters do not specify whether the home in question is new or used. If used manufactured homes are more likely to be titled as real property than new manufactured homes, and used manufactured homes are more likely to receive financing, the unexpectedly low chattel loan share could make sense. Table 1.12 shows the titling of manufactured homes that changed ownership in Texas from 2003 through 2021 - excluding inventory sales to manufactured home dealers - broken out by whether the manufactured home was new or used, according to data reported to the Texas Department of Housing and Community Affairs (TDHCA).[41] Without exception, the majority of both new and used homes that were sold were personal property. In 2021, 84 percent of new homes and 68 percent of used homes were personal property, and hence eligible only for chattel loans. The observed discrepancy in the chattel share of manufactured home loans cannot be

[41]Table A.1 in the Appendix shows the same for manufactured homes that changed ownership in Texas from 1982 through 2002. See Chapter 3 for more information on the Texas data.

Table 1.10
Share of HMDA Loan Originations by Legal Treatment

	Mortgage (%)	Chattel (%)	Total	Chattel - Land (%)
2022	58	42	124,274	16
Conventional	42	58	90,154	26
FHA	99	1	25,526	1
VA or FSA/RHS	100	0	8,594	0
2021	57	43	127,897	16
Conventional	41	59	93,083	27
FHA	99	1	27,158	1
VA or FSA/RHS	100	0	7,656	0
2020	55	45	116,268	18
Conventional	39	61	85,444	29
FHA	99	1	23,628	1
VA or FSA/RHS	99	1	7,196	1
2019	56	44	108,208	18
Conventional	38	62	76,443	31
FHA	99	1	24,108	1
VA or FSA/RHS	99	1	7,657	1
2018	56	44	102,192	18
Conventional	39	61	72,286	30
FHA	97	3	23,030	2
VA or FSA/RHS	98	2	6,876	2

Notes: This table shows the percent of originated first lien, owner-occupied manufactured home purchase loans by legal treatment, along with the total number of originated loans. The column on the right shows the percent of originated loans where land was owned, but the homeowner chose a chattel loan over a mortgage.

Data: Originated Loans, Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

Table 1.11
Median Interest Rate by Legal Treatment

	Mortgage (%)	Chattel (%)	Chattel - Land (%)
2022	5.5	8.0	7.5
Conventional	5.8	8.0	7.5
FHA	5.2	4.9	4.9
VA or FSA/RHS	5.2	5.4	5.2
2021	3.5	7.8	7.0
Conventional	3.5	7.8	7.0
FHA	3.4	3.3	3.2
VA or FSA/RHS	3.2	3.2	3.2
2020	3.8	8.0	7.4
Conventional	4.1	8.0	7.5
FHA	3.6	3.6	3.6
VA or FSA/RHS	3.5	3.6	3.6
2019	4.9	8.6	8.1
Conventional	5.0	8.7	8.2
FHA	4.8	5.5	5.0
VA or FSA/RHS	4.5	3.8	3.8
2018	5.2	8.5	8.0
Conventional	5.4	8.6	8.2
FHA	5.2	7.5	5.5
VA or FSA/RHS	5.0	5.2	5.2

Notes: This table shows the median interest rate for originated first lien, owner-occupied manufactured home purchase loans by legal treatment. The column on the right shows the median interest rate for originated loans where land was owned, but the homeowner chose a chattel loan over a mortgage.

Data: Originated Loans, Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

Table 1.12
Legal Treatment and Sale Type in Texas, 2003 - 2021

	New Homes (%)		Used Homes (%)			
	Chattel	*Realty*	*Chattel*	*Realty*	Total Sales	New (%)
2021	84	16	68	32	40,146	39
2020	83	17	68	32	39,316	42
2019	84	16	69	31	39,293	41
2018	87	13	69	31	39,158	40
2017	87	13	69	31	36,217	38
2016	88	12	70	30	34,199	37
2015	88	12	70	30	31,964	37
2014	89	11	70	30	31,831	39
2013	89	11	71	29	30,111	36
2012	88	12	74	26	30,138	32
2011	84	16	72	28	26,644	32
2010	77	23	69	31	26,017	31
2009	66	34	68	32	24,710	33
2008	65	35	67	33	28,189	38
2007	58	42	67	33	32,768	31
2006	62	38	70	30	32,051	30
2005	63	37	69	31	33,900	31
2004	63	37	72	28	31,990	34
2003	52	48	78	22	31,999	37

Notes: This table shows the legal treatment of manufactured homes that changed ownership in Texas from 2003 through 2021, excluding inventory sales to manufactured home dealers.

Data: Statements of Ownership and Location
Texas Department of Housing and Community Affairs (TDHCA)

blamed on the proportions of new and used homes.

Cash sales are not HMDA-reportable, so the low chattel loan share in the HMDA data might be explained if manufactured homes titled as personal property are more likely to be paid for in cash. Table 1.13 repeats the previous titling breakdown for manufactured home sales with reported financing in Texas from 2003 through 2021 - i.e., for sales that were not cash sales - using data released by the TDHCA under the Texas Public Information Act.[42] Without exception, once again, the vast majority of both new and used homes financed in Texas were personal property. In 2021, 86 percent of new homes that received financing, and 60 percent of used homes that received financing, were financed with chattel loans. The surprisingly low chattel loan share in the HMDA data - 43 percent in 2021 - cannot be attributed to cash sales. The share of manufactured home sales in Texas with reported lien information appears to grow over time; this is likely an artifact of the loan release schedule, and the many bankruptcies in manufactured home lending in the early 2000s. See Chapter 3 for more information on my attempts to correct for this via freedom of information requests for released liens, and a discussion of manufactured home lien data across states.

Table 1.14 reports the breakdown of HMDA manufactured home loans originated only in Texas between 2018 and 2022. The share of HMDA manufactured home loans that were chattel loans is higher in Texas than it was for the US - 63 percent in 2022 for Texas, versus 42 percent in 2022 for the US - but still noticeably lower than the 76 percent implied by the TDHCA data, which should represent the universe of manufactured home sales in Texas.[43] Indeed, more manufactured home liens are perfected in Texas than the HMDA data suggests. The rightmost column of Table 1.14 reports the total number of manufactured home sales with liens that were reported to the TDHCA, excluding inventory sales to manufactured home dealers. This total is a minimum of a thousand loans - or a minimum of six percent - higher than the HMDA Texas total. In 2018, the number of manufactured home sales with liens that were reported to the TDHCA was 18 percent higher than the number of reported HMDA loans.

Table 1.15 repeats this comparison over a longer time period, using a more generous subset of originated HMDA loans in Texas that includes investment proper-

[42]Table A.2 in the Appendix shows the same for manufactured homes from 1982 through 2002. Sales between manufactured home dealers are dropped from the sample.

[43]Certain reported ownership changes are dropped from the TDHCA sample for this aggregation, for example, sales to manufactured home dealers. See Chapter 3 for more information on the Texas data.

Table 1.13
Legal Treatment of Financed Sales in Texas, 2003 - 2021

	New Loans (%)		New Sales (%)	Used Loans (%)		Used Sales (%)
	Chattel	*Realty*	*Reported Lien*	*Chattel*	*Realty*	*Reported Lien*
2021	86	14	71	60	40	27
2020	84	16	74	58	42	27
2019	86	14	71	59	41	25
2018	87	13	69	58	42	24
2017	87	13	67	61	39	25
2016	87	13	65	64	36	25
2015	87	13	62	63	37	24
2014	88	12	55	62	38	23
2013	88	12	58	66	34	24
2012	86	14	55	70	30	25
2011	82	18	52	71	29	24
2010	75	25	50	70	30	24
2009	66	34	48	68	32	22
2008	68	32	41	72	28	24
2007	73	27	34	77	23	21
2006	83	17	31	86	14	21
2005	93	7	26	92	8	21
2004	96	4	24	96	4	22
2003	95	5	21	96	4	23

Notes: This table shows the legal treatment of manufactured homes with reported financing in Texas from 2003 through 2021, alongside the share of total sales with reported financing.

Data: Released Liens (FOIA) & Statements of Ownership and Location
Texas Department of Housing and Community Affairs (TDHCA)

TABLE 1.14
LEGAL TREATMENT OF HMDA LOANS IN TEXAS

	Mortgage (%)	Chattel (%)	Chattel - Land (%)	HMDA	TDHCA
2022	37	63	39	16,453	
2021	35	65	39	16,673	17,674
2020	35	65	40	16,368	18,397
2019	33	67	42	15,431	17,209
2018	33	67	44	13,985	16,526

Notes: This table shows the percent of originated first lien, owner-occupied manufactured home purchase loans in Texas by legal treatment, alongside the total number of HMDA loans in the sample, and the total number of sales to non-dealers in Texas with liens that were reported to the TDHCA. The Chattel - Land column shows the percent of originated HMDA loans where land was owned, but the homeowner chose a chattel loan over a mortgage.

Data: Originated Loans, Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

Released Liens (FOIA) & Statements of Ownership and Location
Texas Department of Housing and Community Affairs (TDHCA)

ties. The HMDA data is still limited to first lien loans, as in this aggregation each change of ownership reported to the TDHCA is counted at most once - if any financing during the buyer's tenure was reported to the TDHCA. In every year from 2008 through 2020, the number of financed sales in Texas according to the TDHCA data was higher than the total number of HMDA loans in Texas. In 2016, the number of financed TDHCA sales was 25 percent higher than the number of reported HMDA loans. In 2009, the difference was 2,603 loans; the number of financed TDHCA sales was 53 percent higher than the number of reported HMDA loans.

Not every home loan is HMDA-reportable, which likely explains much if not all of the difference. HMDA regulation applies to most banks, savings associations, credit unions, and other mortgage lending institutions - but many small and

Table 1.15
HMDA Loans versus Reported Loans in Texas

	HMDA	TDHCA	Difference (n)	Difference (%)
2008	7,288	8,563	1,275	17
2009	4,942	7,545	2,603	53
2010	7,227	8,387	1,160	16
2011	7,261	8,682	1,421	20
2012	8,534	10,527	1,993	23
2013	8,946	11,069	2,123	24
2014	9,334	11,222	1,888	20
2015	9,925	12,201	2,276	23
2016	10,993	13,756	2,763	25
2017	12,584	14,698	2,114	17
2018	14,880	16,526	1,646	11
2019	16,371	17,209	838	5
2020	17,367	18,397	1,030	6
2021	17,680	17,674	-6	0

Notes: This table compares the total number of first lien manufactured home purchase loans in Texas according to the HMDA data, with the total number of sales to non-dealers in Texas with liens that were reported to the TDHCA.

Data: Originated Loans, Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

Released Liens (FOIA) & Statements of Ownership and Location
Texas Department of Housing and Community Affairs (TDHCA)

non-metropolitan lenders are exempt. This is a significant coverage gap, made worse if the vast majority of the unreported loans are chattel loans, as the TDHCA data suggest. As evident in Tables 1.11 and 1.16, the median interest rate is consistently higher for chattel loans than for manufactured home mortgages, and all else equal, chattel loan terms are worse (Consumer Financial Protection Bureau 2014). Applications for chattel loans are also more likely to be denied than applications for manufactured home mortgages. Figure 1.22 breaks down HMDA loan status for first lien, owner-occupied, manufactured home purchase loan applications from 2018 through 2022 by legal treatment. In 2022, only 17 percent of chattel loan applications resulted in the loan being financed, versus 35 percent for manufactured home mortgage applications. This 35 percent can in turn be compared with the 74 percent of successful loan applications for site-built homes (Schneider, Schwartz, Russell, O'Reilly, Melton, and Leitner 2021).

The greater concern is of course that the reported HMDA data for chattel loans, not to mention the summary data above, are not representative of the universe of chattel loans, given that the reported manufactured home HMDA data

Table 1.16

Median Interest Rate by Legal Treatment in Texas

	Mortgage (%)	Chattel (%)	Chattel - Land (%)
2022	5.8	8.1	7.8
2021	3.8	7.9	7.2
2020	4.2	8.1	7.8
2019	5.2	8.8	8.3
2018	5.5	8.9	8.5

Notes: This table shows the median interest rate for originated first lien, owner-occupied manufactured home purchase loans in Texas by legal treatment. The column on the right shows the median interest rate for originated loans where land was owned, but the homeowner chose a chattel loan over a mortgage.

Data: Originated Loans, Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

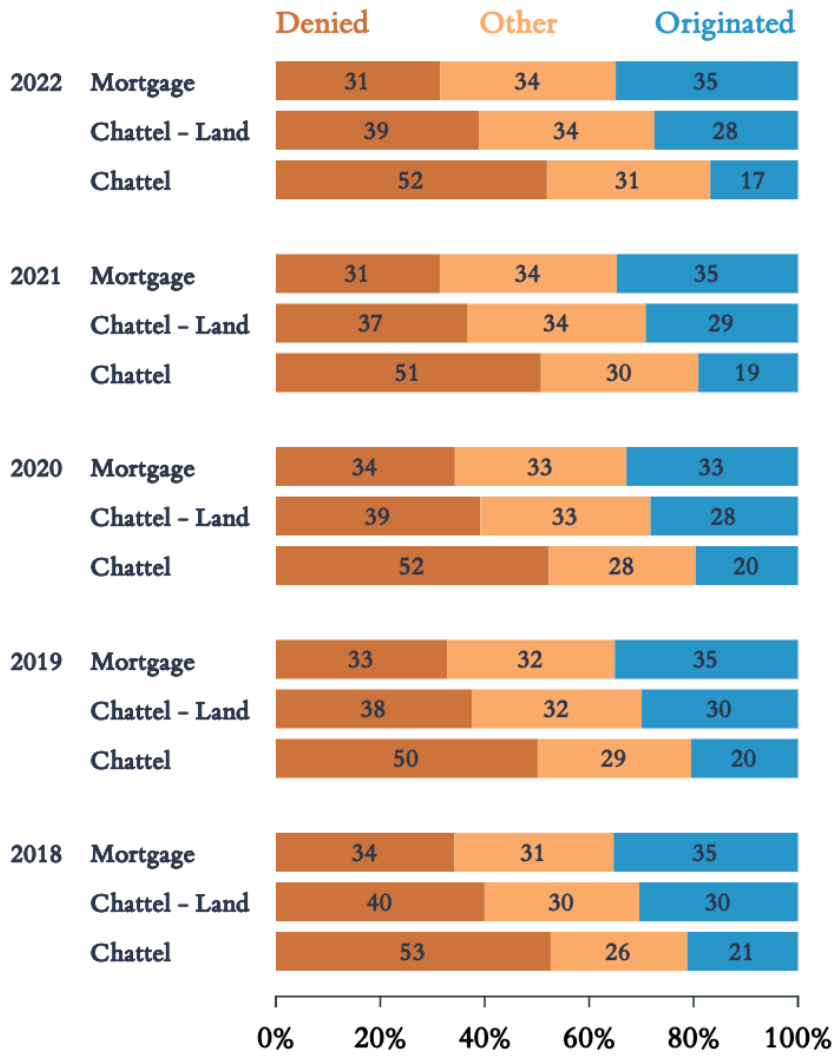

Figure 1.22 - Manufactured Home Loan Application Status

Notes: This figure breaks down loan status for HMDA first lien, owner-occupied manufactured home purchase loan applications by legal treatment. The Other category includes withdrawn applications, applications that were closed for incompleteness, and applications that were approved but not accepted by the applicant. The Chattel - Land category includes originated loans where land was owned, but the homeowner chose a chattel loan over a mortgage.

Data: Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

is not representative of the manufactured home lending market. It makes sense that chattel financing is more likely in rural areas, or through small lenders - but if the actual number of manufactured home loans in a given year can be over 50 percent greater than the number of reported HMDA loans, as it was in Texas in 2009, any understanding of the manufactured home market gained from HMDA data is skewed. Moreover, HMDA data is meant to help regulators determine whether financial institutions are serving the housing needs of their communities, and to identify possible discriminatory lending patterns. If a significant portion of the chattel lending market is going unreported, discriminatory lending patterns might remain hidden.

Intriguingly, the shares of homeowners who could have converted their homes to real property and gotten mortgages, but instead chose to take out chattel loans on personal property - see the Chattel - Land columns in Tables 1.14 and 1.10 - are invariably higher in Texas. Some 39 to 44 percent of homeowners with the choice chose chattel loans over manufactured home mortgages in Texas, versus 16 to 18 percent of homeowners with the choice throughout the US.

The FHA, the VA, and the USDA administer loan guarantee programs for manufactured housing, but both by rule and in practice, chattel loans are neglected. The FHA Title I Manufactured Home Loan Program insures chattel loans, mortgages, or both. The FHA Title II Manufactured Home Loan Program insures only mortgages. USDA loans are also available only for mortgages, and the manufactured homes in question must be new - manufactured within the past 12 months, with no previous owners - and attached to a permanent foundation. Both HUD and the USDA also guarantee loans for the purchase of manufactured home communities. But as Table 1.10 revealed, federal participation in manufactured home loans is almost exclusively limited to manufactured home mortgages.

Since 2008, HUD has guaranteed only 4,959 chattel loans worth $132.2 million (US Government Accountability Office 2023). This is a far cry from the 28,404 chattel loans guaranteed in 1991 through FHA's Title I program alone. Table 1.17 provides a breakdown of federally guaranteed manufactured home loans since 2008. The number of manufactured home mortgages guaranteed by HUD each calendar year has slowly increased since 2013, but the 2022 number - 30,096 mortgages - is still lower than the 33,067 manufactured home mortgages HUD guaranteed in 2008. The number of VA manufactured home mortgages has increased since the VA began tracking manufactured home loans in 2013, but volume is low. The number of USDA manufactured home mortgages is also low: under a thousand loans each year.

Fannie Mae and Freddie Mac also have programs to purchase manufactured

Table 1.17
Federally Guaranteed Manufactured Home Loans

Year	HUD Chattel	HUD Mortgages	VA Mortgages	USDA Mortgages
2008	1,041	33,067		435
2009	1,429	22,431		854
2010	740	18,231		934
2011	329	12,831		653
2012	265	12,924		606
2013	211	12,501	865	625
2014	170	13,057	2,151	472
2015	236	17,167	3,029	511
2016	253	20,603	3,767	447
2017	173	22,580	4,818	594
2018	72	24,467	5,416	571
2019	32	25,398	6,073	660
2020	8	26,474	6,079	900
2021	0	28,314	5,474	948
2022	0	30,096	7,046	750

Notes: This table shows the number of manufactured home mortgages and chattel loans that were federally guaranteed in each calendar year, according to a Government of Accountability (GAO) analysis of agency data. The VA did not track manufactured home loans before 2013.

Data: FHA Title I and Title II
Department of Housing and Urban Development (HUD)
Home Loan Program, Standard Assessor Database
Department of Veterans Affairs (VA)
Section 502
Department of Agriculture (USDA)

housing loans and loans to finance the purchases of manufactured housing communities, but as illustrated in Figure 1.23, virtually no chattel loans are purchased by government-sponsored enterprises (GSEs). By contrast, from 2018 through 2022, more than 50 percent of manufactured home mortgages were purchased by the GSEs. This is despite the Duty to Serve rule issued by the Federal Housing Finance Agency (FHFA) in 2016, which directs Fannie Mae and Freddie Mac to more explicitly provide sustainable liquidity for three key markets: manufactured housing, affordable housing preservation, and rural housing.

After the GSEs sustained large losses in the early 2000s - Conseco filed for bankruptcy in 2002, and Conseco securities constituted 70 percent of Fannie Mae's manufactured housing portfolio - Fannie Mae and Freddie Mac changed their underwriting requirements to only purchase loans located on owned land or on cooperatively owned land. The manufactured home in question must also be attached to a permanent foundation, and in 2022, less than 17 percent of new manufactured homes were attached to a permanent foundation. Figure 1.24 shows the share of new manufactured homes with a permanent foundation by legal treatment for 2014 through 2022, using Manufactured Housing Survey (MHS) estimates. Around five percent of the new manufactured homes installed on a permanent foundation in 2022 were titled real property; around 15 percent were titled personal property. Each GSE also introduced size requirements on the manufactured homes they would guarantee, which further limits potential homes and borrowers: Fannie Mae requires a minimum of 600 square feet; Freddie Mac requires doublewides.

Chattel loans are however eligible for inclusion in mortgage-backed securities pools under the Ginnie Mae Manufactured Housing Program, and new loan products have recently been introduced by the GSEs for certain manufactured home owners in land-lease communities. For example, Freddie Mac will finance manufactured homes built on permanent foundations on leased land, if said lease is at least five years longer than the loan term. And in its 2022-2026 strategic plan, HUD included manufactured housing in its objective to increase the supply of housing: "HUD will employ all resources at its disposal to bolster the national housing supply by increasing new construction; preserving existing housing; and supporting the production of manufactured housing" (US Department of Housing and Urban Development 2022). HUD also committed to working to "ensure that manufactured and other factory-built housing types are a thriving source of affordable, quality, durable, and safe housing."

Regardless of the legal category of manufactured home loan, the government and the GSEs - and hence their housing subsidies - still favor site-built housing. In 2022, guarantees for manufactured housing constituted only four percent of

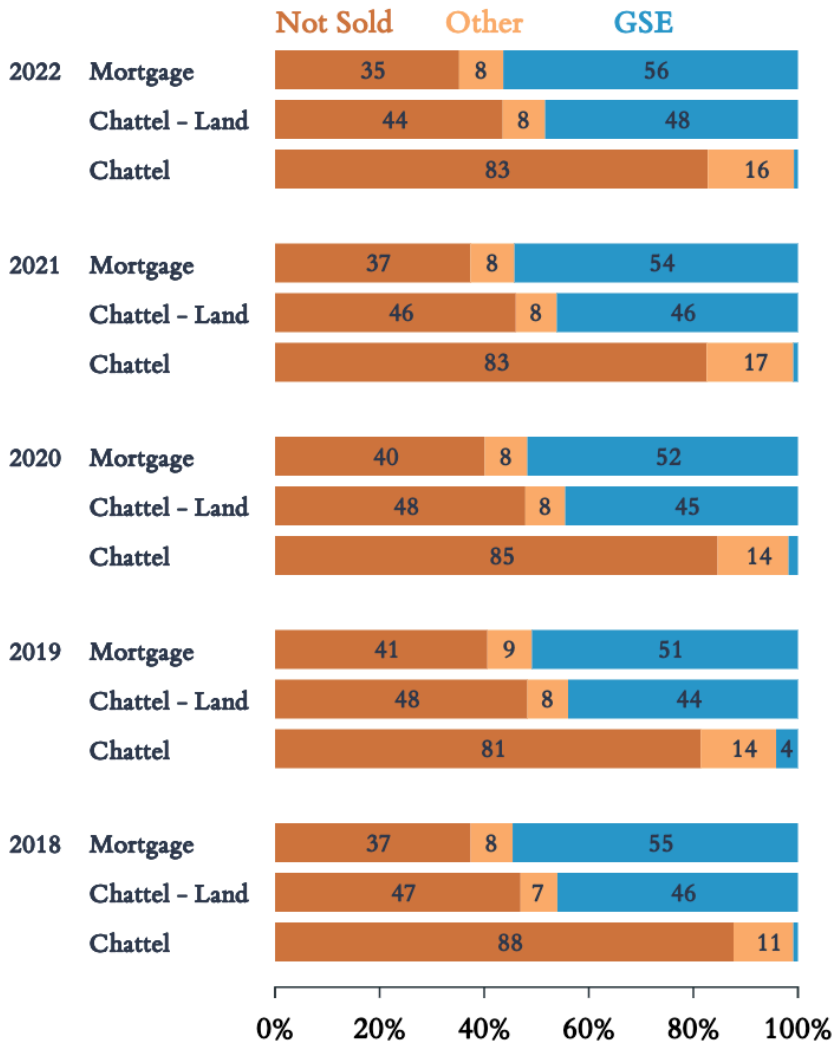

Figure 1.23 - Purchaser Type by Legal Treatment

Notes: This figure breaks down first lien, owner-occupied manufactured home purchase loans by purchaser type and legal treatment. Purchasers in the GSE category include Fannie Mae, Freddie Mac, and Farmer Mac. Purchasers in the Other category include commercial banks, savings banks, credit unions, mortgage companies, finance companies, and all other types of purchasers. The Chattel - Land category includes originated loans where land was owned, but the homeowner chose a chattel loan over a mortgage.

Data: Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

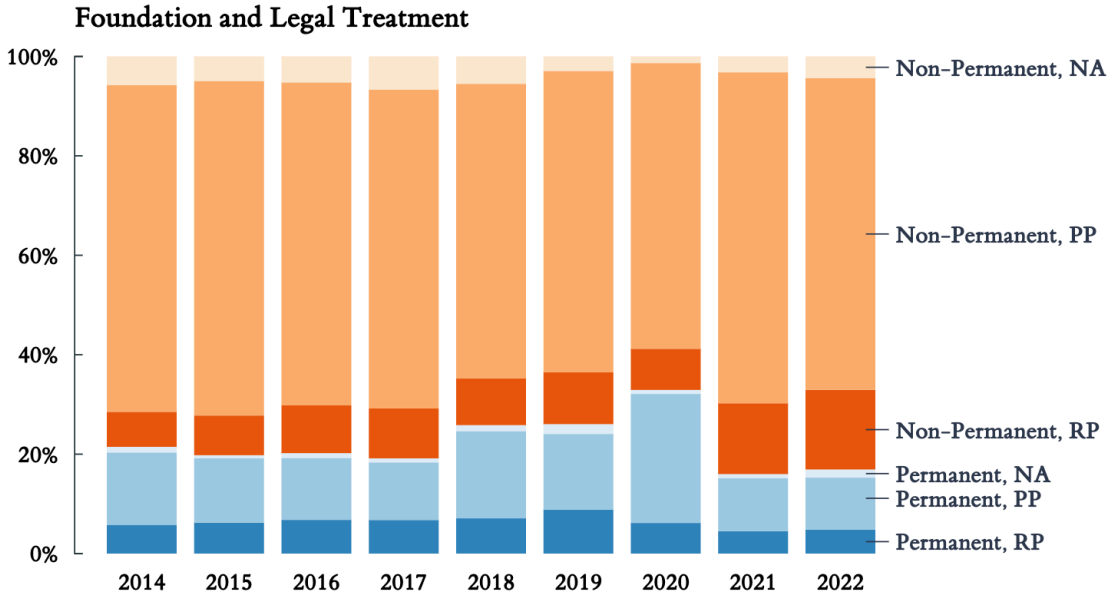

FIGURE 1.24 - FOUNDATION AND TITLING OF NEW MANUFACTURED HOMES

Notes: This figure illustrates the breakdown of foundation type and legal status for manufactured homes based on survey estimates. RP = Real Property; PP = Personal Property; NA = Not Available.

Data: Manufactured Housing Survey (MHS) Estimates
US Census Bureau and US Department of Housing and Urban Development

FHA loans, two percent of VA loans, and one percent of USDA loans (US Government Accountability Office 2023). And from 2008 through 2022, less than one percent of the GSEs' single-family loan purchases were for manufactured housing (US Government Accountability Office 2023). These subsidies shift demand from manufactured housing to site-built housing, which is less efficient, and make it harder for potential manufactured home owners to secure financing. The price of subsidized site-built housing increases relative to other prices, and the real cost of housing increases over time. Schmitz (2020a) cites Thurman Arnold: "You can't spend money in a relief market [housing] like that without subsidizing inefficiency and thus raising both prices and taxes."

1.4.6 It Might be Floor Plan Financing

In most states in the US, manufacturers are not allowed to sell manufactured homes directly to consumers. Manufacturers sell only to dealers, who are usually independent, and licensed by the state. Manufactured homes are constructed in a factory,[44] then shipped to dealerships upon order, where they are displayed and sold to consumers.[45] The dealership system today still works much like the car industry from which it grew: the goal is to turn over inventory quickly. Because dealers need to maintain inventory on their lots, dealers are highly leveraged; they need intermediate financing for possession of inventory until the homes can be sold.

This inventory financing is calling flooring, or floor plan financing. Flooring is generally a three-way transaction wherein each loan is made against a specific piece of collateral. This transaction is illustrated in Figure 1.25. The dealer takes out a loan from a floor lender for a new manufactured home, whereupon the floor lender pays the manufacturer in full for the home, and the home is shipped to the dealership. The floor lender holds title to the manufactured home, while the dealer is granted the right to sell it - sometimes for at minimum a specified release price. Until the home is sold, the dealer pays interest on the flooring loan. When the home is sold, the loan advance against that specific home is repaid.

As the consumer in most cases finances the purchase of his new home, the floor lender might finance both sides of the transaction: the dealer floor plan and the consumer purchase. Historically, dealers received kickbacks from lenders for sending them borrowers, and there was an unwritten understanding that dealers would direct buyers to their floor plan lender. According to Grissim (2006), lenders still grant a rebate worth around two percent of the loan amount to the dealer who brings them the consumer loan.

Most floor lenders also require that manufacturers sign a repurchase agreement to cover the floored inventory: If the dealer does not sell the inventory as expected, the manufacturer agrees to buy back the unsold floor planned homes. As per the Office of the Comptroller of the Currency's handbook on floor plan lending, curtailments requiring periodic principal reductions for stale inventory are also "normally included" (US Department of the Treasury 2017).

Of course, manufacturers in the manufactured home industry integrated into

[44] It generally takes two days to a week to fully construct one manufactured home (Grissim 2006)

[45] Before leaving the factory, a HUD-certified inspector checks each unit.

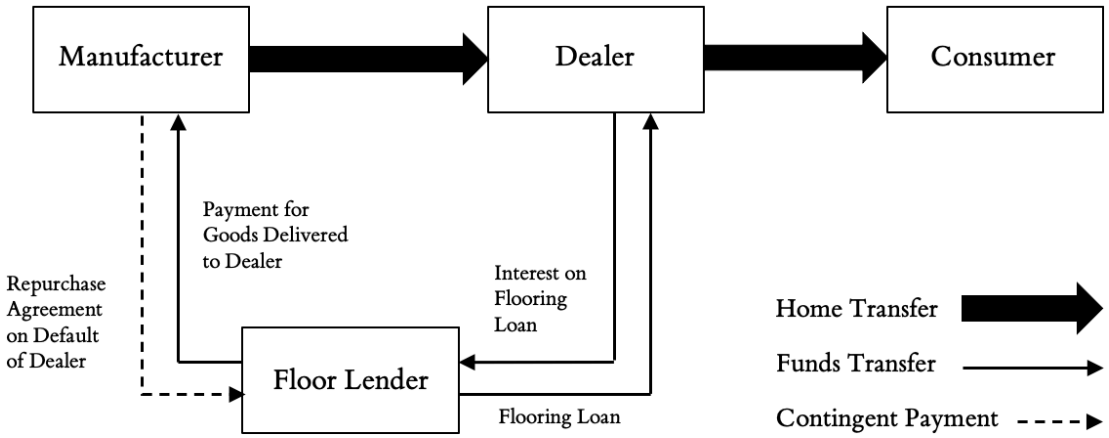

Figure 1.25 - Floor Plan Financing

Notes: This figure illustrates the three-way relationship between the floor lender providing inventory financing, the manufactured home dealer receiving inventory financing, and the manufacturer of the inventory.

floor lending. In fact, captive finance began in floor lending.[46] Manufacturers will place their capital where the most profit is expected. Today, integrated floorplan lenders - lenders that are integrated with manufacturers - have the majority market share.

[46]Through 1920, car dealers paid manufacturers in cash, as they were able to sell their inventories quickly. But as the economy slowed after the post-war boom, manufacturers were seeing their factories sit idle. Hyman (2011) reports, "The problem for automakers was that though production was year-round, consumers liked to buy cars in the late spring and summer. General Motors (GM) and Ford could not produce all the autos they needed for the spring in just February. By producing year-round they lowered the average cost of production, which enabled them to lower the consumer's price to a level that made mass consumption possible. The problem, for manufacturers, was how to lower inventory costs. Storing all those autos could become prohibitively expensive." By offering in-house floor lending - ie, inventory without the need to tie up huge amounts of dealer capital in illiquid assets - manufacturers encouraged dealers to order cars throughout the year, effectively transferring the burden of storage costs to dealers. Within a few years, the captive finance companies created to finance dealer inventory expanded to include retail finance, and by 1927 the GMAC annual report described "provid[ing] credit to the consumer of goods as its most important function" (Hyman 2011).

Dealerships can also be either independent or integrated with manufacturers - factory-owned. Grissim (2006) says of the latter: "Theoretically, factory ownership arrangement makes sense inasmuch as, by owning all the components of the enterprise–from design and manufacture of the homes, to distribution and sales–the manufacturer gains an additional revenue source (the retail home buyer) while offering the advantages of a single chain of accountability, warranty service and customer care... With few exceptions, the idea has flopped. Manufacturers have proven ill-equipped and unschooled for the demands of retailing, customer care and the responsibilities of managing far-flung sales organizations. For example, most factory-owned dealerships, lacking the authority to OK warranty work, often require weeks to get authorization from company headquarters. In contrast, an independent dealer can take care of problems right away, even non-warranty service, in the name of keeping the buyer satisfied." Grissim (2006) also points out that the majority of factory-owned dealerships floor their homes through independent lenders, not their parent manufacturer, so vertical integration into retailing does not appear to offer savings on flooring costs.

The vertical relationships in the industry - between manufacturers, dealers, and floorplan lenders - and their effect on the supply of manufactured homes, are the subject of Chapter 2.

Figure 1.26 compares the number of new manufactured homes shipped each year with the number of new recreational vehicles (RVs). Shipments between the two industries track each other closely, with manufactured housing having the slight edge, until the early 2000s. In 2000, the number of new RVs outnumbered the number of new manufactured homes by around 50,000: 300,085 RVs versus 250,800 manufactured homes. By 2010, more than three times as many new RVs were shipped than new manufactured homes: 242,284 RVs versus some 50,000 manufactured homes. RVs are a luxury good, so the two industries are quite different, but as both began life in the 1920s as travel trailers, they share the same history and original market structure. Even now, manufactured homes and RVs are occasionally still sold together, and pricewise, the average RV costs the same as the average manufactured home. What is markedly different is the level of consolidation, the vertical integration, and the financing practices within each industry. The RV industry is much more competitive, more like the car industry, whereas the high transportation costs involved in manufactured housing mean highly local markets where manufacturers have local monopoly power. In the early 2000s, independent lenders began dropping out of the floorplan lending market - and out of manufactured housing lending in general - and integrated lenders began stepping in.

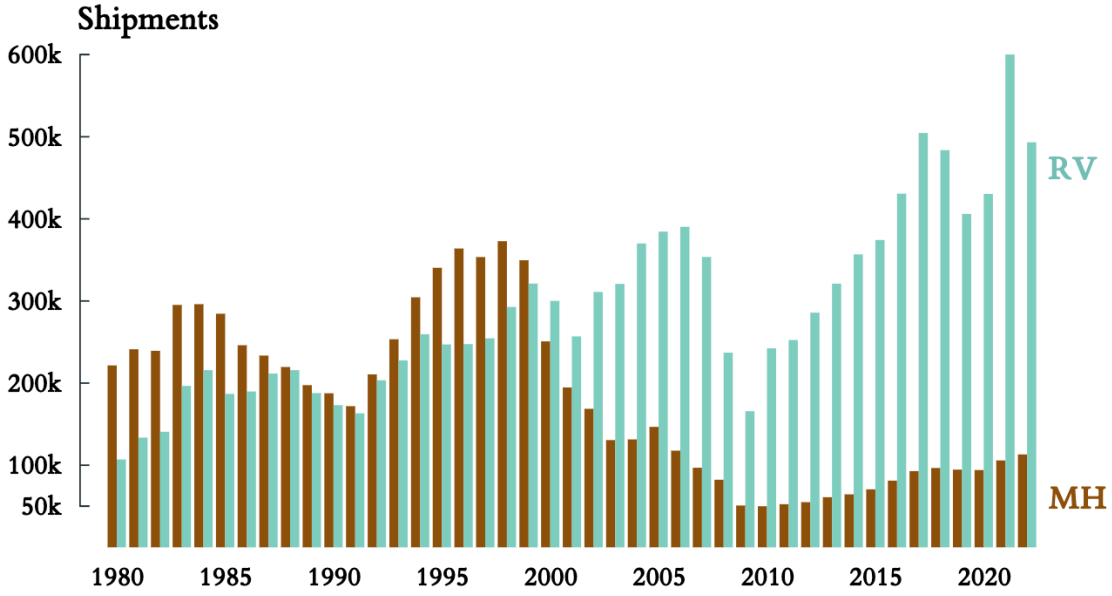

FIGURE 1.26 - TOTAL SHIPMENTS OF NEW MANUFACTURED HOMES AND RVS

Notes: This figure compares the number of new manufactured homes shipped each year with the number of new recreational vehicles (RVs).

Data: US Census Bureau and US Department of Housing and Urban Development Manufactured Housing Survey; New Residential Construction

RV Industry Association

While the reemergence of manufactured housing in the US would not "solve" the affordable housing problem, the costs of housing production, and then the costs of housing itself, would fall in areas with more factory-built housing. More new homes would be built - more quickly and more efficiently - and relocating would be easier. More homeowners would be able to live where they want to work. Opportunities for low-income households would increase. Fewer households would worry about housing instability, and the barriers to homeownership would be reduced. More renters would have a reasonable chance of eventually buying their own homes.

Chapter 2

Vertical Foreclosure

2.1 Introduction

Manufactured homes are built in factories according to a set of building regulations set by the US Department of Housing and Urban Development (HUD). Manufactured homes house the bottom of the income distribution. The median annual household income of residents who own their homes is about $36,000 - less than half the median income of site-built homeowners.[1] 80 percent of all new homes sold under $150,000 are manufactured.

In the 1970s, half of the new single-family homes sold in the US were manufactured.[2] That percentage was expected to rise annually.[3] Builders began developing two-story HUD Code homes and stackable manufactured home towers.[4] In *Travels with Charley*, John Steinbeck says of the factory-built home: "It seemed to me a revolution in living and on rapid increase. Why did a family choose to live in a home? Well, it was comfortable, compact, easy to clean, easy to heat... Each family has a privacy it never had before."

Today, less than ten percent of single-family homes are built in factories. Ship-

[1] US Census Bureau, Income in the United States: 2021 census.gov/data/tables/2022/demo/income-poverty/p60-276.html

[2] Schmitz (2020b) notes that from 1960 to 1972, shipments of small factory-built homes increased from 10 percent to 60 percent of total single-family home production. As the HUD Code was established in 1976, we can only make apples to apples comparisons thereon.

[3] The New York Times (1972), *In a Mobile Home: Cozy and It's Yours*.

[4] See US Department of Housing and Urban Development, Office of Policy Development and Research and NAHB Research Center (2000), Ernest Cline's *Ready Player One* and mobilehomeliving.org/stacked-mobile-homes-highrises for examples.

ments of new manufactured homes have been stagnating around ten percent of total single-family housing starts for two decades. Manufactured housing represents about six percent of the nation's housing stock.[5]

Manufactured homes have many attractive qualities. They are built to a high national standard.[6] Because they are factory-produced, homes are built in days, rather than months, and manufacturers can profitably build small (the average manufactured home is less than half the size of the average site-built home). The relative cost per square foot to build a manufactured home has dropped from 55 percent in the 1990s[7] to 29 percent today.[8] As such, they are affordable: manufactured homes cost less than half the price per square foot of new site-built housing.[9] Given their cost effectiveness - and given that today, the supply of existing homes for sale has never been tighter[10] - it is puzzling[11] that we are not building more manufactured homes.[12]

To investigate why, I merge the results of more than 20 successful federal and state freedom of information requests with various public datasets to build a comprehensive database. I track each manufactured home in Texas - the nation's largest manufactured home producer and consumer - as it moves from factory to dealership to its first buyer. Using the evolution of the industry from 1995 through 2020, I show that this restriction in manufactured housing supply is consistent with vertical foreclosure.

Following O. Hart and Tirole (1990), I define foreclosure as the restriction of output in one market through the use of market power in another market. The upstream manufacturer extends financing - a form of inventory financing called "flooring" or "floor plan" financing - to downstream retailers to restrict output in the downstream market. I show that the greater the share of integrated floor-

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[5] An estimated 17 million Americans live in manufactured homes. data.census.gov/table?q=b25033+2021

[6] When placed on owned land, they appreciate like site-built homes (Consumers Consumers Union 2003).

[7] US Department of Housing and Urban Development and NAHB Research Center (1998).

[8] Home Builder Digest (2019), *How Much Does it Cost to Build a Custom Home?*.

[9] US Census Bureau, 2021 Cost and Size Comparisons census.gov/programs-surveys/mhs/tables/time-series/sitebuiltvsmh.xlsx

[10] Joint Center for Housing Studies of Harvard University (2021).

[11] There is no state or county in the US where a renter working full-time at minimum wage can afford a two-bedroom apartment (nlihc.org/oor).

[12] Schmitz (2020a) suggests that many of the crises facing low- and middle-income Americans - the US housing crisis included - are the result of "toothless" monopolies sabotaging low-cost alternatives that the poor would purchase.

ing loans in a market (the share of inventory loans extended by lenders who are integrated with manufacturers), the lower the number of homes shipped to a market, and the higher the prices. The implied differences are substantial. My results suggest that going from a market with no integrated flooring to one with a 20 percent market share of integrated flooring is associated with a 16 percent drop in manufactured home shipments, and a three percent increase in prices. A look at the raw data is helpful.

In Table 2.1, we see that the numbers of manufacturers, plants and retailers in the industry have dropped by half since the 1990s. By contrast, the numbers of floor lenders - both independent floor lenders and floor lenders who are integrated with manufacturers - have remained stable. This masks massive change and consolidation. In late 2002, the independent Conseco Finance, who provided over 20 percent of the industry's flooring, filed for bankruptcy. The second largest lender, Deutsche Financial, liquidated its flooring portfolio soon after. An estimated 40 percent of the industry's flooring, suddenly gone.

Integrated lenders step in, offering floor plan financing not only for their parent manufacturer's homes, but for their competitors' homes. The share of inventory floored by integrated manufacturers rises to 87 percent, alongside the integrated share of manufactured home production. Aggregate production drops. The manufactured housing share of single-family housing starts drops. These are strong trends that are consistent with vertical foreclosure. They might also be consistent with other stories, perhaps efficiency- or demand-based ones. I will show that my results are robust to various specifications and sources of identification, with vertical foreclosure explaining what happens in manufactured housing when integrated manufacturers extend floor plan financing to retailers.

The empirical literature on vertical foreclosure thus far is sparse.[13] Hortaçsu and Syverson (2007) show that over 34 years in the cement and ready-mixed concrete industries, foreclosure does not drive patterns in the data. Asker (2016) studies exclusive dealing arrangements in the Chicago beer market, and also finds no evidence of anticompetitive foreclosure effects. But J. Boehm and Sonntag (2023) do find evidence that buyer-seller relationships are more likely to break after a supplier vertically integrates with a buyer's competitor. I add support that, at least when finance is involved, vertical relationships can have anticompetitive effects.

[13]The literature on manufactured housing is even more sparse. See the aforementioned Schmitz papers, Banga (2022) for work on price regulation in the manufactured home loan market, and Becker and Rickert (2019) and Becker and Yea (2015) for work on the economics of manufactured home communities.

Table 2.1
Evolution of the Manufactured Housing Industry in Texas

	1995	1998	2001	2004	2007	2010	2013	2016	2019
Number of manufacturers	29	25	20	19	18	10	9	10	14
Number of plants	61	72	46	32	34	25	26	28	35
Number of retailers	434	723	583	340	298	241	282	294	318
Number of integrated floor lenders	2	3	4	2	2	3	2	3	3
Number of independent floor lenders	47	59	63	66	63	47	60	57	51
Integrated share of flooring loans (%)	13	22	19	43	71	77	81	85	87
Integrated share of MH production (%)	6	25	19	25	41	51	53	56	53
MH sold (in thousands)	33	45	21	11	11	8	12	13	16
MH share of building permits (%)	47	45	19	7	9	12	13	12	12

Notes: This table shows summary statistics for various segments of the manufactured housing industry in Texas. Per year: manufacturers and plants ship at least ten homes to Texas; retailers sell at least five homes to buyers in Texas; floor lenders provide floor plan financing for at least one dealership in Texas. Integrated floor lenders are integrated with a manufacturer. MH = manufactured housing.

Data: TDHCA, TxDMV, Texas Secretary of State, US Census Bureau

2.2 Development of Hypotheses

Consider the ex-post monopolization model of O. Hart and Tirole (1990), adapted for manufactured housing. The game is illustrated in Figure 2.1. We have a manufacturer, M, who is a monopoly producer of manufactured homes with marginal cost c. M supplies two downstream retailers, R_1 and R_2, who compete to sell homes in the same local market. The retailers can also buy from a second, higher-cost competitor.

In the first stage of the game, M offers each retailer a contract; the retailers order quantities, and pay. In the second stage of the game, M ships the homes to the retailers; the retailers observe each others' quantity choices, and set their prices. Downstream competition is Bertrand with capacity constraints, which is sensible here as manufacturers produce to order. Under Kreps and Scheinkman (1983) conditions, the equilibrium is Cournot.

M would like to offer the monopoly price and quantity to both retailers, but as O. Hart and Tirole (1990) point out, as soon as one retailer agrees, M has the incentive to sell more than the monopoly quantity to the other retailer. (M takes the quantity as given for the contracted retailer and reoptimizes quantity for the other retailer). This lowers the profits of the first retailer, making him unwilling to sign in the first place. In other words, M can't make the full monopoly profit without distorting downstream competition. To restore monopoly power, he needs either

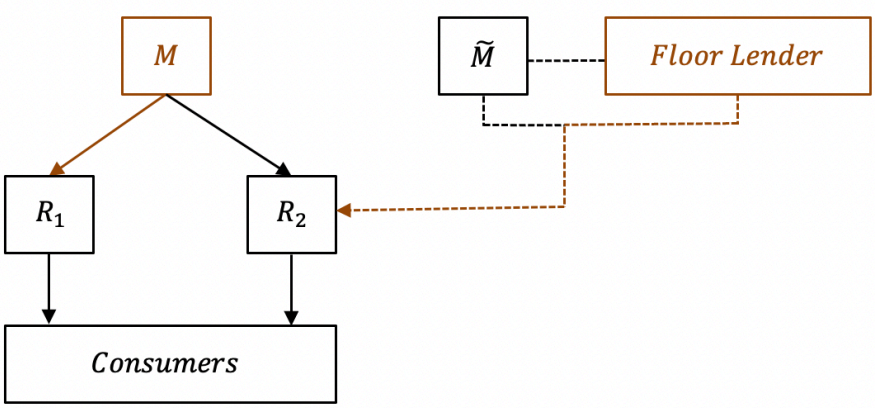

Figure 2.1 - M is integrated with a floor lender; $\tilde{M}$ is not.

control rights over R_1, or to credibly commit to limiting his future production.

In O. Hart and Tirole (1990), the manufacturer achieves this with vertical integration. M can integrate with R_1 and sell nothing to R_2, but then R_2 will second source from the higher-cost competitor. So M integrates with R_1 and still sells to R_2 - at a price that just undercuts the higher-cost competitor. This yields an asymmetric Cournot outcome downstream, with the unintegrated R_2 facing higher costs than the integrated R_1: vertical foreclosure (VF). This framework leads to the following testable implications:

Implication 1: Vertical integration motivated by VF should result in lower quantities and higher average prices in downstream markets.

Implication 2: M ships fewer homes to R_2, or charges R_2 a higher price. Integrated retailers gain downstream market share.

Implication 3: The greater the upstream cost asymmetry (the higher the cost of bypassing M), the greater M's incentive for VF.

2.2.1 Discussion

In our context, M is the integrated manufacturer-cum-floor lender who "integrates" with R_1 downstream by extending floor plan financing. This is similar to the Coasian durable goods argument in Murfin and R. Pratt (2019), where producers face consumers who are unwilling to buy heavy equipment because prices might fall (ie, they face competition from their own future production). Murfin and R. Pratt (2019) suggest that manufacturers financing their own products is a commitment to restrict production that encourages consumers to buy, because risky debt makes lender profits sensitive to the threat of borrower default. The same argument applies here: providing financing allows M to internalize the price impact of his production choices.[14]

The higher-cost competitor is the unintegrated manufacturer with outside flooring. Why would this competitor be higher-cost? The list of the integrated manu-

[14]Cestone and White (2003) also apply the Coasian commitment problem to finance: the well-informed investor will be tempted to fund another firm. In Cestone and White (2003), the solution to the Coase problem is equity ownership.

facturer's competitive advantages is long.

The integrated manufacturer can set the price of a home and its financing to maximize the joint profits of manufacturing and lending. Benetton, Mayordomo, and Paravisini (2021) show that the liquidity contrained integrated manufacturer can increase the cash collected from car sales by relaxing lending standards and reducing loan amounts.

The integrated manufacturer can provide a bundle, the home and the loan, while unintegrated manufacturers must refer dealers to independent lenders. Nalebuff (2000) shows that the integrated firm offering a version of each component in a system with many components gains market share against firms offering a single component, to a point that can offset a price reduction from an increase in competition from bundling, as the unintegrated firms face multiple marginalization problems.

The ability to provide credit can be a more effective competitive weapon than price. We see this often, especially in housing and cars, as in Grunewald and Lanning (2020), where consumers are less responsive to finance charges than to vehicle charges.

The integrated manufacturer usually has better knowledge than a banking relationship alone would supply. Stroebel (2016) shows that asymmetric information about collateral quality – newly developed properties, in his case – leads to significant adverse selection and nonintegrated lenders charging higher interest rates.

The integrated manufacturer can insulate dealers from the vagaries of the credit market. Historically, lenders think of wholesale credit as hazardous: tight money conditions severely affect the availability of wholesale credit. While integration is no guarantee - see Benmelech and Meisenzahl (2017), who show that growing illiquidity at non-bank institutions like captive finance companies led to the collapse in car sales in 2008 (while noting that car dealerships list a lack of floor plan financing as a first-order reason for the decline in car sales) - some bumps can be handled. General Motors successfully introduced the diesel locomotive to a devastated railroad industry during the Depression, while more than 70,000 miles of railroads were in receivership, by financing its sale.

In periods of liberal credit, the integrated manufacturer can either retire from the floor lending market, or guarantee himself a market in the dealers buying his homes.

And then there is the positive use of credit. Banner (1958) points out that captive finance companies cannot be relied on to react in the way monetary authorities anticipate. While independent lenders tighten lending standards and ration credit as rates increase, the integrated manufacturer – knowing these conditions exist –

may take advantage of the situation to enhance his market position. The limitation on credit for his competitors' products could even be his impetus to provide credit: "At such a time new markets can be invaded and a broader distribution of products achieved." This is Implication 3. The greater the upstream cost asymmetry, the greater $M\acute{s}$ incentive for VF, and the closer we get to the inefficient monopoly outcome.

2.3 Empirical Strategy

My empirical approach is straightforward. I will compare the data with the implications of foreclosure theory. Does integrated financing result in higher prices and lower quantities in downstream markets? Do retailers with integrated financing gain downstream market share? As the integrated manufacturer's incentive for VF increases, do markets more closely approach the monopoly outcome? To generate plausibly exogenous variation in the level of integrated flooring in markets, I will use national acquisitions of downstream dealership chains by manufacturers (where some of the acquiring manufacturers provide inventory financing, and some do not). For plausibly exogenous variation in the integrated manufacturer's incentive for VF, I will use changes in upstream competition generated by the unexpected demand for Federal Emergency Management Agency (FEMA) trailers after Hurricane Katrina, which monopolized the production capacity of manufacturers awarded FEMA contracts throughout the US.

This project is motivated by the sluggish manufactured housing supply - why aren't we producing more manufactured homes? - but the industry provides a particularly nice setting for study:

Manufacturers in almost all states, Texas included,[15] are barred from selling directly to consumers. Manufacturers sell only to licensed retailers - à la O. Hart and Tirole (1990).

Manufactured homes are big, bulky objects. Moving one costs minimum $5,000,[16] a sizable chunk of the total selling price of a home, and this scales up with size and distance. These transportation costs severely limit the market radius of each factory and dealership. Texas law restricts transportation of oversize loads to daylight hours, so manufacturers typically locate their factories within a day's drive[17] from the markets they serve: about 250 miles. These costs cut even deeper for retailers, who rarely sell homes to consumers more than 50 miles away: 75 percent of new manufactured homes sold in Texas from 1995 through 2020 are installed within 30 miles of the dealership that placed the order. These nice retailer markets are the downstream markets we are interested in: the retailers playing the Bertrand-Edgeworth games.

[15] Texas Manufactured Housing Act
statutes.capitol.texas.gov/Docs/OC/htm/OC.1201.htm

[16] Homes Direct (2022), *How Much Does it Cost to Move a Manufactured Home?*.

[17] See Grissim (2006).

As Texas law also mandates oversize trip permits for oversize loads traveling on Texas roads - and as mentioned, manufactured homes are oversize - the movement of homes reported on trip permits between factories, dealerships, and buyers will allow us to define and study local downstream markets that capture actual competition between retailers.

2.3.1 Data

For the sake of brevity, the blow-by-blow histories of the various datasets, and how they are merged, are left for Chapter 3. But in every case, I require either a HUD label[18] match or at least three consistent data points (eg, I match without a HUD label if a reported manufacturer name, factory address, or model [1] corresponds with a reported serial number [2], and that serial number falls sequentially in line with a reported manufacturing date [3]).

In addition to oversize trip permits from the Texas DMV (TxDMV), my analysis rests on a few key datasets. The Texas Department of Housing and Community Affairs (TDHCA) released physical address, license, name, DBA/trade name, and ownership changes for licensed manufacturers and retailers in Texas since the 1980s. Around 20 percent of the dealerships in Texas from 1995 through 2020 changed names or ownership at least once, and dealerships publicly report only their mailing addresses (which can be miles, cities, or even states away from their physical locations), so this information is crucial. It allows me to confidently build maps of plants and dealerships over time. For example, Figure 2.2 shows the supplier relationships between factories and dealerships in 2020. Note that in 2020, as in other years, plants in neighboring states - here, in New Mexico and Louisiana - are definite players in some Texas markets. This is not a problem, as we are interested in homes shipped to local markets, and competition within those markets - not "homes produced in Texas."

The TDHCA also give us Statements of Ownership and Location that detail sundry characteristics of each home - eg, the HUD label, serial number, manufacturing date, model, weight and dimensions - along with the name and address of each home's buyers. These ownership statements allow me to back out missing information from used homes and homes produced in other states, and to add

[18] HUD certification labels (or HUD tags) uniquely certify that a manufactured home was built to HUD Code.

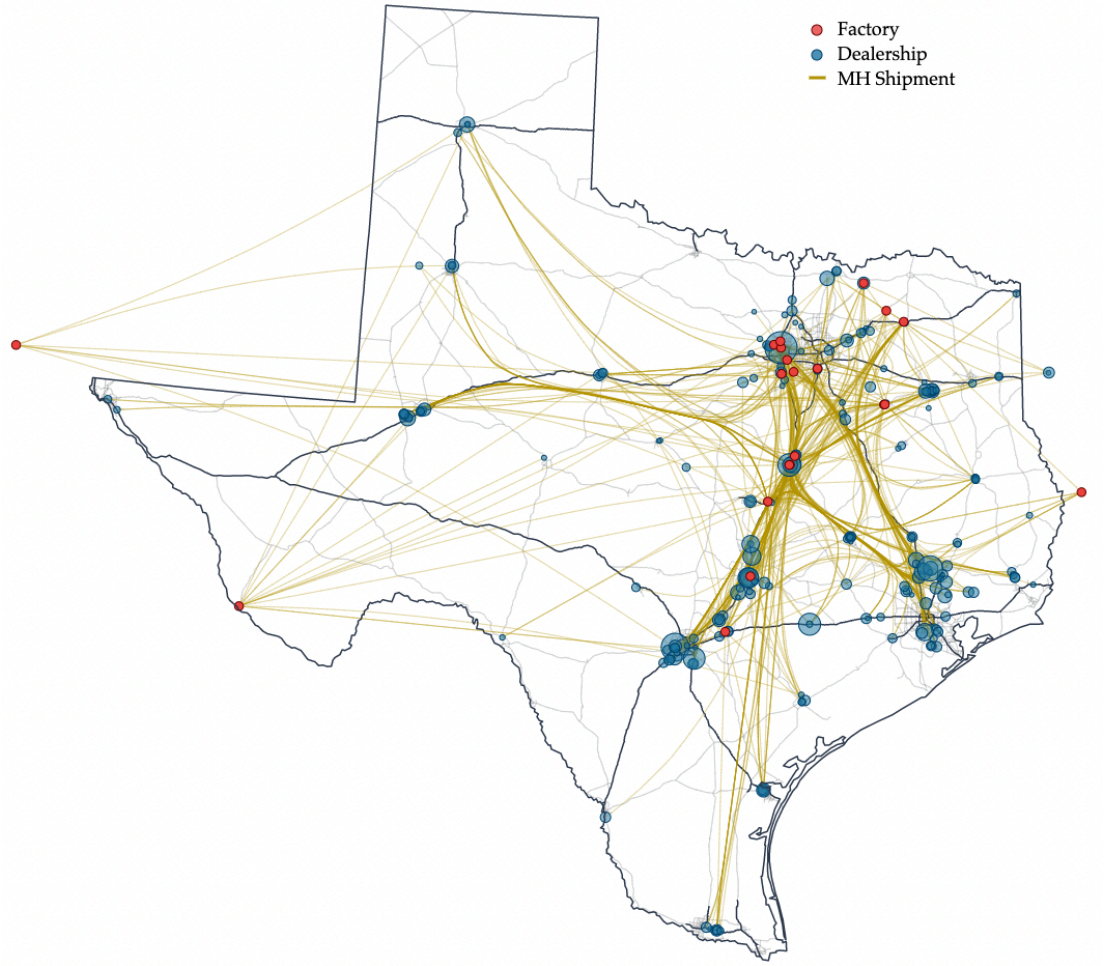

Figure 2.2 - The Manufactured Housing Industry in 2020

Notes: This map shows the manufactured homes shipped from factories to dealerships in Texas in 2020. Dealerships, in blue, are sized by the number of homes received. Paths between factories and dealerships, in yellow, are drawn only when a factory shipped at least two homes to a dealership. MH = manufactured home.

Data: TDHCA, TxDMV

housing characteristics to any price regressions.

Information on flooring contracts comes from three sources: Uniform Commercial Code (UCC) financing statements filed with the Texas Secretary of State, inventory finance liens released by the TDHCA, and older inventory finance liens that were not released by the TDHCA but were publicly accessible online.[19] Legally, only inventory finance liens reported to the TDHCA are valid and enforceable, but as many floor lenders still file UCC financing statements, and we are interested in flooring loans extended to retailers - not flooring liens that are legally enforceable - I use all available information. For a nice introduction to UCC filings, see Edgerton (2012).

Pricing data comes from Texas counties, via Zillow ZTRAX. Unfortunately, these prices are "market values," not sales prices.[20] But Texas counties have the actual sales prices of manufactured homes sold in their appraisal district, as retailers in Texas are required to submit monthly inventory tax statements listing each manufactured home alongside its "Purchaser's Name" and "Sales Price." It would be more difficult for counties to come up with their own valuation system than it would be for them to use the sales prices the retailers send. I deflate these values using the US Bureau of Labor Statistics's manufactured home price index.

Table 2.2 presents summary statistics for all control variables used in the regressions, broken down by whether or not a home was floored by an integrated lender. The two columns on the right show the average differences and associated standard errors between the groups, controlling for the year a home was produced. The homes that are floor financed by integrated and independent lenders are remarkably similar. Manufactured homes in Texas are personal property by default; we see that the share of homes that are later converted to real property is small for both groups - around 16 percent. The vast majority of homes, however, are installed on private property, not in manufactured home communities.

The percent of homes sold by "factory-owned" dealerships - meaning dealerships that are owned by a manufacturer - varies considerably from year to year. On average, we see that around 27 percent of homes floored by integrated lenders, and

[19] The older liens were likely not released because their information has not been transferred into the TDHCA's current inventory financing database, but I found them via an API that works with the released liens, and they are internally consistent - eg, the reported dates line up with the reported HUD labels, and the reported lenders were active floor lenders during the reported years - so I have no reason to doubt them.

[20] Manufactured homes are taxed as personal property, separate from the underlying land, so each home - homes on leased land included - nearly always has its own, distinct assessment record. Records listing sections from multiple different homes are dropped.

TABLE 2.2
SUMMARY STATISTICS OF CONTROL VARIABLES,
MANUFACTURED HOMES IN TEXAS FROM 1995 THROUGH 2020

	Integrated Flooring	Independent Flooring	Δ	SE
Installed in park (%)	17.4	18.6	-2.5	0.1
Real property (%)	16.0	15.6	-3.7	0.2
Manufacturer				
Is lender (%)	59.3			
Out of state (%)	7.1	16.6	-5.9	0.2
Retailer				
Factory-owned (%)	26.7	39.7	-13.4	0.3
Is builder (%)	19.3	31.5	-12.5	0.2
Out of state (%)	0.34	0.33	-0.2	0.0

	Integrated Flooring		Independent Flooring			
	median	*mean*	*median*	*mean*	Δ	SE
Sections	1	1.5	1	1.5	-0.0	0.0
Square Feet	1,296	1,415	1,248	1,397	-44.4	2.2
Weight	25,840	25,937	23,920	24,544	-214.6	35.0
Days at dealership	109	160	104	153	-3.75	1.0

Notes: This table shows summary statistics for the control variables in the analysis. The full dataset includes 449,821 new manufactured homes produced in or shipped to Texas from 1995-2020. The second-to-last column shows the integrated flooring coefficient in a regression of the characteristic on an indicator for integrated flooring and year fixed effects. The last column shows standard errors of the estimate.

Data: TDHCA, TxDMV, Texas Secretary of State

around 40 percent of homes floored by independent lenders, are sold by factory-owned dealerships.[21] But less than sixty percent of homes floored by integrated lenders are floored by the home's manufacturer. In other words, more than 40 percent of the homes integrated lenders choose to provide inventory financing for are built by their competitors.

Approximately 11 percent of the homes produced in Texas are eventually sold to buyers in other states. Homes that are shipped to a Texas dealership, then sold out of state, are included in the sample (so long as they remain on the lot for more than ten days). Homes that are shipped to dealerships in neighboring states, but are sold - new - to a Texas buyer within three months, are also included. All other homes that are immediately shipped out of state are dropped from the sample. On average, it takes a dealership 100 to 150 days to sell a manufactured home.

Figure 2.3 depicts the manufactured housing industry in Texas in 1998, given the data discussed so far: the factories, the dealerships, the buyers and the flooring. For the manufactured housing industry in 2018, 20 years later, see Figure B.1 in the Appendix. For a breakdown of the top players in the flooring, builder, and retailing markets by year, see Tables B.1 to B.3 (also in the Appendix).

2.3.2 Defining a Local Market

The goal here is to determine whether or not manufacturers are using flooring to act monopolistically within local downstream markets, so how we define a local market matters. We want each market to capture retailers in competition with each other, which is not the same thing as retailers within a county, or retailers within some market radius (though the high transportation costs do provide a nice upper bound). We also want the local markets to remain constant, even while the underlying flows of population, production lines and dealerships change considerably over the decades in question.

To identify local markets, I first transform each retailer's raw catchment from geodetic to planar coordinates, and split the bounding polygon into a hexagon grid.[22] I rank the likeliness of retailer sales to a particular cell in the grid by the fraction of homes sold by a retailer that he ships to said cell, and define each retailer's catchment area as the concave hull of the highest-ranked cells generating

[21] In 2020, about 25 percent of manufactured homes were shipped to factory-owned dealerships.

[22] Of the shapes that tile (triangles, squares and hexagons), only hexagons have all neighbors the same distance away. See Tiling the Earth with Hexagons (video).

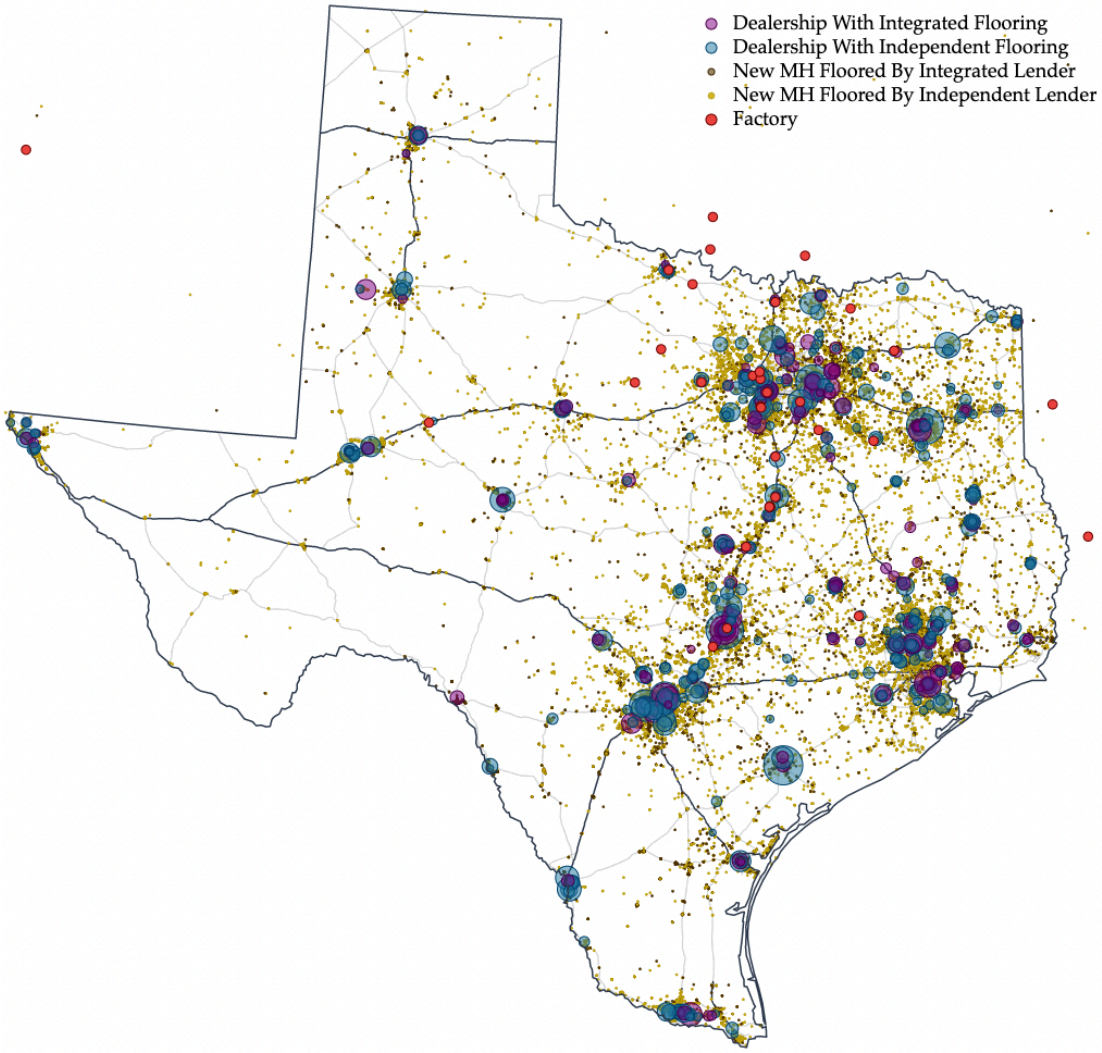

Figure 2.3 - The Manufactured Housing Industry in 1998

Notes: This map shows the industry's factories, dealerships, buyers and flooring in Texas in 1998. Dealerships are sized by the number of homes received. MH = manufactured home.

Data: TDHCA, TxDMV, Texas Secretary of State

80 percent of his sales. If the majority of a retailer's sales fall within another retailer's catchment area, I consider the two retailers competitors in the same local market. See Figure 2.4. In the panel on the right, which shows the raw catchment of four dealerships (as determined by the destinations listed on oversize trip permits where each dealership is the origin), the orange and red dealers are grouped in the same local market.

Table 2.3 shows summary statistics for the 45 local markets I find. Growth and population are unevenly distributed across Texas – 90 percent of Texans live in urban areas today, while 85 percent of its land mass is working agricultural (farms and ranches) - so there is significant heterogeneity in the geographic and constituent sizes of local markets. The average number of retailers in a market-year in the sample is 11. The largest market has 71. Nine different builders ship homes to the average market, but in one market-year (in the 1990s), 25 builders contributed. The average number of homes shipped to a market is 388; the largest is over three thousand. See Figure 2.5 for a rough map.

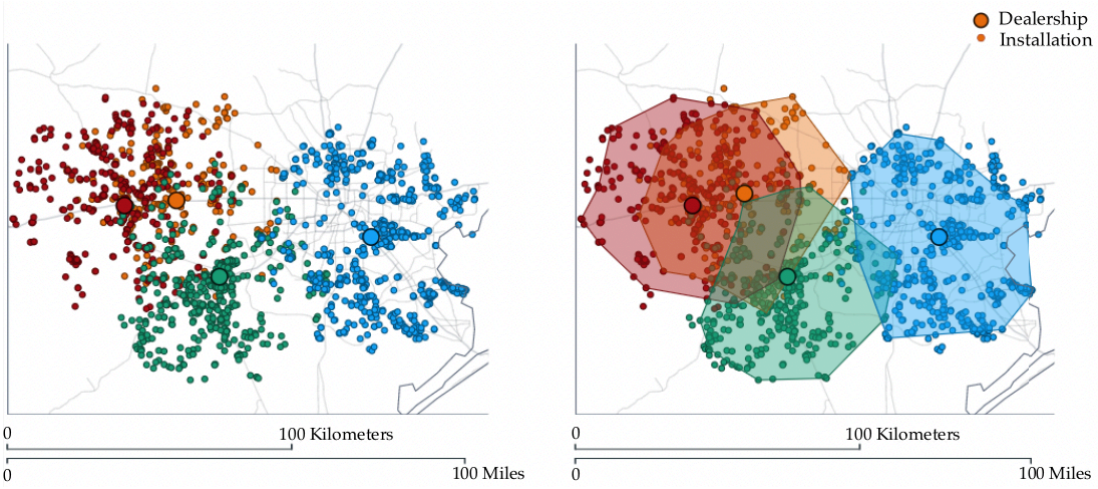

Figure 2.4 - Retail Catchment

Notes: The panel on the left shows the raw catchment of four dealerships, as determined by the destinations listed on oversize trip permits. The panel on the right shows each dealer's calculated catchment area. As the majority of the orange dealer's catchment area falls within the red dealer's catchment area, the orange and red dealers are grouped in the same local market.

Data: TDHCA, TxDMV

TABLE 2.3
SUMMARY STATISTICS OF DOWNSTREAM MARKET STRUCTURE
(1,152 MARKET-YEARS)

	Mean	Min	Q1	Q2	Q3	Max	SD
Number of retailers	11	2	5	8	14	71	9
Retailer HHI	2,487	290	1,329	2,047	3,040	10,000	1,798
Number of homes sold	388	22	127	235	463	3,814	463
Approximate area (miles^2)	3,700	20	2,200	3,150	5,000	9,350	2,350
Integrated flooring share (%)	33	0	4	27	57	100	31
Upstream supply							
Number of plants	20	1	12	18	25	61	11
Number of manufacturers	9	1	5	8	11	25	4
Manufacturer HHI	3,135	744	1,902	2,733	3,837	10,000	1,728
Number of floor lenders	8	1	5	8	11	25	5
Floor Lender HHI	3,033	808	1,632	2,540	3,855	10,000	1,869

Notes: This table shows summary statistics for the 45 local markets found in Texas. Per market-year: retailers sell at least five homes to buyers in Texas; plants and manufacturers ship at least one home to a market and at least five homes to Texas; floor lenders provide floor plan financing for at least one retailer in a market. The integrated flooring share is the share of inventory in a market floored by lenders who are integrated with a manufacturer.

Data: TDHCA, TxDMV, Texas Secretary of State

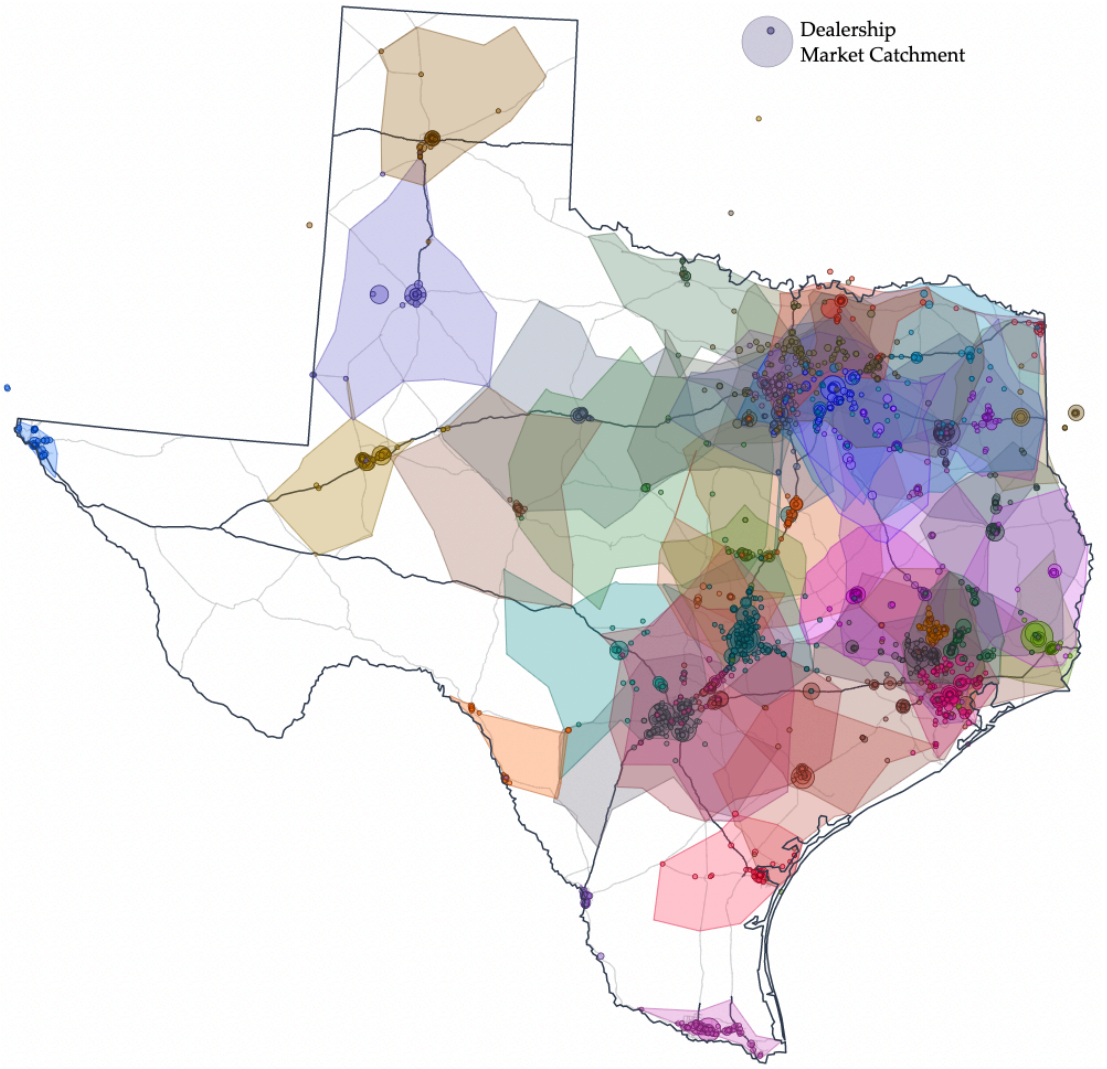

Figure 2.5 - Local Markets in Texas

Notes: This map shows the approximate catchment areas of the 45 local markets found in Texas, along with their constituent dealerships. Dealerships are sized by shipments received, and colored to match their respective local markets. Each market's "catchment area" is the concave hull of its constituent dealers' calculated catchment areas; these catchment areas are meaningful only insofar as they were used to determine the local markets.

Data: TDHCA, TxDMV

2.4 Shipments, Prices and Integrated Flooring

Foreclosure theory implies that integrated flooring motivated by VF should result in lower quantities and higher average prices in downstream markets. Using the markets just defined, I will show that the patterns in the data are consistent with VF. Then, I will confirm that these results are robust to numerous specifications and sources of identification.

2.4.1 Does Integrated Flooring Lower Quantities and Raise Prices?

Economic activity in the industry is generally reported in terms of shipments: units shipped from factories. The first two columns of Table 2.4 report the coefficients obtained by regressing total logged shipments to downstream markets on the integrated share of flooring loans (the percent of flooring loans in a market by integrated floor lenders). In the second two columns, I regress logged prices in a market on the integrated share of flooring loans, and a bevy of controls to account for housing characteristics: the number of sections, weight and titling of a home (personal property or real property), and whether the home is in a manufactured home community.[23] Year fixed effects are included in all specifications to account for the aggregate movement evident in Table 2.1; specifications are reported both excluding and including market fixed effects. Because we are interested in competition within local markets - the retailers playing the Bertrand-Edgeworth games - we focus on the latter (Columns 2 and 4).

We see that the greater the share of integrated flooring loans in a market, the lower the shipments, and the higher the prices. The implied differences are large and significant. Columns 2 and 4 imply that going from a market with no integrated flooring to one with a 20 percent market share of integrated flooring is associated with a 16.4 percent reduction in shipments, and a 3.5 percent increase in

[23] ie, in a mobile home park / on leased land. In Texas, manufactured homes are personal property by default (chattel), but owners who also own the underlying land can choose to convert their homes to real property. Many who have this option opt against the conversion, perhaps to avoid encumbering their land (Freddie Mac and The Center for Community Capital at the University of North Carolina at Chapel Hill 2020). In some states, Texas included, manufactured homes on leased land can also occasionally be titled as real property.

Table 2.4
Market-Level Relationships Between Quantities, Prices and Integrated Flooring

	Total Shipments		Prices	
	(1)	(2)	(3)	(4)
Integrated share of flooring	-0.62	-0.60	0.23	0.16
	(0.27)***	(0.16)***	(0.01)***	(0.06)***
R^2	0.25	0.29	0.58	0.58
Observations	1,117	1,117	282,971	282,971
Year FE	Yes	Yes	Yes	Yes
Market FE		Yes		Yes

Notes: The prices and total quantities of new manufactured homes shipped to a downstream market in Texas are regressed on the market share of integrated floor lending. Hedonic controls in the price regressions include the number of sections, weight and titling of each home, and whether the home is in a manufactured home community. Standard errors are clustered by market. *p < 0.10, **p < 0.05, ***p < 0.01.

Data: TDHCA, TxDMV, Texas Secretary of State, Data provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at http://www.zillow.com/ztrax. The results and opinions are those of the author and do not reflect the position of Zillow Group.

prices. Since 1995, the aggregate market share in Texas of integrated flooring has increased from 13 percent to 87 percent.

2.4.2 Do Integrated Retailers Gain Market Share?

Foreclosure theory predicts that integrated retailers - defined here as retailers with at least one integrated floor lender in a given year - will gain market share, as the integrated manufacturer either ships fewer homes to unintegrated retailers, or charges unintegrated retailers a higher price. Are integrated retailers less likely to exit a market?

In Table 2.5, I regress an indicator for whether a retailer exits a market in the next year on an indicator equal to one if the retailer has an integrated floor lender,

Table 2.5
Likelihood of Retailer Exit from a Downstream Market

	(1)	(2)	(3)	(4)
Integrated retailer indicator	-7.28		-3.98	
	(0.81)***		(0.92)***	
Integrated share of flooring		-7.24		-4.18
		(1.00)***		(1.24)***
Number of homes sold			-11.52	-11.60
			(0.49)***	(0.49)***
R^2	0.02	0.02	0.10	0.10

Notes: An indicator equal to 100 if a retailer exits a market in the next year is regressed on either an indicator equal to one if a retailer has at least one integrated floor lender, or the share of the retailer's flooring loans that are integrated. The sample consists of 10,280 retailer-year observations. Market and year fixed effects are included in all specifications, and standard errors are clustered by market. *p < 0.10, **p < 0.05, ***p < 0.01.

Data: TDHCA, TxDMV, Texas Secretary of State

or the share of the retailer's flooring loans that are integrated. Market and year fixed effects are included in all specifications. We see that, indeed, integrated retailers are significantly less likely to exit a market than their unintegrated competitors. Retailers with at least one integrated floor lender have a 7.3 percentage point lower probability of exit. Even controlling for the (logged) number of homes shipped to a retailer, retailers with at least one integrated floor lender have a 4.2 percentage point lower probability of exit. For comparison, the unconditional exit rate across retailers is 15.5 percent. This is consistent with the VF of unintegrated retailers.

One might worry the results can be explained by unobserved differences in retailer quality. If integrated floor lenders attract or choose higher quality retailers, this would lead to the higher observed exit rates for unintegrated retailers. But if the integrated floor lender has this knowledge, he should be more willing to lend to low-quality dealers than the independent lender, if flooring another home means selling another home. Moreover, if the results are due to efficiency, we would expect lower average prices and higher aggregate quantities downstream. In Table 2.4, we see the opposite.

In Table 2.6, I regress the logged quantities of new manufactured homes shipped to downstream retailers on an indicator equal to one if a retailer has at least one integrated floor lender, or the share of the retailer's flooring loans that are integrated. A retailer having at least one integrated floor lender is associated with receiving 30.8 percent more homes. The implied difference becomes even more stark when the sample is limited to shipments to dealers from integrated manufacturers. Again, this is consistent with VF. The integrated manufacturer, M, tilts shipments to favor the integrated retailer, R_1. The quantity q_1 of homes shipped to the integrated retailer increases - but q_1 increases by less than the quantity q_2 of homes shipped to the unintegrated retailer decreases. Aggregate shipments in a market fall, and average prices increase.

Table 2.6
Shipments of New Manufactured Homes to Downstream Retailers

	Full Sample		Integrated Builders	
	(1)	(2)	(3)	(4)
Integrated flooring indicator	0.27		0.52	
	(0.04)***		(0.05)***	
Integrated share of flooring		0.25		0.53
		(0.05)***		(0.06)***
R^2	0.02	0.02	0.07	0.07
Observations	10,173	10,173	4,643	4,643

Notes: The quantities of new manufactured homes shipped to downstream retailers in Texas are regressed on an indicator equal to one if the retailer has integrated flooring. Columns (3) and (4) limit the sample to shipments from integrated manufacturers. Market and year fixed effects are included in all specifications, and standard errors are clustered by market. *p < 0.10, **p < 0.05, ***p < 0.01.

Data: TDHCA, TxDMV, Texas Secretary of State

2.4.3 Robustness: Multi-Market Acquisitions

Now, we will revisit this evidence paying more attention to endogeneity. The fundamental empirical challenge here is that the manufacturer's choice to extend floor financing to retailers is endogenous to local economic conditions. If local demand is high, the likelihood that a retailer will sell the home and pay back his loan - and that the manufacturer can in turn sell more homes and capture a greater share of the market - increases. If lending is tight, the likelihood that a retailer can only purchase a home if the manufacturer provides flooring increases. Shocks to demand will affect both the level of lending and profitability.

The structural relationship of interest is the impact of flooring on shipments and prices:

$$y_{it} = \alpha_i + \gamma_t + \lambda X_{it} + \beta IntegratedFlooring_{it} + \epsilon_{it} \tag{2.1}$$

where y_{it} is an outcome for local market i in year t,
α_i are local market fixed effects,
γ_t are year fixed effects,
X_{it} is a vector of local market characteristics, and
$IntegratedFlooring_{it}$ is the integrated share of the market's flooring loans.

To identify the impact of integrated flooring on shipments and prices, I use variation in the extent of integrated flooring in local markets generated by multi-market acquisitions of downstream retailers by manufacturers, where some of the acquiring manufacturers provide inventory financing, and some do not. Perhaps surprisingly, factory-owned dealerships in general are not more likely to be floored by their parent manufacturer.[24] Retailers with a parent floor lender, however, are significantly more likely to use in-house flooring. It follows that markets exposed to acquisitions by integrated manufacturers - where I consider a market "exposed" to an acquisition if at least one constituent dealership is acquired - should see a plausibly exogenous increase in the market share of integrated flooring. Markets exposed to acquisitions by unintegrated manufacturers should not.

The critical identifying assumption, used first by Hastings and Gilbert (2005),[25] is that multi-market acquisitions are exogenous to other economic conditions that

[24] We see evidence of this in Table 2.2.

[25] See also Asker and Ljungqvist (2010), Nguyen (2019) and Zhang (2020).

might differentially affect local markets (ie, factors that might simultaneously affect shipments, prices and flooring market structure). To ensure this is true - that the acquisition events are large enough that we can assume they were based on considerations of the acquiring and target manufacturers as a whole, rather than on conditions in any given local market, and hence that we can reasonably claim their incidence is exogenous to economic conditions in local markets - I limit the sample to national acquisitions of large dealership chains (Table 2.7).

2.4.3.1 Description of the Acquisitions

Demand for manufactured homes was high in the 1990s, and early in the decade, two of the biggest builders - Clayton Homes and Oakwood Homes - began integrating downwards into distribution. By the mid 1990s, Clayton owned 143 dealerships and Oakwood owned 120 (Grissim 2006). This triggered what Grissim calls "an industry stampede" into retail distribution.

Acquisition 1 [unintegrated]. In 1998, Fleetwood Enterprises acquired HomeUSA, the leading independent national retailer of manufactured homes. Fleetwood CEO Glenn Kummer on the purchase: "The HomeUSA acquisition establishes Fleetwood as a major force in the manufactured housing retail sector. We are delighted with this ... outstanding group of retailers assembled by HomeUSA,

Table 2.7
Downstream Acquisitions

Year	Builder	Floor Lender	Acquires	Dealerships	In Texas
1998	Fleetwood		HomeUSA	91	5
1998	Champion	Crestpointe	A-1 Homes	60	33
2005	Clayton	21st Mortgage	Fleetwood Retail	121	30
2011	Cavco		Palm Harbor	49	34

Notes: This table lists the four national downstream acquisitions included in the sample, along with their respective numbers of affected dealerships.

and see this as a major step in our goal of becoming a vertically integrated manufactured housing company."[26]

Acquisition 2 [integrated]. A few months later, Champion Enterprises and its integrated floor lender, Crestpointe Financial, acquired the ICA Group (which sold homes under the more recognizable tradenames A-1 Homes, Homes of America and USA Homes). Champion CEO Walter Young said of the purchase: "Champion is now both a major producer and distributor of manufactured housing. We are acquiring some of the best and most profitable retailers in the country."[27]

As both 1998 acquisitions were national, large scale, and motivated by vertical integration into distribution,[28] our exogeneity assumptions are tenable.

The bankruptcies in manufactured housing begin in 2001.[29] American Homestar files for Chapter 11 bankruptcy in January. The following year, Conseco Finance defaults, and Oakwood files for Chapter 11 bankruptcy.

Acquisition 3 [integrated]. In 2005, Clayton and its integrated floor lender, 21st Mortgage, acquired over a hundred dealerships through its purchase of Fleetwood Retail. Clayton offered no comment at the time, but in his public announcement of Fleetwood's exit from the retail business, Fleetwood CEO Elden Smith noted that Clayton was "a well capitalized company."[30]

In 2009, both Fleetwood and Champion filed for bankruptcy. In 2010, Palm Harbor Homes filed for bankruptcy.

Acquisition 4 [unintegrated]. In 2011, Cavco Homes bought the assets of Palm Harbor: assets including 5 operating factories, 9 idled factories, and Palm Harbor's 49 retail locations.

These were eventful years, both in manufactured housing and outside it, and this history is far from exhaustive. But as all four acquisitions in the sample were motivated at the national level and involve national chains - national chains that, by design and to save on transport costs, spread out their dealerships - we can reasonably assume each market's exposure to an acquisition is as good as randomly assigned. That is, we can assume that there is no systematic difference between markets that would make a manufacturer more likely to have acquired a dealership chain. Table 2.8 offers further evidence that, conditional on controls, exposed

[26] sec.gov/Archives/edgar/data/314132/000031413298000004/0000314132-98-000004.txt

[27] Champion Enters Manufactured Housing Deal

[28] if not for the benefits of vertical integration, then in response to others' vertical integration into distribution

[29] In his 2008 letter to shareholders, Warren Buffett calls the 2004-2007 period in conventional housing an "eerie rerun" of the 1997-2000 years in manufactured housing.

[30] sec.gov/Archives/edgar/data/314132/000031413205000011/secexh9017705.txt

markets do not differ significantly from control markets in the years prior to an acquisition. As far as I know, no multi-market acquisitions by manufacturers of downstream dealership chains were excluded.[31] Markets exposed to single-market acquisitions by manufacturers - ie, the purchase of one dealership by a manufacturer - are dropped from the sample.

2.4.3.2 Results

I compare outcomes in markets exposed to a multi-market acquisition by an integrated manufacturer (treatment group) with markets exposed to a multi-market acquisition by an unintegrated manufacturer (control group 1). Both groups are also compared to markets where zero dealerships are acquired by a manufacturer (control group 2).[32] This allows separation of the impact of flooring from the market power effects of vertical integration in general, and suggests the following first-stage regression:

$$IntegratedFlooring_{it} = \kappa_i + \theta_t + \rho X_{it} + \upsilon E_{it} + \beta_f (E_{it} \times FloorLender_{it}) + \omega_{it} \quad (2.2)$$

where E_{it} indicates market i's exposure during year t to a multi-market downstream acquisition involving a manufacturer, $FloorLender_{it}$ indicates whether that manufacturer is also a floor lender, and

κ_i are local market fixed effects,
θ_t are year fixed effects, and
X_{it} is a vector of local market characteristics.

In this framework, the identification assumption is still one of parallel trends: absent the acquisition, the relative outcomes of markets affected by either category of acquisition would trend the same way. For easier examination of pre-trends and parallel trends, I estimate the event-study counterpart:

$$y_{iat} = \alpha_i + \gamma_t + \lambda_t X_i + \sum_\tau \psi_\tau (D^\tau_{at} \times E_{ia}) + \sum_\tau \delta_\tau (D^\tau_{at} \times E_{ia} \times FloorLender_a) + \epsilon_{iat} \quad (2.3)$$

[31] Several upstream acquisitions - for example, Clayton's acquisition of Karsten Homes - are excluded because the manufacturer owned no dealerships in Texas. The Oakwood acquisition is excluded from the sample because, of the 85 Oakwood dealerships in Texas that were active in the 1990s, zero were still active when Oakwood was acquired in 2004.

[32] I allow markets where dealerships change ownership but remain independent. Of the approximately 1,500 dealerships in the data, more than 20 percent change ownership at least once.

TABLE 2.8
SUMMARY STATISTICS FOR EXPOSED AND CONTROL MARKETS

Characteristic	Treatment (1)	Control 1 (2)	p-value (3)	Control 2 (4)	p-value (5)
Number of retailers	12.1	10.2	0.20	10.4	0.74
Retailer HHI	2514.6	2559.2	0.75	2508	0.70
Number of homes sold	241.6	177.0	0.17	280.5	0.12
Integrated flooring share	0.34	0.36	0.47	0.34	0.51
Upstream supply					
Number of factories	25.5	20.6	0.13	25.7	0.10
Manufacturer HHI	2631.4	2791.8	0.28	3034.6	0.14
Floor Lender HHI	2601.3	2770.3	0.48	2806.8	0.87

Treatment Group = Markets exposed to an acquisition by an integrated builder
Control Group 1 = Markets exposed to an acquisition by an unintegrated builder
Control Group 2 = Markets where zero dealerships are acquired by a builder

Notes: Summary statistics are generated by estimating regressions of pre-acquisition characteristics on the relevant indicators and market fixed effects. Column 3 reports the p-value for the difference between Columns 1 and 2. Column 5 reports the p-value for the difference between Columns 1 and 4.

Data: TDHCA, TxDMV, Texas Secretary of State

where y_{iat} is an outcome for market i during year t for acquisition a,
α_i are local market fixed effects,
γ_t are year fixed effects,
X_i is a vector of market characteristics with effects allowed to vary by year,
D_{at}^{τ} is a dummy equal to one if year t is τ years after acquisition a,
E_{ia} is a dummy equal to one if market i is exposed to acquisition a,
$FloorLender_a$ indicates whether acquisition a involves a floor lender, and
τ ranges from -3 to 4.

X includes the retailer HHI and floor lender HHI of the given market-year to control for the horizontal structure of the local market, and standard errors are clustered by market. The coefficient of interest is δ_τ, which measures the difference, conditional on controls, in an outcome between exposed and control markets τ years after an acquisition.

Figure 2.6 plots the estimated δ_τ, where the dependent variable is the share of integrated flooring in local market i during year t, and provides evidence for the first-stage relationship between exposure to an acquisition by an integrated manufacturer and integrated flooring. $\delta_\tau > 0$ indicates an increase in integrated flooring in markets exposed to an acquisition by an integrated manufacturer relative to markets exposed to an acquisition by an unintegrated manufacturer τ years after an acquisition.

Figure 2.6 shows that prior to an acquisition, exposed markets are not more likely than control markets to see an increase in the share of integrated flooring. But relative to controls, the likelihood increases the year following the acquisition, and continues to increase for several years. This difference becomes insignificant four years later. Table 2.9 presents the corresponding point estimates in Column 1. The estimated ψ_τ of Equation 2.3 are listed in Table B.4 in the Appendix. These results confirm an acquisition-by-an-integrated-manufacturer-induced increase in the level of integrated flooring in a market.

Figure 2.7 shows the reduced form relationship between logged total shipments to downstream markets and exposure to an acquisition by an integrated manufacturer, relative to an acquisition by an unintegrated manufacturer. In the years prior to an acquisition, up through the year following an acquisition, there is no evidence of a difference. Shipments drop in year two, then continue to fall. The corresponding point estimates are listed in Column 2 of Table 2.9. As predicted by foreclosure theory, an exogenous increase in the share of integrated flooring results in lower quantities shipped to a downstream market.

Figure 2.8 shows the reduced form relationship between the prices of homes

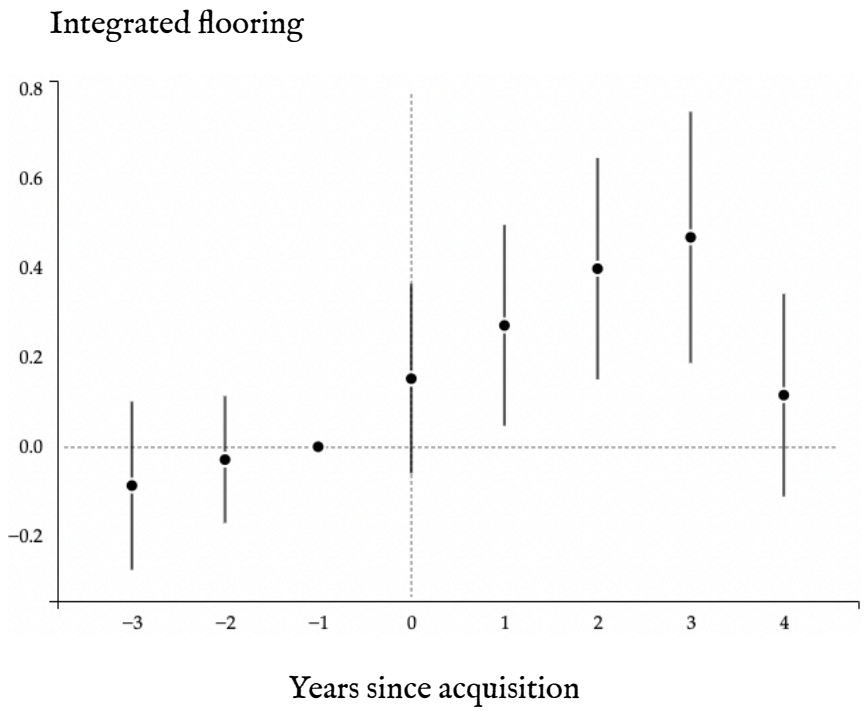

Figure 2.6 - Exposure to an Acquisition and Integrated Flooring

Notes: This figure plots the first-stage relationship between exposure to an acquisition by an integrated manufacturer and the market share of integrated flooring, relative to an acquisition by an unintegrated manufacturer. Coefficients are normalized relative to $\tau = -1$, where $\tau = 0$ is the year the acquisition occurred. The bars show 90 percent confidence intervals. Standard errors are clustered by market.

Data: TDHCA, TxDMV, Texas Secretary of State

Table 2.9
First Stage and Reduced Form Estimates

	Integrated Flooring	Shipments	Prices
	(1)	(2)	(3)
$\delta_{<-1}$	−0.03	−0.38	−0.04
	(0.09)	(0.30)	(0.19)
δ_0	0.15	0.43	0.12
	(0.13)	(0.58)	(0.26)
δ_1	0.27	−0.10	0.50
	(0.14)**	(0.55)	(0.20)***
δ_2	0.40	−1.01	0.47
	(0.15)***	(0.51)**	(0.21)**
δ_3	0.47	−1.62	0.38
	(0.17)***	(0.59)***	(0.25)
δ_4	0.12	−3.08	0.68
	(0.14)	(0.77)***	(0.21)***

Notes: This table shows estimates of Equation 2.3. The sample consists of 726 market-years. All regressions include the downstream retailer HHI and flooring HHI to control for the horizontal structure of the local market, and market and year fixed effects. Column 1 shows the first-stage relationship between integrated flooring and exposure to an acquisition by an integrated lender, relative to an acquisition by an unintegrated lender. Columns 2 and 3 show the reduced-form relationship between exposure to an acquisition by an integrated lender, relative to an acquisition by an unintegrated lender, and manufactured home shipments and prices, respectively. Hedonic controls in the price regressions include the number of sections, weight and titling of each home, and whether the home is in a manufactured home community. All coefficients are normalized relative to $\tau = -1$, where $\tau = 0$ is the acquisition year. Standard errors are clustered by market. *p < 0.10, **p < 0.05, ***p < 0.01.

Data: TDHCA, TxDMV, Texas Secretary of State, Data provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at http://www.zillow.com/ztrax. The results and opinions are those of the author and do not reflect the position of Zillow Group.

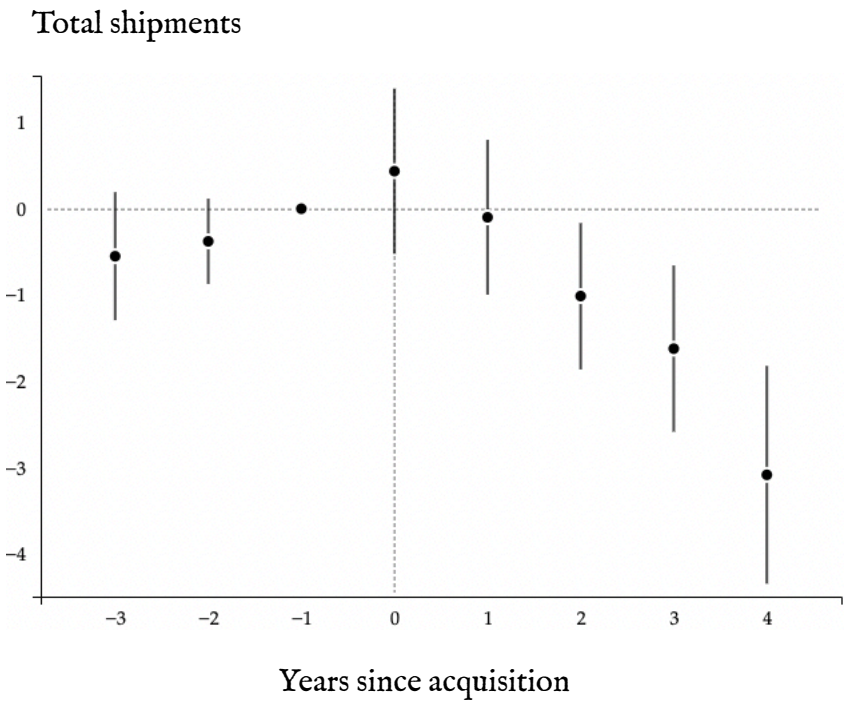

Figure 2.7 - Exposure to an Acquisition and Quantity

Notes: This figure plots the reduced-form relationship between exposure to an acquisition by an integrated manufacturer and the quantity of new homes shipped to a market, relative to an acquisition by an unintegrated manufacturer. Coefficients are normalized relative to $\tau = -1$, where $\tau = 0$ is the year the acquisition occurred. The bars show 90 percent confidence intervals. Standard errors are clustered by market.

Data: TDHCA, TxDMV, Texas Secretary of State

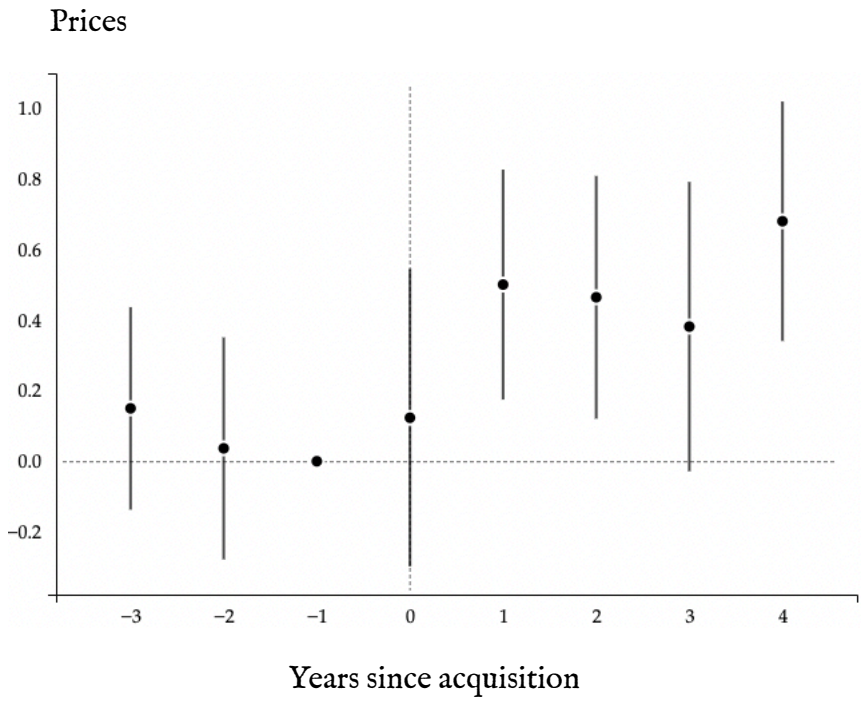

Figure 2.8 - Exposure to an Acquisition and Prices

Notes: This figure plots the reduced-form relationship between exposure to an acquisition by a manufacturer and the prices of new homes shipped to a market. Coefficients are normalized relative to $\tau = -1$, where $\tau = 0$ is the year the acquisition occurred. The bars show 90 percent confidence intervals. Standard errors are clustered by market.

Data: TDHCA, TxDMV, Texas Secretary of State, Data provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at http://www.zillow.com/ztrax. The results and opinions are those of the author and do not reflect the position of Zillow Group.

shipped to a downstream market and exposure to an acquisition by an integrated manufacturer, relative to an acquisition by an unintegrated manufacturer. To account for housing characteristics, I control for the number of sections, weight and titling of each home, and whether the home is in a manufactured home community. Again, in the years prior to an acquisition, there is little evidence of a difference. But relative prices increase the year following the acquisition - an increase that lasts. The corresponding point estimates are listed in Column 3 of Table 2.9. As integrated flooring motivated by VF would imply, a plausibly exogenous increase in the share of integrated flooring is associated with both higher prices and lower quantities in a downstream market.

2.5 Upstream Competition and Integrated Flooring

The theory predicts that the integrated manufacturer has more incentive for VF in markets where he has the greater advantage. The greater the upstream cost asymmetry - the greater the marginal cost difference between the integrated manufacturer and his higher-cost competitors - the greater the manufacturer's incentive to distort downstream competition, and the larger the negative impacts on consumers and welfare.

We can think of this upstream cost asymmetry as the cost of bypassing the integrated manufacturer for another upstream supplier. If many manufacturers and many floor lenders compete in a market, competition should be the main determinant of prices and shipments, as the manufacturer's ability to distort downstream competition depends on the presence of upstream market power. In this case, the integrated manufacturer has little incentive to strategically raise prices for "unintegrated" retailers, as retailers can costlessly second source. But if credit is scarce or the number of competing homes dwindles, the integrated manufacturer has the ability - through integrated flooring - to offer different prices to "integrated" retailers and their rivals, and to increase profits.

If manufacturers are using flooring monopolistically, then, markets should more closely approach the monopoly outcome as the cost of bypassing the integrated manufacturer increases. Prices should rise, and shipments should fall, as competition upstream becomes less fierce. Figure 2.9 illustrates the correlations we expect between the number of homes shipped to a market and upstream competition in our sample, conditional on the market share of integrated flooring.

The Justice Department considers markets with HHI measures below 1,000 competitive, markets with HHI measures above 1,000 moderately concentrated, and markets with HHI measures above 1,800 highly concentrated. As the manufacturer HHI increases beyond 1,800 and markets become less competitive, we see a stronger relationship between shipments and HHI in the panel on the right, which pictures markets in the top quartile of integrated flooring, than is evident for the remaining 75 percent of markets. This is consistent with the integrated manufacturer's strategic use of flooring for VF: his incentive to distort competition increases with both the HHI and his ability to use flooring monopolistically (the share of integrated flooring in a market).

Competitive markets are relatively rare in our sample, but nevertheless, there is no evidence of a relationship between shipments and HHI even for moderately competitive markets. This is true for markets both in the top quartile and in the

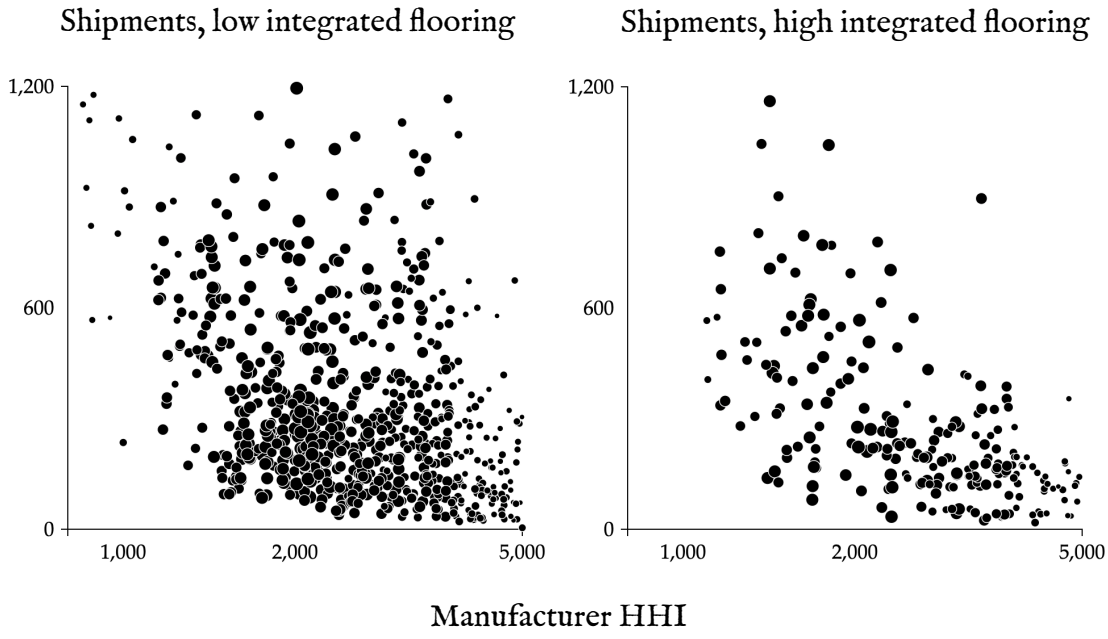

Figure 2.9 - Upstream Competition and Integrated Flooring

Notes: This figure plots the number of homes shipped to a downstream market in Texas versus the market's manufacturer HHI from 1995 through 2020. The panel on the left shows markets in the bottom 75 percent of integrated flooring; the panel on the right shows markets in the top quartile of integrated flooring (integrated floor lenders are integrated with a manufacturer). Dots are sized by the number of markets in the same shipments-HHI bin. The manufacturer HHI is defined as: $HHI = \sum_i^N s_i^2$, where s_i is the share of homes shipped to a market produced by manufacturer i.

$$\begin{aligned} HHI \leq 1000 &= \text{unconcentrated} \\ 1000 < HHI \leq 1800 &= \text{moderately concentrated} \\ HHI > 1800 &= \text{highly concentrated} \end{aligned}$$

Data: TDHCA, TxDMV, Texas Secretary of State

bottom 75 percent of integrated flooring.

This suggests a negative coefficient on the interaction term, which we can think of as the integrated manufacturer's incentive for VF, in the following model:

$$\begin{aligned} Shipments_{it} = \alpha_i + \gamma_t + \beta_1 IntegratedFlooring_{it} + \beta_2 BypassCost_{it} \\ + \beta_3 (IntegratedFlooring_{it} \times BypassCost_{it}) \\ + \lambda X_{it} + \epsilon_{it} \end{aligned} \tag{2.4}$$

where $Shipments_{it}$ is the number of homes shipped to market i during year t,
α_i are market fixed effects,
γ_t are year fixed effects,
$IntegratedFlooring_{it}$ is the integrated share of floored inventory,
$BypassCost_{it}$ is the cost of bypassing the integrated manufacturer, and
X_{it} is a vector of market characteristics.

As the cost of bypassing the manufacturer increases, shipments fall. The greater the share of integrated flooring in a market, the greater (more negative) the drop. But the typical measures of upstream competition in a market - the manufacturer HHI included - are endogenous.

Our goal is hence to test for the effects of integrated flooring on prices and shipments in downstream markets through exogenous shocks to upstream competition. Differential decreases in upstream competition should imply proportional exogenous increases in the integrated manufacturer's incentive for VF - the interaction term - and if manufacturers are using flooring for VF, we should see higher prices and lower quantities.

To identify this impact, I use the unexpected national production of FEMA trailers after Hurricane Katrina, which discretely and differentially affected competition in local markets by monopolizing the production capacity of manufacturers that were awarded FEMA contracts for months.

2.5.1 Description of the Disaster

Hurricane Katrina made landfall along the Gulf Coast on August 29, 2005, flooding 80 percent of New Orleans and destroying 300,000 homes.[33] Under the author-

[33] US Department of Homeland Security (2008)

ity of the Stafford Act, FEMA initiated its Direct Housing Assistance Program.

The manufactured housing industry immediately contacted FEMA about the possible purchase of existing inventory or the production of new homes. While FEMA entertained the idea of buying off the lot, insofar as they collected inventory lists, J.D. Harper - the Executive Director of the Arkansas Manufactured Housing Association - testified before Congress that the industry would likely not participate in future efforts to gather inventory lists from retailers "because we have not seen any real instance that FEMA is going to purchase retail inventory."[34] Instead, FEMA created a new specification sheet for FEMA trailers,[35] then gave industry manufacturers one day to submit bids for the production of new homes.[36]

Contracts were awarded (Table B.5 in the Appendix) on either a non-competitive basis or under limited competition to manufacturers across the country.[37] And the production of tens of thousands of FEMA trailers began. Manufacturers spread emergency production throughout their plants, regardless of their distance from Louisiana. For example, the Indiana-based Forest River built more than 500 of its 5,000 FEMA trailers at its Oregon plant.[38] Per Harper's Congressional testimony, "participating builders found it necessary to suspend their normal production of homes ... to produce FEMA-approved units for disaster relief efforts, creating major disruptions in the normal course of business and in the normal supply of manufactured housing."

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[34] govinfo.gov/content/pkg/CHRG-109shrg28240/html/CHRG-109shrg28240.htm

[35] Manufactured homes are built to HUD Code, which is national and supersedes local and state construction codes, but in this case FEMA chose to develop its own specifications. In an "amusing" turn of events, 10,000 of the homes FEMA purchased (to the new specifications) ended up sitting in an Arkansas airport instead of being sent to Louisiana, because per FEMA regulations, they could not be placed in floodplains.

Chairman Collins. It is not as if these regulations are from another part of the Federal Government and FEMA was unaware of them. These are not new regulations, are they?

Mr. Garratt. I am not sure of the exact date of that Executive Order, but it has been in place for some time.

Chairman Collins. The Executive Order is dated May 24, 1977.

[36] Cavalier Homes president David Roberson testimony on the process: "It would be helpful if the industry were given more than one day... It would not be unreasonable to provide manufacturers at least two."

archives-financialservices.house.gov/media/pdf/091505dr.pdf

[37] FEMA testimony on the acquisitions: "The initial manufacturing contracts for temporary housing units were awarded on a non-competitive basis to geographically dispersed vendors to meet the immediate humanitarian need... Subsequent manufacturing contracts were awarded based on limited competition."

hsgac.senate.gov/imo/media/doc/041006Burnette.pdf

[38] rvbusiness.com/forest-river-starts-production-of-fema-units

Downstream markets throughout Texas were differentially exposed to these disruptions. Consider the case of a factory that supplies two local markets: it builds five percent of the homes shipped to one market, and 30 percent of the homes shipped to the other. When this factory begins emergency FEMA production, the two markets experience the hit differently. The likelihood of a retailer bypassing the integrated manufacturer for another supplier drops more in the second market - where the "FEMA Factory" had a 30 percent market share - than it does in the first market.

Note that in both markets, retailers can always bypass the integrated manufacturer: they can order homes from more distant factories that are not building FEMA trailers. But because of the high transportation costs involved, the more distant the factory, the higher the price - so the likelihood of a retailer actually buying from another manufacturer drops more in the market where the FEMA Factory historically provided 30 percent of supply than in the market where the FEMA Factory provided only five percent. So long as the manufacturer's decision to begin FEMA production at this particular factory was made on the basis of the firm as a whole, rather than on conditions in either downstream market - and so long as FEMA's awarding of contracts was likewise unrelated to specific factories or downstream markets - this difference in upstream competition will be exogenous to market-specific outcomes.

Table 2.10 lists summary statistics for the factories in Texas that produced homes in support of Hurricane Katrina relief efforts ("FEMA Factories") during the 12 months prior to Hurricane Katrina. As the table makes apparent, factories supply many downstream markets - with the minimum here being 13 - and every market in Texas is supplied by more than one factory, so FEMA disruption in this context is cumulative. Local markets affected by Hurricane Rita in September 2005 were dropped from the sample. Individually, FEMA Factories produced from one percent to 35 percent of the new manufactured homes shipped from factories to local downstream markets.

Table 2.11 shows summary statistics for upstream supply in affected downstream markets: the numbers of manufacturers and factories that shipped homes downstream, the numbers of manufacturers and factories that went on to produce for FEMA, and the cumulative FEMA Factory share - the cumulative mean market share of FEMA Factories in the 43 downstream markets in the sample during the 12 months prior to Hurricane Katrina. At least five factories, with at least two different parent manufacturers, shipped homes to each downstream market. The FEMA Factory share varied from two percent to 75 percent. This variation across markets in cumulative FEMA disruption is the variation in upstream competition

TABLE 2.10
MONTHLY MEAN MARKET SHARE OF FEMA FACTORIES DURING THE YEAR PRIOR TO HURRICANE KATRINA

Manufacturer	Factory	Affected Markets	Min	Median	Max
American Homestar	Lancaster	24	2	14	35
Champion	Burleson	27	1	3	20
Clayton	Bonham	35	3	7	34
Clayton	Breckenridge	13	1	2	21
Palm Harbor	Austin	27	1	3	18
Palm Harbor	Buda	28	2	5	23
Palm Harbor	Fort Worth	29	1	4	12
Patriot	Waco	19	1	2	30
Silver Creek	Henrietta	21	1	4	25
Southern Energy	Fort Worth	20	1	3	17

Notes: This table lists the factories in Texas that produced homes in support of Hurricane Katrina relief efforts, alongside the number of downstream markets each factory supplied and each factory's minimum, median, and maximum mean market share during the 12 months prior to Hurricane Katrina (August 2004 through August 2005). Markets affected by Hurricane Rita in September 2005 were dropped from the sample.

Data: FEMA, Texas GLO, TDHCA, TxDMV

TABLE 2.11
SUMMARY STATISTICS FOR UPSTREAM SUPPLY IN AFFECTED DOWNSTREAM MARKETS (N=43)

	Mean	Min	Q1	Q2	Q3	Max	SD
FEMA Factory share (%)	37	2	29	37	49	75	15
FEMA Factories	6	1	5	7	8	10	2
Factories	16	5	13	17	20	26	5
FEMA manufacturers	4	1	4	5	6	7	1
Manufacturers	9	2	7	9	11	16	3

Notes: This table lists summary statistics for the 43 downstream markets in the sample exposed to FEMA production for Hurricane Katrina victims during the 12 months preceding Hurricane Katrina. The FEMA Factory share is the monthly mean market share of manufactured homes shipped to a market by factories that went on to produce for FEMA (FEMA Factories). Factories ship at least one home to a market and at least five homes to Texas.

Data: FEMA, Texas GLO, TDHCA, TxDMV

we will use to identify the impact of integrated flooring on shipments and prices through the integrated manufacturer's incentive for VF.

I construct a variable, "FEMA Exposure," that approximates both a market's exposure to FEMA production and the resulting exogenous increase in the cost of bypassing the integrated manufacturer. The construction is detailed in Table 2.12, but the logic is simple: I weight the expected supply gap by the actual monthly drop in the share of homes shipped to local markets by FEMA Factories, in an attempt at the counterfactual (what FEMA Factories would have produced for local markets, were it not for Hurricane Katrina). Every FEMA Factory built FEMA trailers in October 2005, but the start and end production dates vary by contract, so the FEMA exposure variable provides a better approximation for the relevant upstream competition than either the simple market share or FEMA trailer production numbers.

TABLE 2.12
APPROXIMATING A MARKET'S EXPOSURE TO FEMA PRODUCTION

Variable Construction and Definitions

$$\text{EXPECTED GAP}_i = \frac{1}{12}\sum_{t=-12}^{t=-1}\frac{\#\text{ FF homes shipped to market } i \text{ during month } t}{\#\text{ homes shipped to market } i \text{ during month } t}$$

$$\text{FF SHARE}_i = \frac{1}{12}\sum_{t=-12}^{t=-1}\frac{\#\text{ FF homes shipped to market } i \text{ during month } t}{\#\text{ FF homes shipped during month } t}$$

$$\text{FF ACTUAL}_{it} = \frac{\#\text{ FF homes shipped to market } i \text{ during month } t}{\#\text{ FF homes shipped during month } t}$$

$$\text{EXPOSURE}_{it} = \text{EXPECTED GAP}_i * \max\left\{\frac{\text{FF SHARE}_i - \text{FF ACTUAL}_{it}}{\text{FF SHARE}_i}, 0\right\}$$

FF = FEMA Factories (that produced homes in support of Hurricane Katrina relief efforts)

For example, 16 factories shipped new homes to the Tyler market during the year before Hurricane Katrina. Of those 16 factories, six had parent manufacturers who were later awarded FEMA contracts - so the Tyler market was affected by six "FEMA Factories." On average, these six FEMA Factories built 42 percent of the total homes shipped each month to Tyler:

$$\begin{aligned}\text{EXPECTED GAP}_{Tyler} &= \frac{1}{12}\sum_{t=-12}^{t=-1}\frac{\#\text{ FF homes shipped to Tyler during month } t}{\#\text{ homes shipped to Tyler during month } t}\\ &= 0.42\end{aligned}$$

But these six FEMA Factories built homes for other markets in addition to Tyler; during the year prior to Katrina, they collectively shipped only an average 14 per-

cent of their new homes to Tyler:

$$\begin{aligned}\text{FF Share}_{Tyler} &= \frac{1}{12}\sum_{t=-12}^{t=-1}\frac{\text{\# FF homes shipped to Tyler during month } t}{\text{\# FF homes shipped during month } t}\\ &= 0.14\end{aligned}$$

In late September 2005, the production of FEMA trailers began. The six FEMA Factories shipped 13 percent of the homes they produced that September to Tyler:

$$\begin{aligned}\text{FF Actual}_{Tyler,200509} &= \frac{\text{\# FF homes shipped to Tyler during September 2005}}{\text{\# FF homes shipped during September 2005}}\\ &= 0.13\end{aligned}$$

So FEMA Exposure in September 2005 in the Tyler market was close to negligible, only 0.03 - which makes sense, as FEMA Factories only started building FEMA trailers at the end of the month (very few FEMA trailers in the denominator above):

$$\begin{aligned}\text{Exposure} &= \text{Expected Gap}_{Tyler} * \max\left\{\frac{\text{FF Share}_{Tyler} - \text{FF Actual}_{Tyler,200509}}{\text{FF Share}_{Tyler}}, 0\right\}\\ &= 0.42 * \max\left\{\frac{0.14 - 0.13}{0.14}, 0\right\}\\ &= 0.03\end{aligned}$$

By October, FEMA production was well underway. The six FEMA Factories shipped less than two percent of the new homes they built to Tyler,[39] so FEMA Exposure in October 2005 in the Tyler market was 0.36:

[39] Many of the homes shipped to local retailers while FEMA production was running full steam were likely shipped from storage.

$$\begin{aligned}\textsc{Exposure} &= \textsc{Expected Gap}_{Tyler} * \max\{\frac{\textsc{FF Share}_{Tyler} - \textsc{FF Actual}_{Tyler,200510}}{\textsc{FF Share}_{Tyler}}, 0\} \\ &= 0.42 * \max\{\frac{0.14 - 0.02}{0.14}, 0\} \\ &= 0.36\end{aligned}$$

That November, the six FEMA factories shipped less than one percent of their new homes to Tyler. By December, many FEMA contracts had been fulfilled; eight percent of new FEMA Factory homes were shipped to Tyler. The production of FEMA trailers continued at some factories into mid-2006.

2.5.2 Results

We replace the hypothetical bypass cost variable in Equation 2.4 with FEMA Exposure:

$$\begin{aligned}y_{it} = \alpha_i + \gamma_t + \beta_1 IntegratedFlooring_{it} + \beta_2 FEMAExposure_{it} \\ + \beta_3(IntegratedFlooring_{it} \times FEMAExposure_{it}) \\ + \lambda X_{it} + \epsilon_{it}\end{aligned} \tag{2.5}$$

Our coefficient of interest is still the interaction term, which measures the integrated manufacturer's incentive for VF. Do prices rise, and quantities fall, given FEMA-induced increases in the cost of bypassing the integrated manufacturer?

The identifying assumption is again one of parallel trends: that markets would trend the same way with no exposure to FEMA production - that there is no other contemporaneous shock generating a difference in differential trends between affected markets. As our FEMA exposure variable is continuous, a causal interpretation also requires the stronger assumption that markets with low exposure to FEMA disruptions are a good counterfactual for markets with high exposure to FEMA disruptions (that conditional on controls, the evolution of outcomes across markets and exposure levels would have been the same).

We see the negative relationship implied by VF between shipments and the integrated manufacturer's incentive to use flooring for VF in Table 2.13, which reports the results for affected markets during the 24 months surrounding Hurricane Katrina. In all specifications, the coefficients on both the interaction term and FEMA exposure are negative and significant. This is true in the cross section

TABLE 2.13
THE EFFECTS OF UPSTREAM COMPETITION AND INTEGRATED FLOORING ON SHIPMENTS OF NEW MANUFACTURED HOMES

	Total Shipments		
	(1)	(2)	(3)
Integrated flooring	-0.23	-0.06	-0.27
	(0.08)***	(0.13)	(0.10)***
FEMA Exposure	-0.23	-0.26	-0.13
	(0.05)***	(0.06)***	(0.05)***
Integrated flooring x FEMA Exposure	-1.68	-4.04	-2.88
	(0.59)***	(0.85)***	(0.66)***
R^2	0.46	0.11	0.10
Observations	1,075	1,075	1,757
Market FE	No	Yes	Yes

Notes: The total quantities of new manufactured homes shipped to a downstream market in Texas over the 24 months surrounding Hurricane Katrina (12 before, 12 after) are regressed on the market share of integrated floor lending, the market's FEMA exposure, and the interaction between the two. Controls: retailer HHI, floor lender HHI. In Column (3),the sample is expanded to the 40 months surrounding Hurricane Katrina. Standard errors are clustered by market. *p < 0.10, **p < 0.05, ***p < 0.01.

Data: FEMA, TDHCA, TxDMV, Texas GLO, Texas Secretary of State

(Column 1), and within markets over time (Columns 2 and 3). The specification without market fixed effects highlights differences across markets where the integrated manufacturer's incentive for VF differs. In Column 2, the "main" integrated flooring effect loses significance, but given the market fixed effects, small sample size, and the fact that FEMA exposure is zero for the majority of the sam-

ple, this is not too surprising. When we expand the sample to the 40 months surrounding Hurricane Katrina, all three coefficients are negative and significant.

In Table 2.14, we see the positive relationship between prices and the interac-

Table 2.14
The Effects of Upstream Competition and Integrated Flooring on Prices of New Manufactured Homes

	Prices		
	(1)	(2)	(3)
Integrated flooring	0.01	0.03	0.01
	(0.04)	(0.02)*	(0.02)
FEMA Exposure	0.05	0.05	0.05
	(0.02)***	(0.01)***	(0.01)***
Integrated flooring x FEMA Exposure	0.07	0.16	0.16
	(0.17)	(0.09)*	(0.08)**
R^2	0.61	0.61	0.63
Observations	18,384	18,384	18,384
Market FE	No	Yes	Yes

Notes: The prices of new manufactured homes shipped to a downstream market in Texas over the two years surrounding Katrina are regressed on the share of integrated floor lending, the market's FEMA exposure, and the interaction between the two. Controls: retailer HHI, floor lender HHI. Hedonic controls in the price regressions include the number of sections, weight, titling, whether the home is in a manufactured home community - and in Column (3), the manufacturer. Standard errors are clustered by market. *p < 0.10, **p < 0.05, ***p < 0.01.

Data: FEMA, TDHCA, TxDMV, Texas GLO, Texas Secretary of State, Data provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at http://www.zillow.com/ztrax. The results and opinions are those of the author and do not reflect the position of Zillow Group.

tion term implied by foreclosure theory - but the relationship appears much less strong. The positive FEMA exposure effect alone (and forseeably) retains significance in all three specifications. But in Columns 2 and 3, our specifications with market fixed effects, the interaction term is positive and significant. Together, these results support the integrated manufacturer's strategic use of flooring for VF.

One might worry these effects are driven by selection - either by FEMA's selection of manufacturers to build FEMA trailers, or by the manufacturers' selection of factories for FEMA production. While I cannot confirm that FEMA production was uniformly spread across factories,[40] every manufacturer in the sample spread production over multiple factories. Plant production capacity is limited, and manufacturers were given deadlines, so this is not surprising. Moreover, Table 2.15 shows that before Hurricane Katrina, prices were not significantly higher for any FEMA Factory than prices for non-FEMA factories, so the results are not due to FEMA monopolizing production in cheaper factories.

In fact, prices for four of the FEMA Factories were significantly higher than prices for non-FEMA factories, which suggests a non-random awarding of FEMA contracts the other way. While we would expect the government to choose the lowest bidders, competition here was - in FEMA's own words - non-competitive or limited, and manufacturers were only given one day to submit bids. These price differences are not ideal, but for our purposes they are better than the alternative - and they support our assumption that manufacturers selected FEMA plants at the firm-level, rather than the factory- or market-level (if there was any selection at all).[41]

Brass tacks, the integrated manufacturer's incentive for VF - the interaction term - is negatively correlated with shipments and positively correlated with prices. The results support the integrated manufacturer's strategic use of flooring for VF, and the possible market power effects of vertical integration proposed in the theoretical literature on VF.

[40] FEMA responded to a FOIA request for a complete list of the HUD labels or serial numbers of FEMA units with a list that included only 90 homes built in the two years following Katrina. See Chapter 3 for how I backed out FEMA production in Texas.

[41] Id est, we would expect choosy Palm Harbor and Clayton manufacturers to limit FEMA production to their Fort Worth and Breckenridge plants, respectively. (The signs and significance of all coefficients stay the same in price difference regressions without the market fixed effects.)

Table 2.15
Manufactured Housing Production in Texas for Hurricane Katrina Relief

Manufacturer	Factory	Price Difference
American Homestar	Lancaster	0.02 (0.01)
Champion	Burleson	0.01 (0.02)
Clayton	Bonham	0.05 (0.02)***
Clayton	Breckenridge	−0.01 (0.03)
Palm Harbor	Austin	0.11 (0.02)***
Palm Harbor	Buda	0.05 (0.02)**
Palm Harbor	Fort Worth	0.03 (0.03)
Patriot	Waco	−0.05 (0.04)
Silver Creek	Henrietta	0.01 (0.02)
Southern Energy	Fort Worth	0.16 (0.03)***

Notes: This table lists the factories in Texas that produced homes in support of Hurricane Katrina relief efforts, alongside the coefficient and standard error obtained from regressing logged prices of the listed factory and non-FEMA factories on an indicator for the listed factory and the usual controls (market and year fixed effects; the number of sections, weight and titling of each home; and whether the home is in a manufactured home community). All statistics were calculated using the two years prior to Katrina. *p < 0.10, **p < 0.05, ***p < 0.01.

Data: FEMA, Texas GLO, TDHCA, TxDMV, Data provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at http://www.zillow.com/ztrax. The results and opinions are those of the author and do not reflect the position of Zillow Group.

2.6 Conclusion

The majority of empirical work on VF finds no evidence of anticompetitive foreclosure effects. But vertical integration is fundamentally different when financial firms are involved, because access to credit affects prices. Even holding supply and demand fixed, financing changes the price. It relaxes the budget constraint. It changes the reservation price. It can be a more effective competitive weapon than price.

O. Hart and Tirole (1990) suggest that policymakers should be especially alert to anticompetitive VF when one of the firms is especially efficient - when the upstream cost asymmetry is large. But as Dennis Carlton points out in his comment on the paper, this is "precisely the situation in which efficiency gains from vertical integration are greatest because price exceeds marginal cost and there are variable proportions or a double markup." While this still may be true for financial firms, the competitive advantages of integrated finance (Section 2.2.1) can allow firms to perennially sustain prices above marginal cost. And this is most likely in precisely this situation: when the upstream cost asymmetry is large.

Firm size implications are also worthy of mention. The successful use of integrated financing for VF requires both access to credit and upstream market power. Large firms have better access to liquidity and can borrow at lower rates (Chodorow-Reich, Darmouni, Luck, and Plosser 2022); they invariably have established sources of financing. Integrated financing is hence more strategically useful to large firms - yet another competitive advantage of size.

I find evidence that VF through integrated financing is quantitatively important in the manufactured housing industry: quantities fall, prices rise, and retailers floor financed by integrated lenders gain market share. Of course, VF does not fully explain the drop in the production of manufactured homes; there are other factors in play. Schmitz (2020b) details how builders in site-built housing have lobbied for regulations to make manufactured housing less substitutable for site-built homes - for example, with zoning requirements. We also know that site-built homes offer better legal protections, buildup of equity, and marketability - and that consumers who qualify for conventional mortgages on average get more favorable terms than those who take out chattel loans, which suggests they might also offer better financing. These are serious shortcomings, but they are the product of laws, policy choices, and business practices. They are not inherent in manufactured housing.

Chapter 3

Manufactured Housing Data

3.1 Identifying Manufactured Homes

In 1976, HUD established a set of federal building codes and standards governing manufactured homes in response to concerns about their safety and quality: the Manufactured Home Construction and Safety Standards (MHCSS), more commonly known as the HUD Code. Prior to the establishment of the HUD Code, factory-built construction was regulated at the state level, which led to a patchwork of inconsistent building, zoning, installation, inspection, sales, and tax laws that - according to HUD and Congress - made producing homes of a consistent quality difficult for manufacturers.[1] The HUD Code, which supersedes local and state building codes and is periodically updated, regulates all aspects of construction. This includes transportability, efficiency, safety, durability, and design. Currently, manufactured homes must be at least 320 square feet with a permanent chassis.

3.1.1 HUD Tags

Manufactured homes built in compliance with the HUD Code are certified with HUD certification labels, also known as HUD tags. Section 3280.11 of the MHCSS states, "The label shall be approximately two in. by four in. in size and shall be permanently attached to the manufactured home by means of four blind rivets,

[1] See Schmitz (2020b) for a very different interpretation of the motivation behind the HUD Code.

Figure 3.1 - HUD Certification Label

Notes: A certification label, also known as a HUD tag, is a metal plate with a unique label number affixed to a manufactured home built in compliance with the HUD Code.

drive screws, or other means that render it difficult to remove without defacing it. It shall be etched on 0.32 in. thick aluminum plate. The label number shall be etched or stamped with a three letter designation which identifies the production inspection primary inspection agency and which the Secretary shall assign. Each label shall be marked with a six digit number which the label supplier shall furnish. The labels shall be stamped with numbers sequentially." See Figure 3.1 for an example of a HUD tag.

HUD oversees the enforcement of the HUD Code and the awarding of HUD tags through approved state and private third party inspection agencies: the aforementioned Primary Inspection Agencies (PIAs). Manufacturers contract directly with a PIA for design review and mandated inspections at various stages of the construction process. The first three letters of a manufactured home's HUD tag indicate which PIA certified the home.

For example, Table 3.1 lists the Production Inspection Primary Inspection Agencies (IPIAs) that inspected new homes shipped to Texas as indicated by HUD tags containing each IPIA's 3-letter prefix. Before September 1, 1995, the state of Texas was the exclusive IPIA for factories in Texas, so manufactured homes produced in Texas through that point had HUD label numbers beginning with "TEX." In the TDHCA data, "TXS" is used as the placeholder prefix for homes with Texas Seals

TABLE 3.1
IPIAs FOR MANUFACTURED HOMES SHIPPED TO TEXAS, 1995-2021

State	IPIA	Prefix	HUD Tags	Last Seen
	NTA, Inc	NTA	271,926	2021
	PFS Corporation	PFS	223,235	2021
	RADCO, Inc	RAD	81,693	2010
	Hilborn, Werner, Carter & Associates	HWC	79,750	2017
x	Texas	TEX	22,846	1996
	T. R. Arnold & Associates	TRA	21,757	2021
x	Louisiana	LOU	6,864	2000
x	New Mexico	NMX	4,937	2018
x	Tennessee	TEN	2,709	2021
x	Georgia	GEO	1,421	2018
	Underwriters Laboratories, Inc	ULI	828	2005
x	Colorado	COL	376	2000
x	Arizona	ARZ	341	2015
x	Florida	FLA	87	2013
x	Arkansas	ARK	35	1995

Notes: This table lists the Production Inspection Primary Inspection Agencies (IPIAs) that inspected homes shipped to retailers in Texas from 1995 through the year in the Last Seen column on the right, along with the number of inspected manufactured home sections according to HUD tags containing the IPIA's 3-letter prefix. Before September 1, 1995, the state of Texas was the exclusive IPIA for homes produced in Texas. In the TDHCA data, "TXS," "DLS," and "DMH" show up as dummy prefixes for homes with missing labels.

Data: Home Ownership Records, Manufactured Housing Division
Texas Department of Housing and Community Affairs (TDHCA)

instead of HUD tags; "DLS" and "DMH" are also dummy prefixes for homes with missing labels. The analogous data for Oregon is shown in Table 3.2.

Each HUD tag is unique, as the numbers that follow each IPIA prefix increase sequentially, so HUD tags are enormously helpful - and often critical - for almost any merge involving manufactured home data. IPIAs inspect manufactured homes from multiple factories at a time, though, and certification labels can be issued without being used, so the HUD tag alone does not reveal the factory where a home was produced, nor when a home was produced. The date of manufacture can often be deduced from a HUD tag, though, given enough other manufactured homes with known HUD tags and manufacturing dates. To illustrate, conservative HUD tag ranges are listed for manufactured homes certified by NTA, Inc in Table 3.3, and for manufactured homes certified by PFS Corporation in Table 3.4.

Table 3.2

IPIAs for Manufactured Homes in Oregon, 1976-2021

State	IPIA	Prefix	HUD Tags	Last Seen
x	Oregon	ORE	55,304	2021
	NTA, Inc	NTA	912	2021
x	Idaho	IDA	808	2021
x	Washington	WAS	350	2010
	PFS Corporation	PFS	51	2021
	Hilborn, Werner, Carter & Associates	HWC	17	2007
	RADCO, Inc	RAD	5	1993

Notes: This table lists the Production Inspection Primary Inspection Agencies (IPIAs) that inspected manufactured homes in Oregon, along with the number of inspected manufactured home sections according to HUD tags containing the IPIA's 3-letter prefix.

Data: Manufactured Home Ownership Document System (MHODS)
Oregon Building Codes Division

Table 3.3
Implied HUD Tag Ranges by Year for Homes Certified by NTA

Year	Min	Max	Safe Min	Safe Max
1995	428874	533519	NTA439211	NTA517780
1996	517780	644919	NTA533519	NTA625373
1997	625373	765080	NTA644919	NTA743977
1998	743977	890773	NTA765080	NTA872414
1999	872414	1008262	NTA890773	NTA987332
2000	987332	1101985	NTA1008262	NTA1087614
2001	1087614	1185102	NTA1101985	NTA1170924
2002	1170924	1260603	NTA1185102	NTA1250070
2003	1250070	1314368	NTA1260603	NTA1305736
2004	1305736	1353447	NTA1314368	NTA1347574
2005	1347574	1387057	NTA1353447	NTA1382164
2006	1382164	1419061	NTA1387057	NTA1413759
2007	1413759	1453577	NTA1419061	NTA1447110
2008	1447110	1489855	NTA1453577	NTA1484316
2009	1484316	1512031	NTA1489855	NTA1508559
2010	1508559	1535280	NTA1512031	NTA1532014
2011	1532014	1561816	NTA1535280	NTA1557037
2012	1557037	1588380	NTA1561816	NTA1585425
2013	1585425	1620960	NTA1588380	NTA1615929
2014	1615929	1658837	NTA1620960	NTA1652635
2015	1652635	1698500	NTA1658837	NTA1691249
2016	1691249	1745915	NTA1698500	NTA1735518
2017	1735518	1804692	NTA1745915	NTA1793471
2018	1793471	1869081	NTA1804692	NTA1857348
2019	1857348	1929962	NTA1869081	NTA1920921
2020	1920921	1997568	NTA1929962	NTA1986841

Notes: This table lists the minimum and maximum HUD label numbers per reported manufacturing year for manufactured homes certified by NTA, with outliers excluded, along with the implied "safe" HUD tag range for said year, according to TDHCA and TxDMV data.

Table 3.4
Implied HUD Tag Ranges by Year for Homes Certified by PFS

Year	Min	Max	Safe Min	Safe Max
1995	331695	376008	PFS331695	PFS372027
1996	372027	436216	PFS376008	PFS428079
1997	428079	498768	PFS436216	PFS489885
1998	489885	575524	PFS498768	PFS563256
1999	563256	646782	PFS575524	PFS635463
2000	635463	699119	PFS646782	PFS689939
2001	689939	746268	PFS699119	PFS736249
2002	736249	798929	PFS746268	PFS789203
2003	789203	843024	PFS798929	PFS834635
2004	834635	889234	PFS843024	PFS878397
2005	878397	949516	PFS889234	PFS938341
2006	938341	994331	PFS949516	PFS986328
2007	986328	1031662	PFS994331	PFS1026405
2008	1026405	1056596	PFS1031662	PFS1053623
2009	1053623	1068950	PFS1056596	PFS1066753
2010	1066753	1082080	PFS1068950	PFS1079259
2011	1079259	1095176	PFS1082080	PFS1093618
2012	1093618	1110533	PFS1095176	PFS1109101
2013	1109101	1126872	PFS1110533	PFS1126200
2014	1126200	1142650	PFS1126872	PFS1140809
2015	1140809	1160761	PFS1142650	PFS1159030
2016	1159030	1179482	PFS1160761	PFS1177521
2017	1177521	1199602	PFS1179482	PFS1198851
2018	1198851	1222230	PFS1199602	PFS1220872
2019	1220872	1245757	PFS1222230	PFS1243586
2020	1243586	1270643	PFS1245757	PFS1268673

Notes: This table lists the minimum and maximum HUD label numbers per reported manufacturing year for manufactured homes certified by PFS, with outliers excluded, along with the implied "safe" HUD tag range for said year, according to TDHCA and TxDMV data.

3.1.2 Serial Numbers

Each manufactured home is also given a Data Plate: a paper label with information about the home that includes the name and address of the factory where the home was built, the HUD label number, the serial number of the home, the model of the home, the date the home was manufactured, and a list of major factory-installed equipment.[2] See Figure 3.2 for an example of a Data Plate.

Manufactured home serial numbers are more informative than HUD tags in terms of backing out where and when a home was produced. The first few characters usually indicate the manufacturer or the specific factory. For example, Table 3.5 lists serial numbers for manufactured homes produced in Clayton Homes' fac-

Table 3.5
Serial Numbers, Clayton Homes' Sulphur Springs Factory

Year	Serial	Factory	Digits	State	Section
1999	CSS001290TXA	CSS	1290	TX	A
1999	CSS001290TXB	CSS	1290	TX	B
2005	CSS005668TXA	CSS	5668	TX	A
2005	CSS005668TXB	CSS	5668	TX	B
2010	CSS010973TXA	CSS	10973	TX	A
2010	CSS010973TXB	CSS	10973	TX	B
2021	CSS022460TXA	CSS	22460	TX	A
2021	CSS022460TXB	CSS	22460	TX	B

Notes: This table shows the anatomy of serial numbers for a random sample of manufactured home sections produced in Clayton Homes' Sulphur Springs, Texas plant.

Data: Home Ownership Records, Manufactured Housing Division
Texas Department of Housing and Community Affairs (TDHCA)

[2] 24 CFR §3280.5

Manufacturer: _____
_____

Serial Number: _____
Model: _____
Certification Label: _____
Date of Manufacturer: _____
Design Approved By: _____

- ☐ This manufactured home is designed to comply with the Federal Manufactured Home Construction and Safety Standards in force at the time of manufacture.
- ☐ This manufactured home has been substantially completed in accordance with the approved design and has been inspected (except for the components specifically identified in the instructions for completion on-site) in accordance with the Federal Manufactured Homes Construction and Safety Standards and the requirements of the Department of Housing and Urban Development (HUD) in effect at the date of manufacture.
- ☐ This manufactured home IS design to accommodate the additional loads imposed by the attachment of an attached accessory building or structure in accordance with the manufacturer's installation instructions. The additional loads are in accordance with the design load(s) on the Data Plate.
- ☐ This manufactured home IN NOT designed to accommodate the additional loads imposed by the attachment of an attached accessory building or structure in accordance with the manufacturer's installation instructions.

The manufacturer certifies that this home is compliant with Title VI, Toxic Substance Control Act (TSCA).

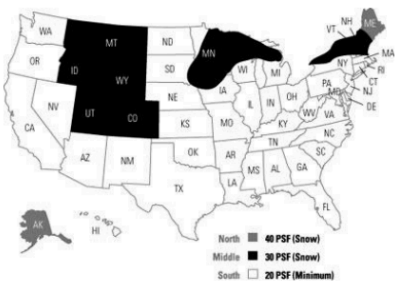
Item	Manufacturer	Model Number
Furnace		
Water Heater		
Range		
Refrigerator		
Washer		
Dryer		
Dishwasher		
Disposal		
Smoke Alarms		
Fireplace		
Microwave		

HOME CONSTRUCTED FOR ☐ ZONE I ☐ ZONE II ☐ ZONE III

This home has not been designed for the higher wind pressure and anchorage provisions required for ocean/coastal areas and should not be located within 1500 feet of the coastline in Wind Zones II and III, unless the home and its anchoring and foundation system have been designed for the increased requirements specified for Exposure D in ANSI/ASCE 7-88.

This home ☐ has ☐ has not been equipped with storm shutters or other protective coverings for windows and exterior door openings. For homes designed to be located in Wind Zones II and III, which have not been provided with shutters or equivalent covering devices, it is strongly recommended that the home be made ready to be equipped with these devices in accordance with the method recommended in the manufacturers printed instructions.

HOME CONSTRUCTED FOR: ☐North ☐Middle ☐South ☐Other _____PSF



COMFORT HEATING

This manufactured home has been thermally insulated to conform with the requirements of the federal manufactured home construction and safety standards for all locations within U_o value Zone _____ (See map at bottom). Heating equipment manufacture and model (See list at left).

The listed heating equipment has the capacity to maintain an average 70° F temperature in this home at outdoor temperatures of _____ ° F. To maximize furnace operating economy, and to conserve energy, it is recommended that this home be installed where the outdoor winter design temperature (97 ½%) is not higher than _____ ° F.

The above information has been calculated assuming a maximum wind velocity of 15 MPH at standard atmospheric pressure.

COMFORT COOLING

☐ AIR CONDITIONER PROVIDED BY FACTORY (Alternate I)

The air conditioner manufacturer and model (see list at left).

Certified capacity _____ Btu/h in accordance with the appropriate Air Conditioning and Refrigerator Standards.

The central air conditioning system provided in this home bas been sized assuring an orientation of the front (hitch end) of the home facing _____. On this basis the system is designed to maintain an indoor temperature of 75° F dry bulb and _____ ° F wet bulb.

The temperature to which this home can be cooled will change depending upon the amount of exposure of the windows of this home to the sun's radiant heat. Therefore, the home's heat gains will vary dependent upon its orientation to the sun and any permanent shading provided. Information concerning the calculation of cooling loads at various locations, window exposures and shadings are provided in Chapter 22 of the 1989 edition of the ASHRAE Handbook of Fundamentals. Information necessary to calculate cooling loads at various location and orientations is provided in the special comfort cooling information provided with this home.

☐ AIR CONDITIONER NOT PROVIDED BY FACTORY (Alternate II)

The air distribution system of this home is suitable for the installation of central air conditioning. The supply air distribution system installed in this home is sized for a manufactured home central air conditioning system of up to _____ Btu/h rated capacity which are certified in accordance with the appropriate Air Conditioning and Refrigerator Institute standards, when the air circulators of such air conditioners are rated at 0.3-inch water column static pressure or greater for the cooling air delivered to the manufactured home supply air duct system.

To determine the required capacity of the equipment to cool a home efficiently and economically, cooling load (heat gain) calculation is required. The cooling load is dependent on the orientation location and the structure of the home. Central air conditioner operates most efficiently and provide the greatest comfort when their capacity closely approximates the calculated cooling load. Each home's air conditioner should be sized in accordance with Chapter 22 of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals once the location and orientation are known.

INFORMATION PROVIDED BY THE MANUFACTURER NECESSARY TO CALCULATE SENSIBLE HEAT GAIN

Walls (without windows or doors): _____ "U"
Ceiling and roofs of light color: _____ "U"
Ceilings and roofs of dark color: _____ "U"
Floors: _____ "U"
Air ducts in floors: _____ "U"
Air ducts in ceiling: _____ "U"
Air ducts installed outside the home: _____ "U"
Duct area in this house as follows:
Air ducts in the floor: _____ sq. ft.
Air ducts in the ceiling: _____ sq. ft.
Air ducts outside the home: _____ sq. ft.

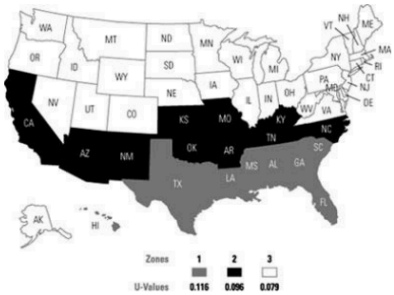


FIGURE 3.2 - HUD DATA PLATE

tory in Sulphur Springs, Texas. Each serial number begins with "CSS." The two letter abbreviation for the state where the home was produced - here, "TX" for Texas - is typically also included.

Each serial number will also include at least one series of digits. These digits appear to increase sequentially for every factory, so serial numbers can be used not only to locate where a home was produced, but also - given enough other homes with reliably reported manufacturing dates and serial numbers - to place it in time. In Table 3.5, the digits increase from 1290 in 1999 to 22460 in 2021.[3]

Manufactured home serial numbers often end with a single character - an "A," "B," or "C," - indicating the section of a double-wide or triple-wide. In Table 3.5, the first two rows, and then each successive pair of rows, refer to two sections of the same double-wide home.

Unfortunately, the order of each component of the serial number varies by factory, though manufacturers are usually consistent across their own factories. Table 3.6 lists the manufacturer, factory location, serial number, and implied factory identifier for a sample of manufactured homes shipped to Texas in 2000. The state abbreviation appears at the beginning of the serial number for Fleetwood Homes; at the end of the serial number for Patriot Homes; in the middle of the serial number for Pioneer Homes, Cavalier Homes, and Southern Energy Homes; before the multi-wide section identifier for Clayton Homes - and not at all for others.

Manufacturers can build manufactured homes that do not conform to the requirements of the MHCSS with permission from HUD prior to construction and shipment under the Alternative Construction (AC) program,[4] which is meant to encourage innovation and the use of new technology in the manufactured housing industry.[5] Homes with approved alternative construction will contain "AC" somewhere in the serial number. For example, the serial number for an alternative construction manufactured home produced in Alabama in 2021 by Cavalier Homes is "SOU01656 1ALAAC."

[3] The first manufactured home built by Clayton Homes in Sulphur Springs that appears in the TDHCA data was built in 1997; the serial number was "CSS000007TXA."

[4] 24 CFR §3282.14

[5] HUD lists common types of AC approvals on its website: "vent pipe extensions through hinged roofs, two story construction, site installed siding, deletion of insulation in any part of the home's thermal envelope, shipment of home without a water heater, dormer roofs, accessible shower stalls, high slope roofs, whole house ventilation, roof ridge interconnection, tankless water heaters."

TABLE 3.6
MANUFACTURED HOME SERIAL NUMBERS BY FACTORY

Manufacturer	City	Serial	Factory
American Homestar	Lancaster, TX	AH010010774A	AH01
American Homestar	Burleson, TX	AH02004851A	AH02
Belmont	Belmont, MS	MSB001680SN43708	MSB
Cappaert	Vicksburg, MS	CHVM010025616489A	CHVM
Cavalier	Addison, AL	CV00AL0254915A	CV00
Cavco	Seguin, TX	CAVIXS20001732A	CAVIXS
Chandeleur	Boaz, AL	CH2AL08469A	CH2
Clayton	Bonham, TX	CBH008125TXA	CBH
Clayton	Waco, TX	CLW012866TX	CLW
Crest Ridge	Breckenridge, TX	CRH1TX10123A	CRH1
Fleetwood	Belton, TX	TXFLY86A03425EG11	FLY86
Fleetwood	Waco, TX	TXFLY12A84569CG11	FLY12
Fleetwood	Wichita, TX	TXFLY66A05763CG12	FLY66
Oak Creek	Fort Worth, TX	OC05001390 5A	OC
Palm Harbor	Austin, TX	PH0514921A	PH05
Palm Harbor	Burleson, TX	PH175279A	PH17
Palm Harbor	Fort Worth, TX	MP158278A	MP1
Patriot	Sulligent, AL	PIN01785AAL	PIN
Pioneer	Leesville, LA	PH3122LA1728A	PH
Silver Creek	Henrietta, TX	SCH010046 07A	SCH
Southern Energy	Addison, AL	DSL2AL33428A	DSL2
Southern Energy	Double Springs, AL	DSD4AL30905A	DSD4

Notes: This table lists serial numbers for manufactured homes shipped to Texas in 2000.

Data: Home Ownership Records, Manufactured Housing Division
Texas Department of Housing and Community Affairs (TDHCA)

3.2 Identifying Manufacturers and Retailers

Most states in the US run State Administrative Agency (SAA) programs that administer the MHCSS on behalf of HUD. Under their agreements with HUD, SAAs monitor manufacturers and retailers, initiate class action cases when necessary, and oversee post-production inspection of manufactured homes. In states without state-run SAA programs,[6] HUD is responsible for conducting these periodic inspections and responding to consumer complaints.

Under the Manufactured Housing Installation Program Regulations, retailers are required to report detailed information about every sale in HUD-administered states within 30 days from the time a contract is signed.[7] Retailers report the HUD tag, serial number, and manufacturer of each sold home, along with the sale or lease date, the buyer name, and the installation address on the HUD Manufactured Home Retailer Report.[8]

HUD also requires monthly production reports from every manufacturer and IPIA under the Manufactured Housing Procedural and Enforcement Regulations.[9] The monthly production report asks for the HUD label and serial number of each home, the type of unit, the date of manufacture, retailer information, the first home location type, and the first installation address. Unfortunately, HUD has a dismal FOIA record. Requests for a subset of this data that HUD staff acknowledged were FOIA-releasable in 2019 are still pending.

Data is more easily accessible from SAAs. Chapter 1201 of the Texas Occupations Code governs the licensure of manufacturers, retailers, brokers, and installers in Texas. Under Texas law, a manufacturer "may not sell or exchange, or offer to sell or exchange, a manufactured home to a person in this state who is not a licensed retailer,"[10] and manufacturers must be licensed, as well. TDHCA Statements of Ownership and Location (SOL) list license, name and address information for the retailer and the manufacturer involved in each sale - but quite often, the reported addresses are mailing addresses, or out of date. As of 2003, buyers report both their mailing and physical addresses, but only the most recent physical

[6] Arkansas, Connecticut, Delaware, District of Columbia, Hawaii, Illinois, Indiana, Iowa, Kansas, Massachusetts, Michigan, Montana, New Hampshire, New Jersey, Ohio, Oklahoma, Vermont, and Wyoming

[7] 24 CFR § 3286.113

[8] HUD 305

[9] 24 CFR § 3282.552

[10] Texas Occupations Code § 1201.504(a)

location is publicly available. Full name and address history is, however, releasable under the Texas Public Information Act, as manufacturers, retailers, brokers, installers, and salespeople in Texas submit business name and mailing or physical address change requests on the Name and Address Change Request form.[11]

The TDHCA also released audit histories from manufacturer and retailer license applications that request "all other business or trade names, or other business organizations that are subject to regulation by the Department, in which you are principal or have ownership interest in"[12] under the Texas Public Information Act. Ownership and name changes must be reported, even when the license number remains the same, so this data is extremely valuable.

The manufactured housing industry has seen waves of consolidation over the past few decades, both horizontally and vertically. Figure 3.3 shows the top ten builders per year in Texas by manufacturing housing shipment market share from the mid 1990s through today, with shipments from all other builders grouped into "Other." The increasing consolidation is evident. Figure 3.4 goes back further in time - to the 1970s, when no manufacturer was dominant.[13]

Figure 3.5 repeats the breakdown for manufactured home builder market share in Oregon from 1990 through today, using data from Oregon's Manufactured Home Ownership Document System (MHODS). While increased consolidation is evident here, as well, the relative builder market shares in Texas and Oregon are quite different. Figure 3.6 repeats the analysis for Nevada, using data from the Nevada Housing Division that begins in 1981. Again, the industry becomes increasingly consolidated, but the builder market shares are different. Manufactured housing markets are - as the high transportation costs would predict - highly local. Downstream retailers do face more competitive markets, though, as illustrated in Figure 3.7.

Tables 3.7 and 3.8 list an incomplete, but still extensive, history of mergers and acquisitions in the manufactured housing industry - in manufacturing, retail, and lending - from 1995 through today.[14]

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[11] TDHCA MHD 1002

[12] TDHCA MHD 1005 and TDHCA MHD 1001

[13] Figures 3.3 and 3.4 were both drawn because builder market share for the first was determined from reported sales of new manufactured homes - which TDHCA tracks quite reliably - while historical builder market share was inferred from the manufacturing dates and manufacturers of the homes that ended up in Texas.

[14] There is no single data source for these tables; information was mostly pulled from news articles about acquisitions or bankruptcies. New information was added in pieces as I came across it.

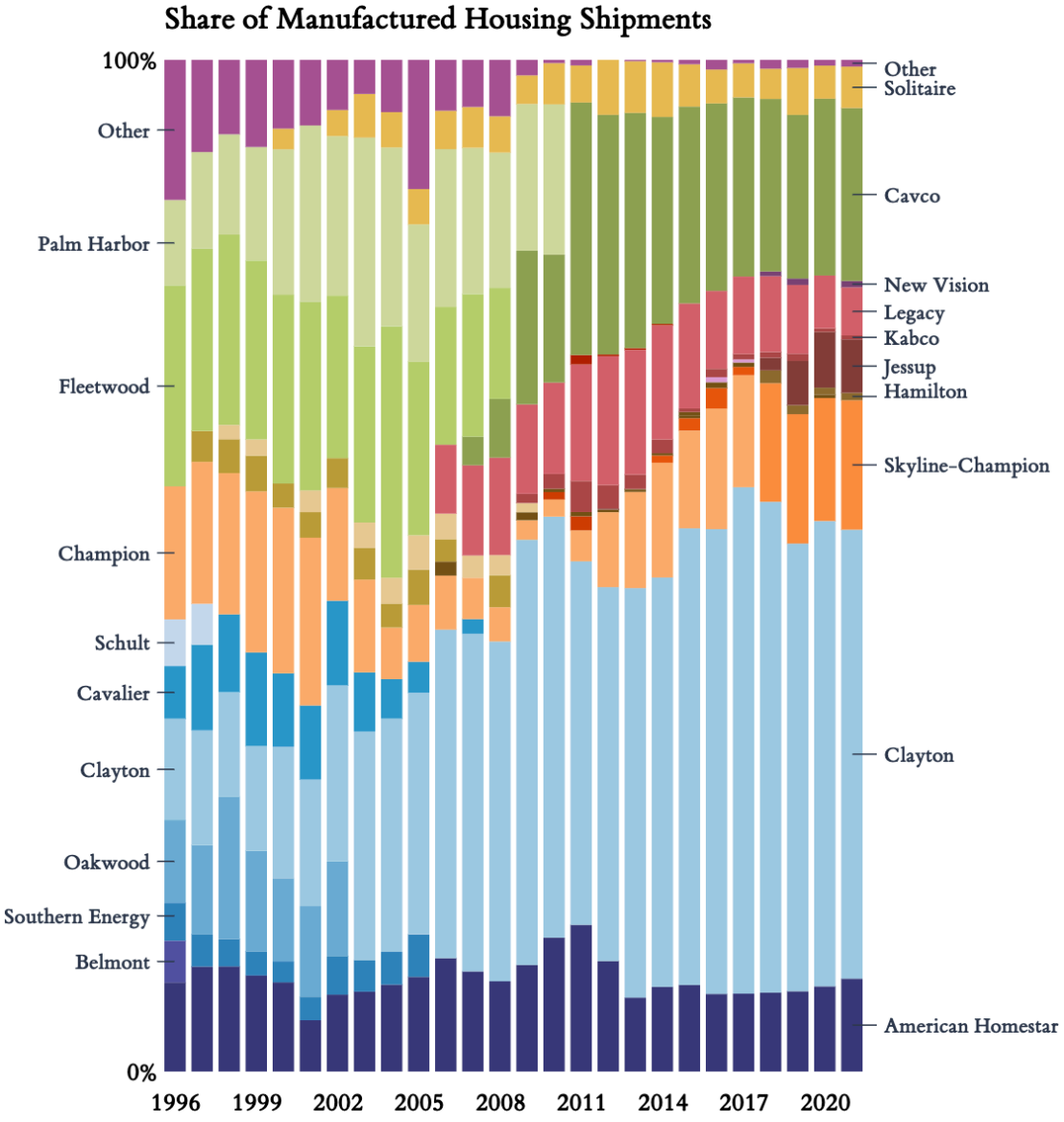


Figure 3.3 - Builder Market Share in Texas, 1995-2021

Notes: This figure shows the top ten builders per year in Texas by manufacturing housing shipment market share. Shipments from all other builders are grouped into "Other."

Data: Home Ownership Records, Manufactured Housing Division
Texas Department of Housing and Community Affairs (TDHCA)

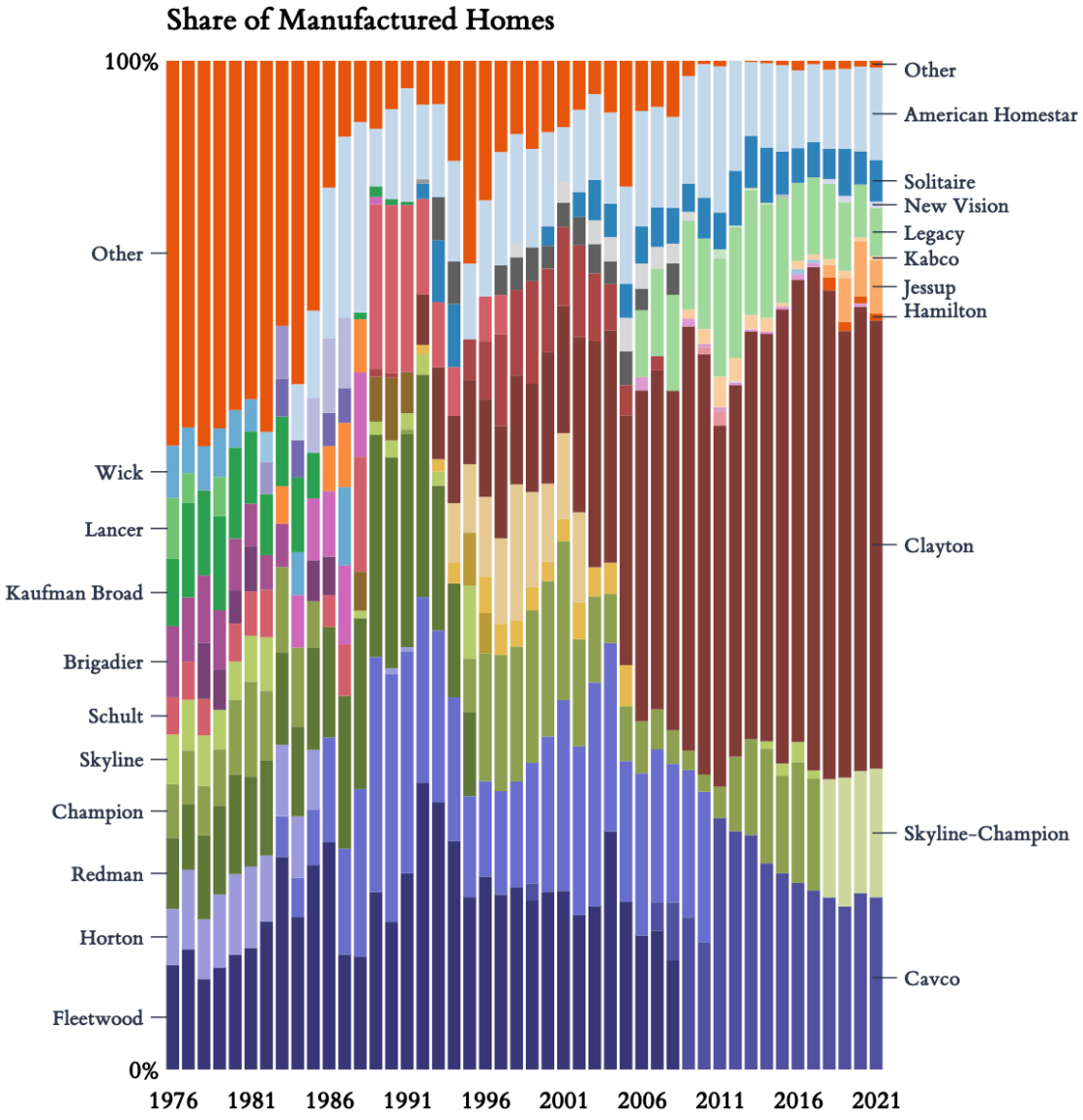


Figure 3.4 - Builder Market Share in Texas, 1976-2021

Notes: This figure shows the implied top ten builders per year in Texas by market share. Manufactured homes produced by all other builders are grouped into "Other."

Data: Home Ownership Records, Manufactured Housing Division
Texas Department of Housing and Community Affairs (TDHCA)

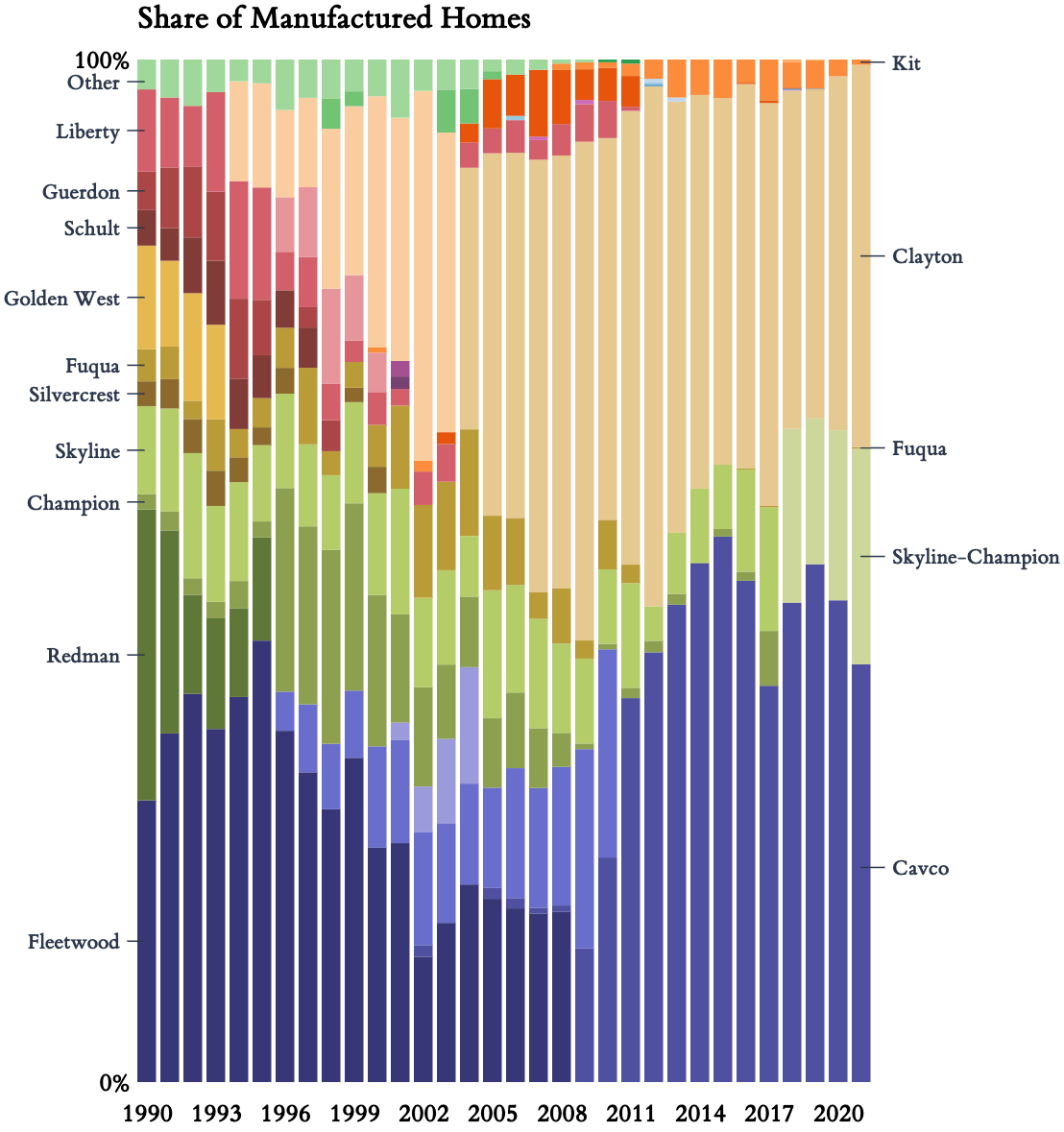


Figure 3.5 - Builder Market Share in Oregon, 1990-2021

Notes: This figure shows the implied top ten builders per year in Oregon by market share. Manufactured homes produced by all other builders are grouped into "Other."

Data: Manufactured Home Ownership Document System (MHODS)
Oregon Building Codes Division

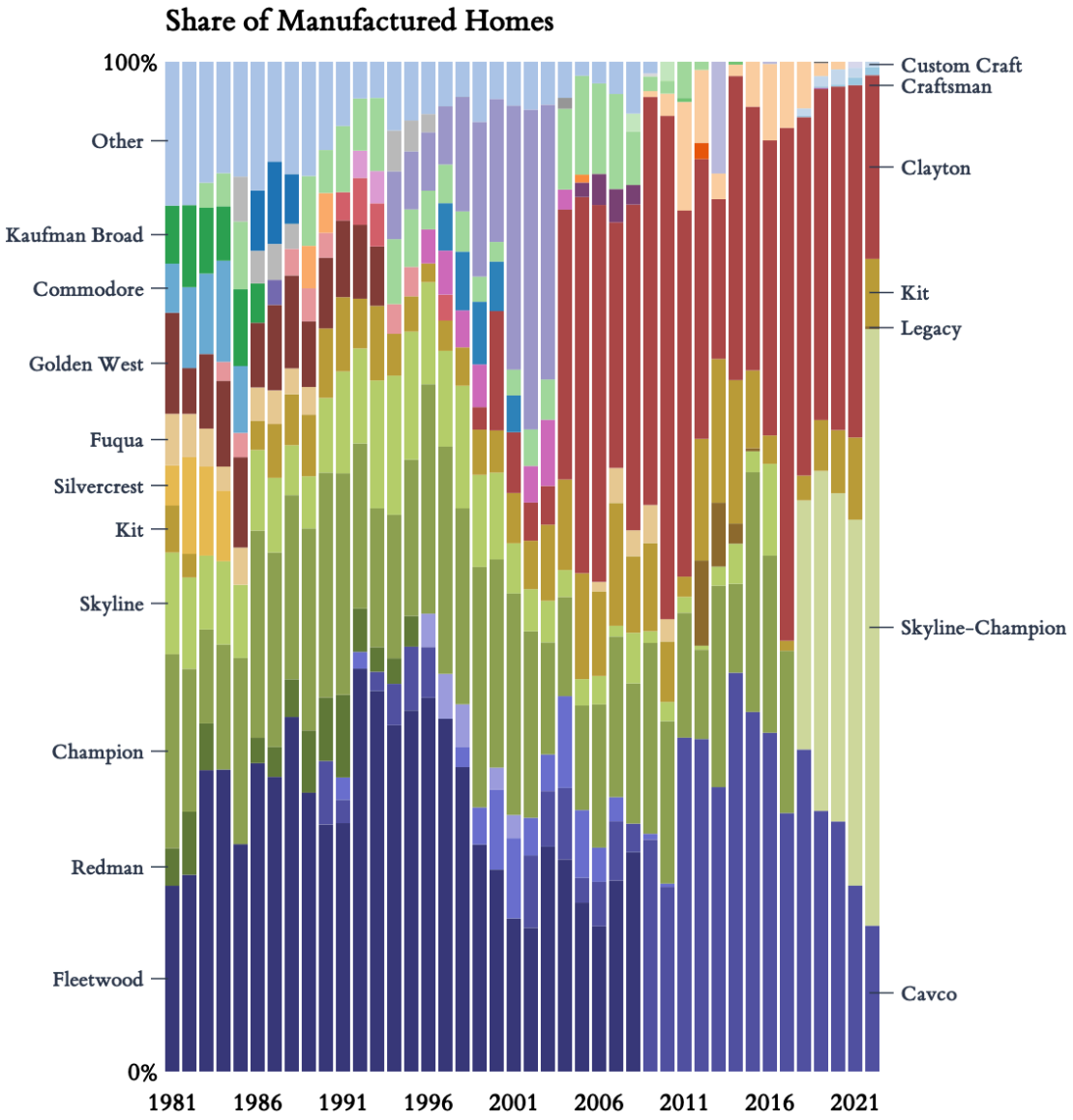


Figure 3.6 - Builder Market Share in Nevada, 1981-2022

Notes: This figure shows the implied top ten builders per year in Nevada by market share. Manufactured homes produced by all other builders are grouped into "Other."

Data: Online Title Search, Nevada Housing Division, Department of Business and Industry

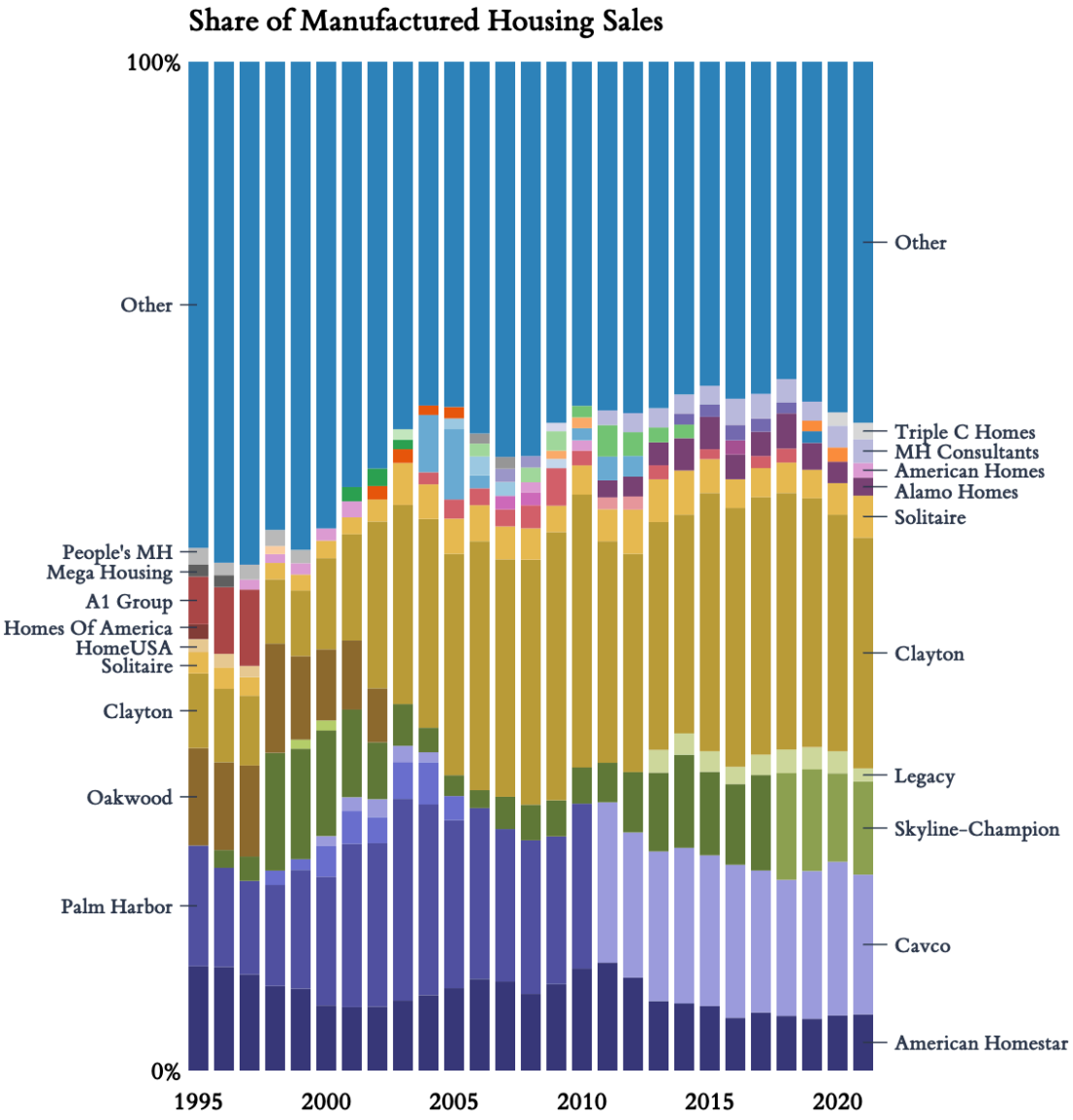


Figure 3.7 - Retailer Market Share in Texas, New Homes

Notes: This figure shows the top ten retailers per year in Texas in terms of the number of new manufactured homes sold. Sales from all other retailers are grouped into "Other."

Data: Home Ownership Records, Manufactured Housing Division
Texas Department of Housing and Community Affairs (TDHCA)

TABLE 3.7
M&A IN MANUFACTURED HOUSING, 1995-2003

Year	Vertical	Deal
1995		Champion acquires Crest Ridge
1995		Belmont acquires Spirit
1995	Finance	21st Mortgage founded
1996		Champion acquires Redman
1996		American Homestar acquires Guerdon
1996	Retail	HomeUSA acquires nine retailers; becomes leading national retailer
1997		Cavalier acquires Belmont
1997		American Homestar acquires Brilliant
1998		Oakwood acquires Schult
1998		Oakwood buys Saturn Housing plant
1998		Patriot acquires Pinnacle
1998	Retail	Champion acquires ICA Group
1998	Retail	Cavco acquires AAA Homes
1998	Retail	Fleetwood acquires HomeUSA
1998	Finance	Cavco/Centex Finance open office in Dallas for retail dealers
1998	Finance	Conseco acquires Green Tree
1999	Retail	Champion closes 300 dealerships
2000		Big Spring / Solitaire buys Signal plant
2000		Centex fully acquires Cavco
2000	Finance	Citigroup acquires Associates Housing Finance; discontinues loans
2001	Retail	Centex forms Factory Liquidators with inventory from failed dealers
2001		*American Homestar files for Chapter 11 bankruptcy*
2002		*Oakwood files for Chapter 11 bankruptcy*
2002	Finance	*Conseco files for Chapter 11 bankruptcy*
2002	Finance	Deutsche Financial discontinues new floor plans
2003		Centex Spins off Cavco
2003		Berkshire Hathaway acquires Clayton
2003	Finance	Clayton fully acquires 21st Mortgage
2003	Finance	Green Tree sold by Conseco to private equity firms

TABLE 3.8
M&A IN MANUFACTURED HOUSING, 2004–2023

Year	Vertical	Deal
2004		Clayton acquires Oakwood (Schult, Marlette, Golden West)
2004		Karsten acquires Crest Ridge/Champion Homes plant
2005		Clayton acquires Karsten
2005		Legacy acquires Cavalier plant
2005	Retail	Clayton acquires 135 Fleetwood dealerships
2005	Finance	Bombardier transfers manufactured housing portfolio to Green Tree
2006		Clayton acquires Southern Energy
2007		American Homestar acquires Platinum Homes
2007	Retail	Clayton sells communities (65 of 66 sold to Yes Communities)
2008		*Patriot files for Chapter 11 bankruptcy*
2008	Finance	GE Commercial Distribution Finance places retailer credit on hold
2009	Finance	Textron liquidates floor planning business
2009		*Champion files for Chapter 11 bankruptcy*
2009		*Fleetwood files for Chapter 11 bankruptcy*
2009		Cavco, Clayton and Champion buy Fleetwood plants
2009		Clayton acquires Cavalier (via Southern Energy)
2010		*Palm Harbor files for Chapter 11 bankruptcy*
2011		Cavco acquires Palm Harbor
2015		C_3 Design acquires Franklin Homes
2016		Cavco acquires Chariot Eagle
2016		Southern Energy/Clayton acquires River Birch Homes
2017		Cavco acquires Lexington Homes
2018		Skyline and Champion merge
2018		Jessup acquires idled Patriot Homes plant
2019		New Vision reopens idled Clayton plant
2019		RGN Manufacturing buys New Vision plant
2020		Skyline Champion acquires ScotBilt Homes
2021		Cavco acquires Commodore
2022		Cavco acquires Solitaire

3.3 Identifying Ownership

Titling and reporting requirements for manufactured homes vary by state and property election status. A manufactured home that is personal property will generally require a manufactured home title, while converting that home to real property will generally require surrendering said title. Some states mandate manufactured home titles regardless of property type.

Manufactured home ownership is not spread evenly throughout the US. Figure 3.8 shows the breakdown of annual manufactured housing shipments to states from 1994 through 2022, with the top twenty states per year named, and shipments to all remaining states grouped into "Other." Texas alone receives almost 18 percent of the new manufactured homes produced each year - more manufactured homes are shipped to Texas than to the bottom 30 states and the District of Columbia combined. Florida and Alabama come second and third; they receive eight percent and 6.5 percent, respectively, of the new manufactured homes produced in the US.

3.3.1 Statements of Ownership and Location - Texas

The Texas Department of Housing and Community Affairs (TDHCA) assumed titling responsibility from the Motor Vehicle Division in 1981, and responsibility for the manufactured housing program in 1995. In 2003, title certificates were eliminated and replaced with the Statement of Ownership and Location (SOL).[15]

Manufactured homeowners in Texas must submit an Application for Statement of Ownership within 60 days from the date of any sale or relocation of a home, whether the home is personal property or real property. Ownership is not considered vested at the time of sale; ownership vests only when the complete SOL is filed with the TDHCA.[16]

Schneider, Schwartz, Russell, O'Reilly, Melton, and Leitner (2021) note that SOL are only legally required when a licensed retailer sells a home,[17] so used homes sold in consumer-to-consumer transactions or brought in from another state might not be recorded. To an extent, this is true; used manufactured homes

[15] TDHCA MHD 1023
[16] Texas Occupations Code § 1201.206(e)
[17] Texas Occupations Code § 1201.206(c)

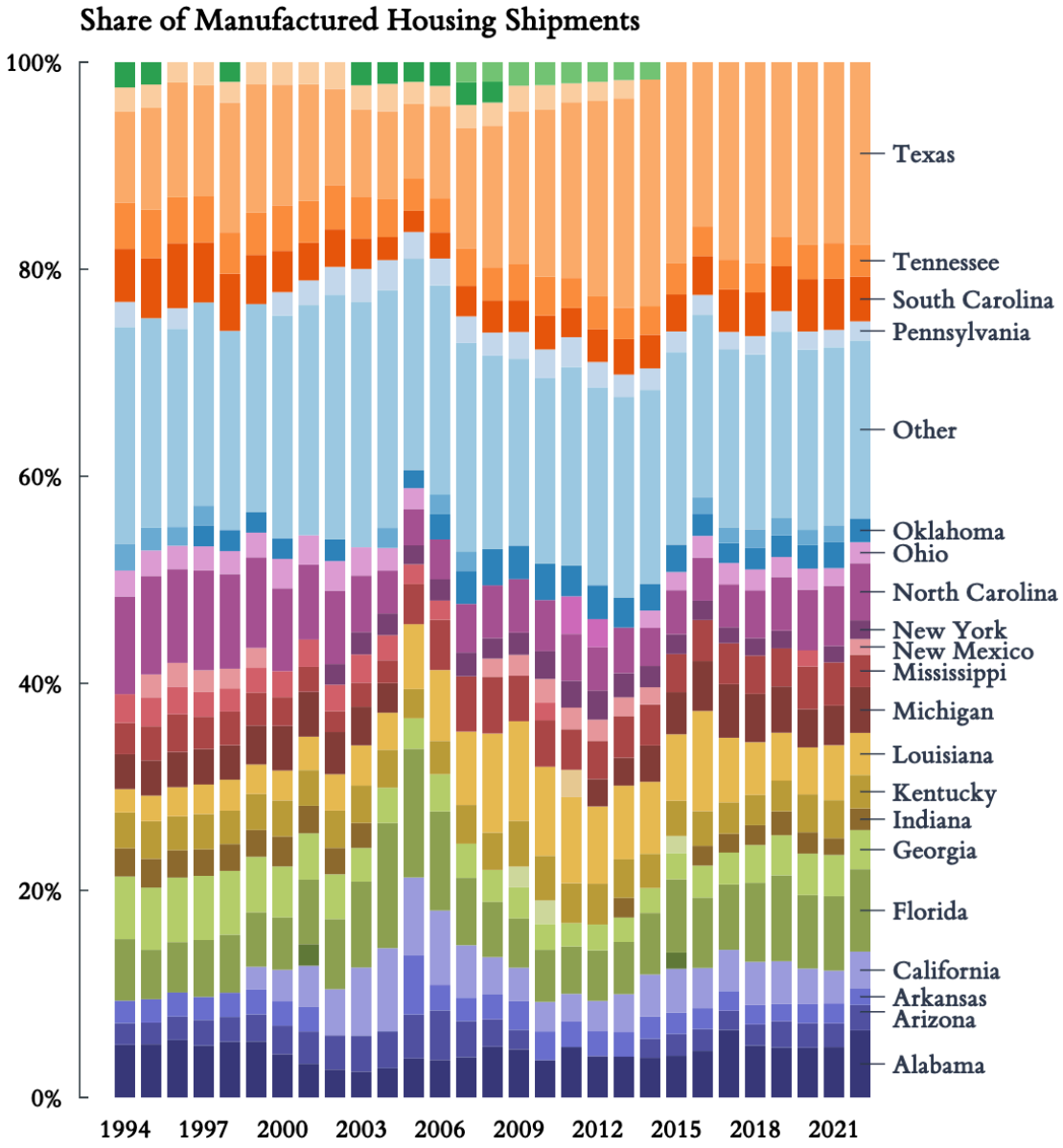


Figure 3.8 - Annual Shipments to States

Notes: This figure shows the top twenty states per year by manufacturing housing shipment market share. Shipments to all remaining states are grouped into "Other."

Data: Institute for Building Technology & Safety via the US Census Bureau

produced in other states are particularly likely to only appear in the data via oversize trip permits.[18] But the public ownership records are impressively comprehensive, likely thanks to the rule just mentioned: Texas only considers ownership of a home vested or transferred on receiving a completed SOL.[19]

The SOL include the HUD Label, serial number, weight, dimensions, model, manufacturer, home age, retailer, buyer and titling status of each home. Manufactured homes in Texas were originally personal property by default. This changed in 2001 when the 77th Legislature HB 1869 shifted the baseline to real property, with the intention of promoting access to financing (Irvine 2003). The change was short lived; the 78th Legislature switched the default back to personal property in 2003, amidst record high foreclosures and bankruptcies in the industry. For more summary information on manufactured home titling in Texas, see Chapter 1. Tables 3.9 and 3.10 show the breakdown of distinct manufactured home sales in Texas by home age - by whether or not the home is new - and the number of sections from 1982 through 2021.

3.3.2 Manufactured Home Ownership Documents - Oregon

The Oregon Building Codes Division (BCD) tracks ownership, security interests, and location for all manufactured homes that are personal property through its Manufactured Home Ownership Document System (MHODS). When a new or used manufactured home that is personal property changes ownership or classification, the Manufactured Home Ownership Application - Form 2952 - must be submitted.[20] This form includes information about each home's buyer, sale price, location, manufacturer, model, year of manufacture, square footage, roofing type, siding type, heating type, cooling type, number of sections, number of bedrooms, number of bathrooms, titling status, land ownership, and whether the home is new or used.[21] Table 3.11 lists the number of distinct ownership changes found, and the

[18] Homes produced in Texas but shipped out of state and homes produced for FEMA are the biggest "offenders."

[19] It is also possible I am missing homes that were produced and sold in Texas and hence underestimating the problem, as buyers who both fail to report ownership (missing from TDHCA SOL) and fail to show up on tax rolls (missing from Zillow and TDHCA tax liens), are surely more likely to fail to apply for oversize trip permits. But hiding a manufactured home traveling on state-maintained roads would not be easy.

[20] ORS §446.568

[21] Oregon BCD 2952

Table 3.9
Manufactured Home Ownership Changes in Texas, 1982-2002

	New Sales (%)		Used Sales (%)			
	Single	*Multi*	*Single*	*Multi*	Total Sales	New (%)
1982	86	14	94	6	49,263	19
1983	86	14	94	6	62,541	43
1984	83	17	93	7	62,829	52
1985	74	26	92	8	54,945	46
1986	68	32	91	9	44,509	36
1987	63	37	89	11	36,914	26
1988	56	44	88	12	31,591	16
1989	54	46	88	12	26,069	13
1990	53	47	87	13	23,939	16
1991	54	46	86	14	20,571	20
1992	57	43	84	16	23,106	30
1993	60	40	85	15	28,370	44
1994	63	37	81	19	36,521	53
1995	64	36	80	20	44,543	63
1996	61	39	78	22	53,195	64
1997	56	44	76	24	56,369	63
1998	53	47	75	25	63,744	63
1999	47	53	71	29	62,579	60
2000	43	57	68	32	53,622	52
2001	36	64	69	31	44,659	48
2002	34	66	68	32	35,391	39

Notes: This table lists the number of distinct ownership changes found, and the breakdown of sold manufactured homes by age and number of sections in Texas from 1982 through 2002.

Data: Home Ownership Records, Manufactured Housing Division
Texas Department of Housing and Community Affairs (TDHCA)

Table 3.10
Manufactured Home Ownership Changes in Texas, 2003-2021

	New Sales (%)		Used Sales (%)			
	Single	*Multi*	*Single*	*Multi*	Total Sales	New (%)
2003	30	70	65	35	31,999	37
2004	38	62	62	38	31,990	34
2005	39	61	64	36	33,900	31
2006	39	61	64	36	32,051	30
2007	41	59	64	36	32,768	31
2008	46	54	62	38	28,189	38
2009	46	54	62	38	24,710	33
2010	52	48	63	37	26,017	31
2011	56	44	64	36	26,644	32
2012	58	42	65	35	30,138	32
2013	56	44	64	36	30,111	36
2014	56	44	63	37	31,831	39
2015	52	48	63	37	31,964	37
2016	51	49	63	37	34,199	37
2017	52	48	63	37	36,217	38
2018	52	48	63	37	39,158	40
2019	47	53	63	37	39,293	41
2020	46	54	62	38	39,316	42
2021	45	55	62	38	40,146	39

Notes: This table lists the number of distinct ownership changes found, and the breakdown of sold manufactured homes by age and number of sections in Texas from 2003 through 2021.

Data: Home Ownership Records, Manufactured Housing Division
Texas Department of Housing and Community Affairs (TDHCA)

Table 3.11
Manufactured Home Purchases in Oregon, 2005-2019

				Single-wide ($)		Multi-wide ($)	
	Records	New (%)	Single (%)	*New*	*Used*	*New*	*Used*
2005	5,049	19	43	48,905	20,000	74,626	30,000
2006	3,776	19	41	36,125	13,500	87,472	28,000
2007	3,936	22	41	37,633	12,880	89,826	30,000
2008	5,919	17	45	43,257	13,000	78,504	30,000
2009	5,434	11	43	40,062	12,000	73,865	29,000
2010	6,294	8	46	35,605	12,000	71,657	28,000
2011	6,562	8	44	34,753	10,400	69,790	25,656
2012	7,131	6	45	36,393	12,000	64,950	26,000
2013	8,484	7	41	40,755	13,900	75,007	29,000
2014	9,468	9	41	39,665	13,400	75,483	30,000
2015	10,590	11	42	36,456	16,000	78,850	35,000
2016	11,437	13	41	44,918	20,000	79,855	40,000
2017	12,328	16	36	49,950	20,000	93,745	49,900
2018	12,438	16	34	46,541	22,500	102,977	59,000
2019	11,889	17	32	50,800	29,000	109,507	64,500

Notes: This table lists the number of distinct ownership changes found, and the distribution and median purchase price of manufactured homes by size and age in Oregon from 2005 through 2019. Multi-wide homes consist of two or more single units joined together.

Data: Manufactured Home Ownership Document System (MHODS)
Oregon Building Codes Division

distribution and median price of manufactured homes by size and age in Oregon from 2005 through 2019.

3.3.3 Certificates of Ownership - Nevada

Nevada statute requires all manufactured homes sold in Nevada or shipped into Nevada to be registered and titled within 30 days if a home is new, or 45 days if a home is used, regardless of property election type.[22] The Nevada Housing Division, a division of the Department of Business and Industry, issues titles and maintains ownership records for manufactured homes, and offers online manufactured home title searches from 1983 onwards.[23] Each ownership record includes a description of the home (the year, manufacturer, model, size, and serial number), the physical location of the home, and owner and lienholder information.[24] Bills of Sale include the purchase price and the date of purchase.[25] Tables 3.12 and 3.13 show summary statistics for manufactured home titles in Nevada from 1983 through 2022.

3.3.4 Certificates of Title - Wisconsin

The Division of Professional Credential Processing within the Wisconsin Department of Safety and Professional Services requires Manufactured Home Certificate of Title Applications,[26] Bills of Sale,[27] and Indemnity Statements[28] for manufactured homes in Wisconsin unless the homeowner "intends, upon acquiring the manufactured home, to make the manufactured home a fixture to land in which the owner of the manufactured home has an ownership or leasehold interest."[29] Each title application includes the physical location of the home, whether the home is on owned land, and other information about the home including the HUD label number, serial number, model year, size, and manufacturer. Owner, lienholder,

[22] NRS §489.501; NRS §489.511; NRS §489.521
[23] Nevada Housing Division, Online Title Search
[24] Nevada Housing Division TL-100; Nevada Housing Division TL-101
[25] Nevada Housing Division TL-112
[26] Wisconsin SBD-10687
[27] Wisconsin SBD-10696
[28] Wisconsin SBD-10688
[29] Wis. Stat. § 101.9203(4)

Table 3.12
Titled Manufactured Homes in Nevada, 1983-2002

	Titles	New (%)	Single-wide (%)	Single-wide ($) *New*	Single-wide ($) *Used*	Multi-wide ($) *New*	Multi-wide ($) *Used*
1983	2,464	32	62	19,161	8,540	32,760	19,500
1984	2,643	27	60	20,650	8,842	30,188	19,900
1985	2,748	26	54	21,670	7,147	24,500	21,995
1986	3,324	26	51	20,900	6,521	31,500	21,165
1987	4,219	29	49	21,277	5,000	21,190	19,000
1988	4,895	33	48	24,068	5,675	29,978	21,999
1989	5,190	33	48	22,450	4,225	33,179	24,000
1990	5,894	32	51	20,926	6,603	37,000	21,000
1991	7,058	30	48	20,898	7,000	40,184	19,450
1992	7,590	25	49	24,950	5,500	41,829	25,000
1993	7,000	22	51	26,492	6,995	42,500	25,000
1994	8,605	25	44	28,073	7,000	45,800	25,400
1995	10,623	27	44	30,190	8,500	45,660	24,750
1996	10,936	29	41	26,236	9,000	46,910	26,500
1997	10,423	29	39	31,427	9,000	49,473	27,500
1998	10,746	27	40	30,200	11,100	51,835	28,500
1999	11,592	27	37	23,715	10,000	51,900	32,900
2000	9,553	21	41	27,900	11,200	53,900	31,500
2001	7,989	20	39	25,835	10,000	55,982	30,000
2002	7,307	21	37	25,396	10,300	55,447	32,900

Notes: This table lists the number of distinct title changes found, and the distribution and median price of manufactured homes by size and age in Nevada from 1983 through 2002. Multi-wide homes consist of two or more single units joined together.

Data: Online Title Search, Nevada Housing Division, Department of Business and Industry

Table 3.13
Titled Manufactured Homes in Nevada, 2003-2022

	Titles	New (%)	Single (%)	Single-wide ($) *New*	Single-wide ($) *Used*	Multi-wide ($) *New*	Multi-wide ($) *Used*
2003	7,297	20	37	28,201	11,550	55,900	30,000
2004	8,987	22	35	23,718	11,000	58,100	30,721
2005	8,855	24	37	22,765	7,997	63,160	33,000
2006	9,705	27	32	24,858	10,900	68,000	34,500
2007	7,498	23	37	27,700	12,500	70,000	30,000
2008	5,354	19	40	26,691	10,250	72,579	28,900
2009	5,690	15	40	25,510	11,000	59,912	26,600
2010	5,395	15	42	29,994	11,200	57,350	27,000
2011	6,175	10	43	26,768	9,592	57,485	23,450
2012	5,766	10	44	25,735	12,000	56,900	23,500
2013	5,775	10	43	27,146	10,000	54,167	22,907
2014	5,618	10	43	27,000	9,500	50,135	25,000
2015	6,027	11	43	27,499	10,000	53,100	26,000
2016	5,975	12	44	29,820	10,030	57,187	27,000
2017	4,735	16	42	33,694	9,500	57,155	27,000
2018	6,570	10	43	42,470	8,000	79,529	26,500
2019	5,874	10	41	39,989	8,000	83,081	30,250
2020	3,494	17	37	36,380	10,000	86,777	38,000
2021	3,916	14	40	49,626	17,200	84,900	55,000
2022	4,875	14	39	76,010	26,000	100,931	60,000

Notes: This table lists the number of distinct title changes found, and the distribution and median price of manufactured homes by size and age in Nevada from 2003 through 2022. Multi-wide homes consist of two or more single units joined together.

Data: Online Title Search, Nevada Housing Division, Department of Business and Industry

Table 3.14
Titles and Home Age in Wisconsin, 2001-2019

Issued	Titles	New Homes (%)	Used Homes (%)
2001	9,061	19.4	80.6
2002	9,318	18.7	81.3
2003	8,282	15.6	84.4
2004	8,116	12.3	87.7
2005	6,371	11.3	88.7
2006	7,885	10.4	89.6
2007	6,542	8.6	91.4
2008	5,736	6.4	93.6
2009	5,590	4.2	95.8
2010	5,222	3.8	96.2
2011	5,364	2.9	97.1
2012	5,158	2.6	97.4
2013	5,536	3.2	96.8
2014	5,142	3.1	96.9
2015	5,703	4.7	95.3
2016	5,444	6.0	94.0
2017	5,641	6.9	93.1
2018	4,775	8.3	91.7
2019	4,765	6.9	93.1

Notes: This table lists the number of distinct manufactured home title changes found, and the breakdown by manufactured home age in Wisconsin for 2001 through 2019.

Data: Wisconsin Electronic Safety and Licensing Application (eSLA) Public Lookup

and dealer information is also listed. Bills of Sale include the purchase price, date of purchase, and seller name and address. Table 3.14 shows the breakdown of manufactured home title changes in Wisconsin by home age, according to data from the Wisconsin Electronic Safety and Licensing Application (eSLA) Public Lookup.[30]

3.3.5 Zillow ZTRAX

The Zillow Transaction and Assessment Dataset (ZTRAX) is an aggregation of more than 400 million public records across 2,750 US counties. Assessment data is sourced from county assessors' offices; transaction data is from county recorders' offices. Manufactured homes titled as personal property are taxed separately from the land - ie, the park owner and the people living in manufactured home communities receive separate tax bills. This is reflected in the ZTRAX data.

To filter for ZTRAX data related to manufactured homes:

1. Create a master RowID list by pulling RowID from the assessment data files if any of the following case insensitive conditions are true:
    - ZAsmt/Main - RecordTypeStndCode is MH
    - ZAsmt/Main - PropertyZoningDescription contains MH, MANUFACTURED, or MOBIL
    - ZAsmt/Building - PropertyLandUseStndCode is RI109, RR103, or RR115
    - ZAsmt/Building - PropertyCountyLandUseDescription contains MANUF, MOBIL, MH, WIDE, MOBL, or MANF and does not contain CTURING, CTURER, LIGHT, HEAVY, AUTO, PROCES, DISTRIB, or PRODUCT
    - ZAsmt/Oby - ObyStndCode is MH
    - ZAsmt/ExtraFeature - ExtraFeaturesStndCode is MHH
    - ZAsmt/SaleData - DocumentTypeStndCode is MHTL
2. Create a master TransId list by pulling TransId from the transactions data files if any of the following case insensitive conditions are true:

[30] Wisconsin Electronic Safety and Licensing Application (eSLA) Public Lookup

- ZTrans/Main - DocumentTypeStndCode is MHTL
- ZTrans/Main - PropertyUseStndCode is MH or MB

3. Create a master ImportParcelID list and add relevant RowID that might have been missed to the master RowID list by pulling
    - ZTrans/PropertyInfo - ImportParcelID for each found TransId
    - ZAsmt/Main - RowID for each found ImportParcelID
    - ZAsmt/Main - ImportParcelID for each found RowID
4. Add relevant TransId that might have been missed to the master TransId list by pulling
    - ZTrans/PropertyInfo - TransId for each found ImportParcelID
5. Pull all assessment data corresponding to the master RowID list
6. Pull all transactions data corresponding to the master TransId list

3.4 Identifying Loans

Lenders in the US take a security interest in real estate by recording a mortgage or deed of trust with the relevant county. The Uniform Commercial Code (UCC)[31] allows for the analogous collateralization of personal property at the state level, e.g.

- 1997 Ford Dump Truck
- One Membership in the Vaquero Golf Club
- 50 percent ownership of Red Barre, LLC
- One Nintendo Wii U 32GB Bundle
- Two female alpacas, two male alpacas

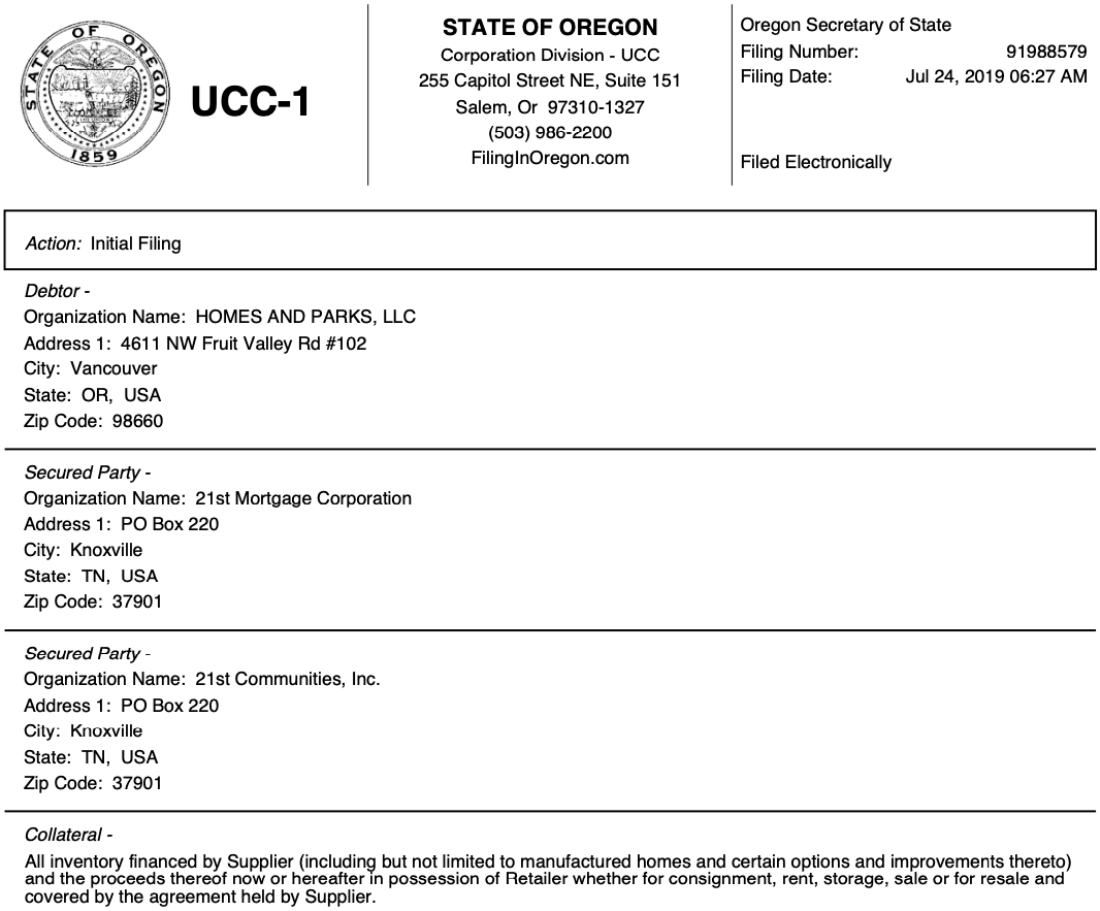
The UCC Financing Statement[32] asks for the debtor's organization, name and address; the secured party's organization, name and address; and a description of the collateral. UCC filings are public data.

Every state in the US has adopted some of the UCC, but each jurisdiction can adopt selectively, and make its own modifications. The relevant section of the UCC here is Article Nine: Secured Transactions; Sales of Accounts and Chattel Paper.[33]

3.4.1 Inventory Finance - UCC Filings

Figure 3.9 shows an example of a UCC Financing Statement submitted by 21st Mortgage and 21st Communitites, the lenders, regarding the inventory of Homes and Parks LLC, a retailer in Oregon. Figure 3.10 shows another example: a UCC Financing Statement submitted by ITT Commercial Finance, a lender, regarding the inventory of a Texas retailer, Spears Mobile Homes.

[31] Uniform Commercial Code
[32] Form UCC1
[33] UCC Article 9



UCC-1

STATE OF OREGON
Corporation Division - UCC
255 Capitol Street NE, Suite 151
Salem, Or 97310-1327
(503) 986-2200
FilingInOregon.com

Oregon Secretary of State
Filing Number: 91988579
Filing Date: Jul 24, 2019 06:27 AM

Filed Electronically

Action: Initial Filing

Debtor -
Organization Name: HOMES AND PARKS, LLC
Address 1: 4611 NW Fruit Valley Rd #102
City: Vancouver
State: OR, USA
Zip Code: 98660

Secured Party -
Organization Name: 21st Mortgage Corporation
Address 1: PO Box 220
City: Knoxville
State: TN, USA
Zip Code: 37901

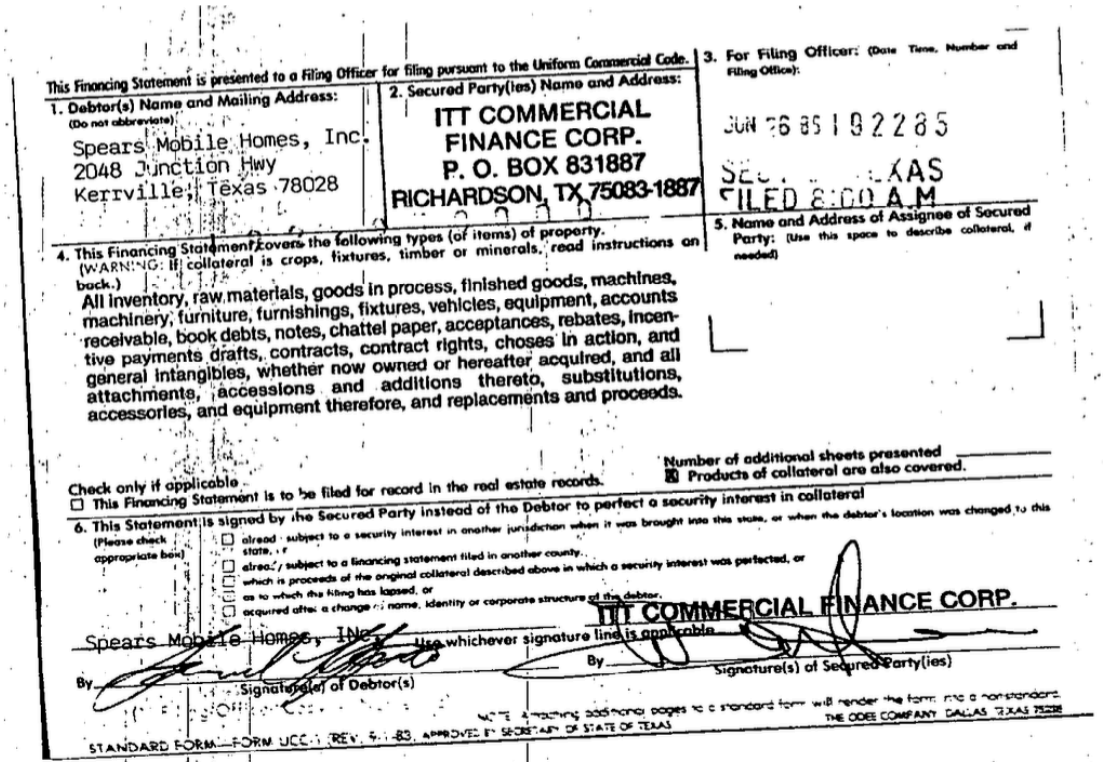
Secured Party -
Organization Name: 21st Communities, Inc.
Address 1: PO Box 220
City: Knoxville
State: TN, USA
Zip Code: 37901

Collateral -
All inventory financed by Supplier (including but not limited to manufactured homes and certain options and improvements thereto) and the proceeds thereof now or hereafter in possession of Retailer whether for consignment, rent, storage, sale or for resale and covered by the agreement held by Supplier.

Figure 3.9 - UCC Financing Statement Covering Oregon Inventory

Notes: This figure shows a UCC Financing Statement submitted by 21st Mortgage and 21st Communities, the secured parties, covering the inventory of Homes and Parks, a retailer in Oregon and the debtor.

Data: UCC Search
Oregon Secretary of State



This Financing Statement is presented to a Filing Officer for filing pursuant to the Uniform Commercial Code.

1. Debtor(s) Name and Mailing Address: (Do not abbreviate)
Spears Mobile Homes, Inc.
2048 Junction Hwy
Kerrville, Texas 78028

2. Secured Party(ies) Name and Address:
ITT COMMERCIAL FINANCE CORP.
P. O. BOX 831887
RICHARDSON, TX 75083-1887

3. For Filing Officer: (Date, Time, Number and Filing Office):
JUN 26 85 192285
SEC... ...EXAS
FILED 8:00 A.M

4. This Financing Statement covers the following types (or items) of property. (WARNING: If collateral is crops, fixtures, timber or minerals, read instructions on back.)
All inventory, raw materials, goods in process, finished goods, machines, machinery, furniture, furnishings, fixtures, vehicles, equipment, accounts receivable, book debts, notes, chattel paper, acceptances, rebates, incentive payments drafts, contracts, contract rights, choses in action, and general intangibles, whether now owned or hereafter acquired, and all attachments, accessions and additions thereto, substitutions, accessories, and equipment therefore, and replacements and proceeds.

5. Name and Address of Assignee of Secured Party: (Use this space to describe collateral, if needed)

Check only if applicable
☐ This Financing Statement is to be filed for record in the real estate records.

Number of additional sheets presented
☒ Products of collateral are also covered.

6. This Statement is signed by the Secured Party instead of the Debtor to perfect a security interest in collateral
(Please check appropriate box)
☐ already subject to a security interest in another jurisdiction when it was brought into this state, or when the debtor's location was changed to this state, or
☐ already subject to a financing statement filed in another county,
☐ which is proceeds of the original collateral described above in which a security interest was perfected, or
☐ as to which the filing has lapsed, or
☐ acquired after a change of name, identity or corporate structure of the debtor.

Spears Mobile Homes, Inc.
By _____ Signature(s) of Debtor(s)

ITT COMMERCIAL FINANCE CORP.
Use whichever signature line is applicable
By _____ Signature(s) of Secured Party(ies)

NOTE: If attaching additional pages to a standard form will render the form not a nonstandard form.

STANDARD FORM—FORM UCC-1 REV. 5-1-83. APPROVED BY SECRETARY OF STATE OF TEXAS
THE ODEE COMPANY DALLAS, TEXAS 75235

Figure 3.10 - UCC Financing Statement Covering Texas Inventory

Notes: This figure shows a UCC Financing Statement submitted by ITT Commercial Finance, the secured party, covering the inventory of Spears Mobile Homes, a retailer in Texas and the debtor.

Data: Business Entity and Secured Transactions Database
Texas Secretary of State

3.4.2 Inventory Finance - Texas

The Texas Manufactured Housing Standards Act assigns additional responsibilities to the TDHCA, beyond those required through its position as a SAA. Under Texas law, the Manufactured Housing Division must record and release liens.[34]

A lien on a manufactured home in inventory in Texas is perfected by filing a financing statement with the TDHCA: the Texas Inventory Finance Security Form.[35] The perfected lien applies to "all reported manufactured homes which have been financed by the creditor-lender or for which the creditor-lender has advanced any funds or has incurred any obligation which enabled the retailer to acquire the manufactured home." Liens on inventory automatically convert at the first retail sale to a security interest in cash proceeds.[36] This data was released by the TDHCA under the Texas Public Information Act.

Properly perfected liens have priority over other liens against the home.[37] Despite this, lenders in Texas still routinely file UCC Financing Statements.

3.4.3 Consumer Finance - HMDA

The Home Mortgage Disclosure Act (HMDA) has required lenders to collect and report information about their housing-related lending activity since 1975. Figure 3.11 shows the market share of the top ten manufactured housing lenders per year, according to HMDA-reported consumer loans, with loans from all other lenders grouped into "Other." HMDA loans here include originated first lien, owner-occupied manufactured home purchase loans.

21st Mortgage and Vanderbilt Mortgage and Finance are both subsidiaries of Clayton Homes, which is itself a wholly owned subsidiary of Berkshire Hathaway. As the figure makes evident, Clayton Homes is gaining market share not just in manufacturing, but also in lending.

Recall from Chapter 1 that from 2018 onwards, HMDA requires lenders to identify the secured property type - whether the collateral consists of both a manufactured home and the underlying or intended land, or just a manufactured home.

[34] Texas Occupations Code §1201
[35] TDHCA MHD 1049
[36] Texas Occupations Code §1201.219(a)
[37] Texas Occupations Code §1201.219(b)

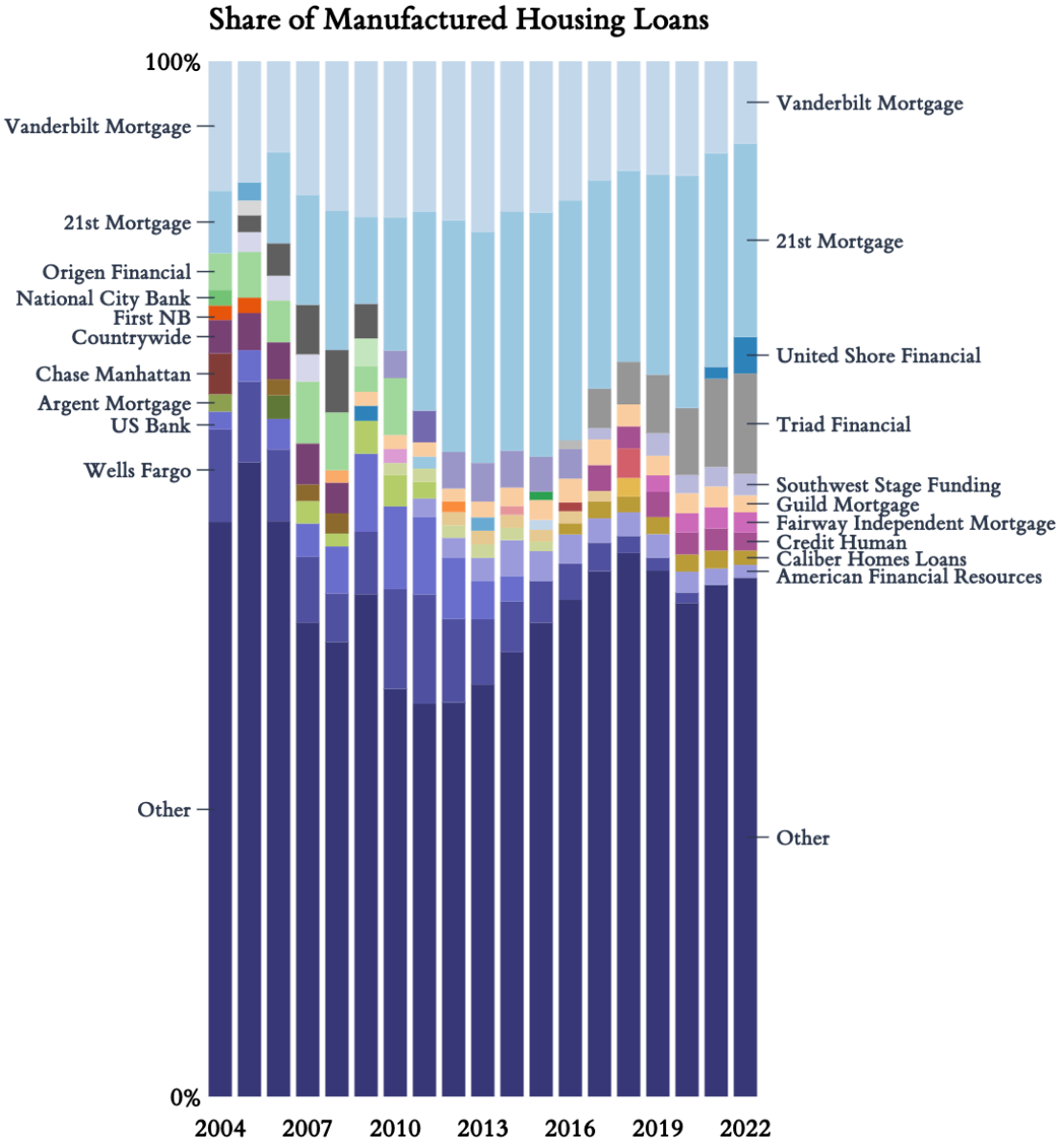


Figure 3.11 - Manufactured Home Loan Market Share

Notes: This figure shows the top ten lenders per year in the US by HMDA-reported manufacturing housing loan share. Loans from all other lenders are grouped into "Other." HMDA loans include originated first lien, owner-occupied manufactured home purchase loans.

Data: Originated Loans, Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

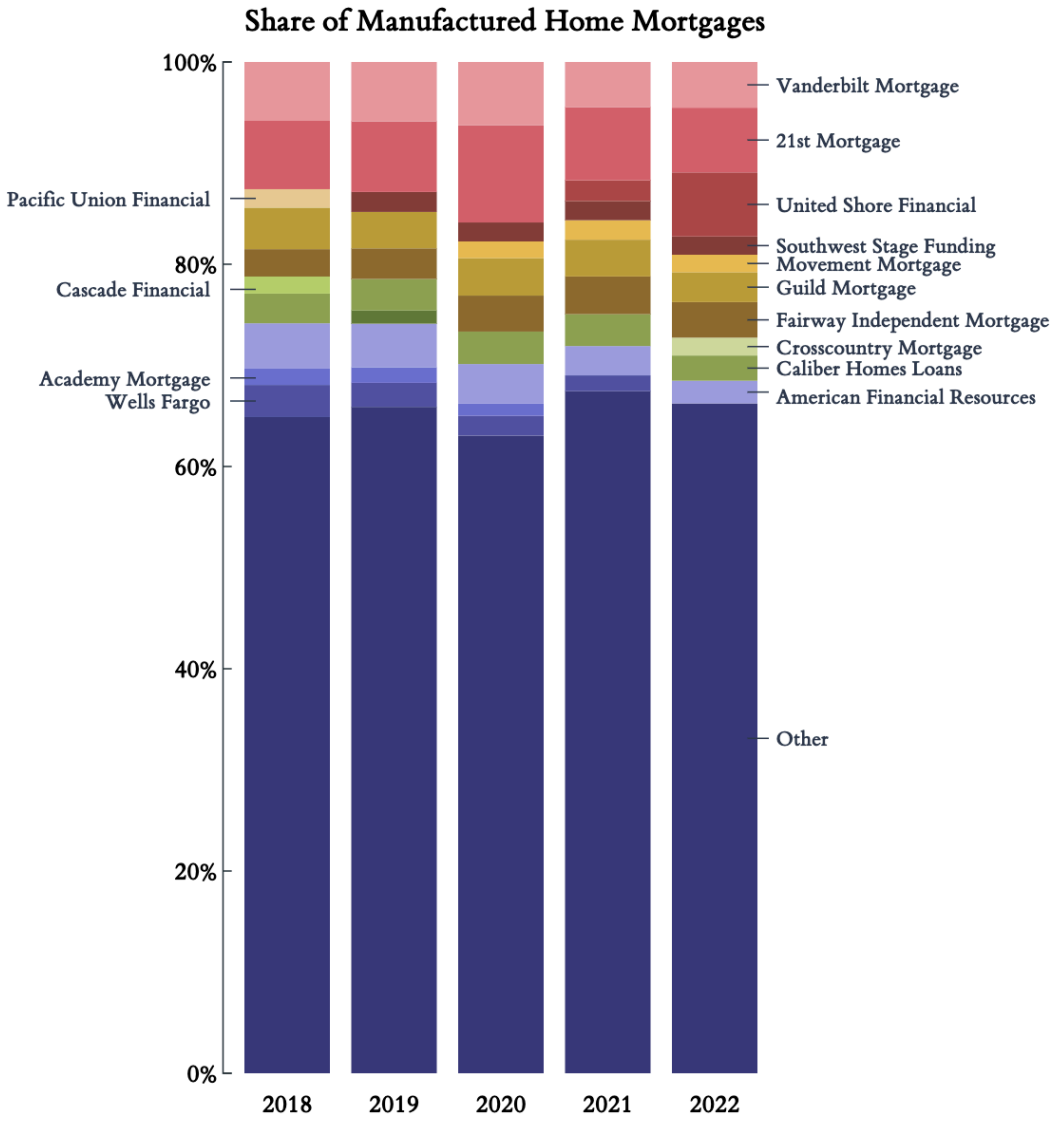


Figure 3.12 - Manufactured Home Mortgage Market Share

Notes: This figure shows the top ten lenders per year in the US by HMDA-reported manufacturing housing mortgage loan share. Loans from all other lenders are grouped into "Other." HMDA loans include originated first lien, owner-occupied manufactured home purchase mortgage loans.

Data: Originated Loans, Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

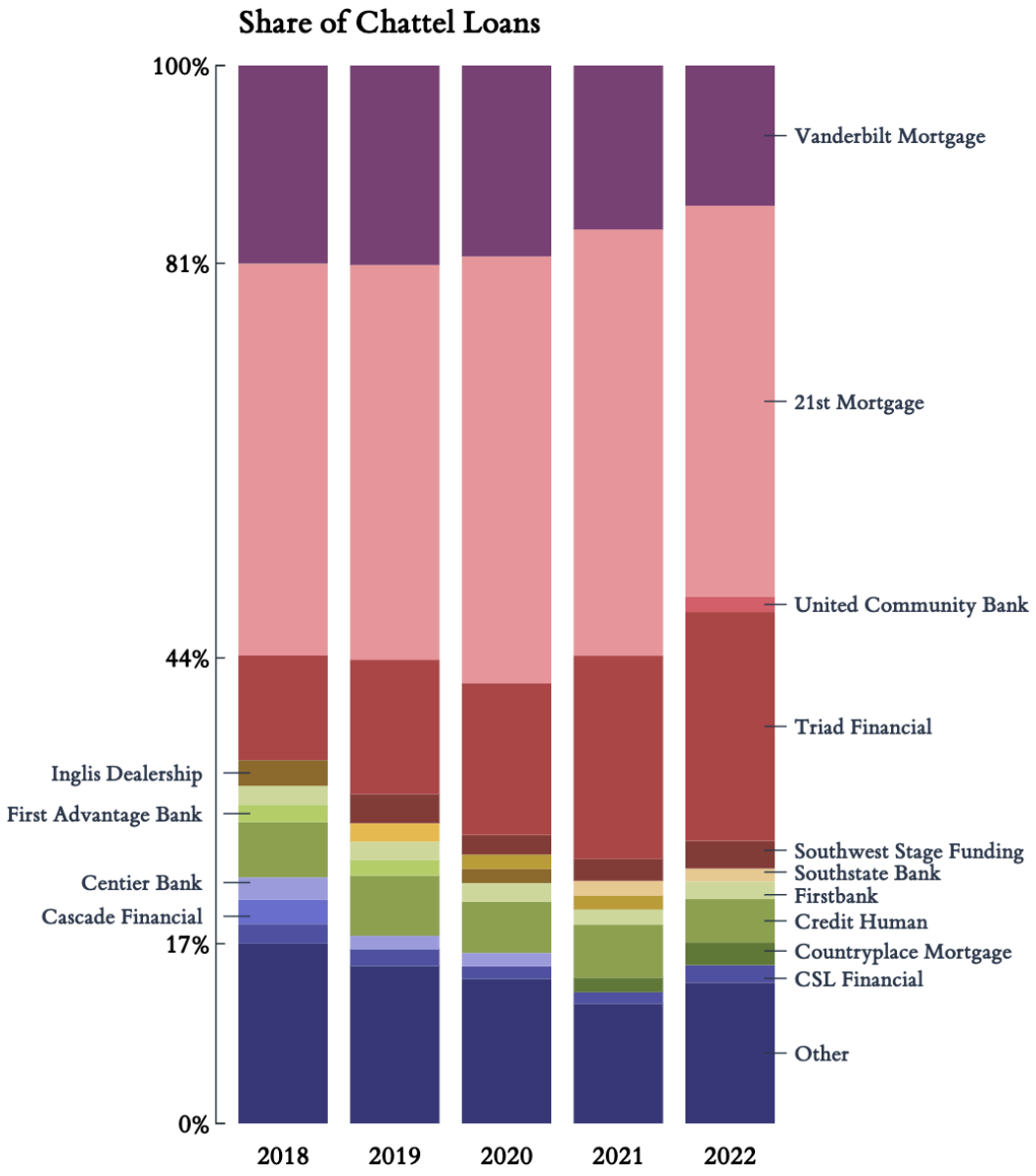


Figure 3.13 - Chattel Loan Market Share

Notes: This figure shows the top ten lenders per year in the US by HMDA-reported manufacturing housing chattel loan share. Chattel loans from all other lenders are grouped into "Other." HMDA loans include originated first lien, owner-occupied manufactured home purchase chattel loans.

Data: Originated Loans, Home Mortgage Disclosure Act (HMDA)
Consumer Financial Protection Bureau

This implies the type of manufactured housing loan - a manufactured home mortgage, if land is included,[38] or a chattel loan. As discussed in Chapter 1, the manufactured home mortgage and chattel loan markets are quite different, with loan terms for chattel loans generally being "worse." Figures 3.12 and 3.13, which repeat the market share breakdown by loan type, show that the lenders offering manufactured home mortgages and chattel loans are also quite different. When the subset of HMDA manufactured housing loans is limited to chattel loans, Clayton Homes alone provides more than 50 percent of HMDA-reported financing in the US.

3.4.4 Consumer Finance - Texas

Liens on manufactured homes in Texas are perfected by filing notice of the lien with the TDHCA. Consumer loans are reported on the Statement of Ownership and Location (SOL).[39] Under Texas law, TDHCA tracks and publishes the lien date, and the lender name and address for each consumer loan. See Chapter 1 for summary information about consumer loans in Texas.

Schneider, Schwartz, Russell, O'Reilly, Melton, and Leitner (2021) note that TDHCA SOL records often fail to list consumer-level lien information for homes titled as real property. This is true. TDHCA SOL records also often fail to list liens for homes titled as personal property. While some released liens are still public, older released liens disappear from the TDHCA's public-facing website when newer liens on a given home are recorded.

Both personal property liens and real property liens on manufactured homes can be released. Mortgage liens are released via recording with the county clerk. Personal property liens are released by lienholders via the TDHCA's Finance Lien Release System.[40] Updated statements of ownership are then published without the lien. Manufactured home mortgages can also be perfected elsewhere, so they might never show up in the TDHCA data - though the data suggests most loans are reported on ownership statements regardless of the property election.

These missing loans can be mitigated by supplementing the homeownership records with real property mortgages from the usual mortgage databases,[41] and MHD Form 1013/Form B - Release of Lien or Repossession data released under

[38] or in certain cases a long-term lease
[39] TDHCA MHD 1023
[40] TDHCA MHD Finance Lien Release User Guide
[41] e.g., Zillow or the equivalent

the Texas Public Information Act.[42] Released liens are common, so this FOI request is worthwhile.[43]

A large percentage of chattel loans do not show up in Home Mortgage Disclosure Act (HMDA) data - presumably because they are not reportable, as discussed in Chapter 1 - so using any of these data sources alone will lead to undercounting manufactured housing loans. Further missing loans can be inferred from other data - for example, we can assume a lender only sells or ships a home he is repossessing - but I would not call this worthwhile (only a few hundred additional loans in Texas).

3.4.5 Borrower Distress - Repossessions in Texas

Under the Texas Finance Code, when a consumer defaults, the creditor with the first recorded perfected security interest can repossess the manufactured home - even if the manufactured home is affixed to real property.[44] Repossession dates are reported to the TDHCA on MHD Form 1013/Form B - Release of Lien or Repossession.[45] This data was released under the Texas Public Information Act.

3.4.6 Borrower Distress - Tax Liens in Texas

On January 1 of each year, a tax lien is attached to each manufactured home in Texas to secure the payment of property taxes. This tax lien is released when a tax paid receipt is filed with the TDHCA, or when the lien has been delinquent for more than four years and no suit to collect the tax lien has been filed.[46]

Under the Texas Tax Code,[47] a tax lien on a manufactured home can only be enforced if the lien was filed with the TDHCA within 150 days of the delinquency date. The tax lien notice requires identifying information about the manufactured

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[42] TDHCA MHD 1013

[43] This data is not associated with "Form B" or "Form 1013" in TDHCA databases, so related FOI requests should be very specific.

[44] Texas Finance Code §347.355: "If the manufactured home is affixed to real property, the creditor, after notice, may remove the manufactured home from the real property in accordance with the applicable provisions of the Business & Commerce Code as if it were personal property."

[45] TDHCA MHD 1013

[46] Texas Occupations Code §1201.219(g) and (h)

[47] Texas Tax Code §32.03

home, the homeowner name and address on the tax roll, and the dollar amount of the tax lien.[48] TDHCA publishes tax liens on manufactured homes on its website by law.[49]

3.4.7 Borrower Distress - Trip Permits in Texas

Borrower distress can also be inferred from oversize trip permits released by the Texas Department of Motor Vehicles (TxDMV) under the Texas Public Information Act. For example, trip permits will show that a manufactured home was

1. Shipped from the factory where it was produced to a dealership
2. Shipped from that dealership to the address where the home was installed
3. Shipped from the installation address back to a dealership, either by the lender with a perfected lien on the manufactured home, or with that lender now listed as the home owner

[48] TDHCA MHD 1045
[49] Texas Occupations Code §1201.205

3.5 Identifying FEMA Trailers

3.5.1 FEMA Production - FEMA

The Federal Emergency Management Agency (FEMA) released the serial number, manufacturer name, model, acquisition date, and model year for about 14,000 FEMA Trailers in response to a FOIA request for HUD data plate information for every manufactured home purchased by FEMA from 2000 through 2018. While FEMA's response letter stated the request was granted in full, their data listed only 90 manufactured homes as acquired in the two years following Hurricane Katrina. Perhaps surprisingly, their investigation into the missing homes - many of which were identified by HUD label in Office of the Inspector General (OIG) reports, and which by FEMA's own accounting numbered over 24,967 - resulted in the conclusion that "the information would only be available within documents that would take more than three months to obtain plus additional time to review all those documents."

3.5.2 FEMA Production - Texas General Land Office

The Texas General Land Office (GLO) released the following information for 895 federally- or state-funded manufactured homes procured by the GLO on behalf of FEMA to support housing recovery from disasters: model, unit type, year of manufacture, "VIN number." The GLO noted that manufactured housing units do not have serial numbers, so they were releasing VIN numbers - not the requested serial numbers - but the VIN numbers they released were formatted like and consistent with each factory's typical serial numbers.

3.5.3 FEMA Production - HUD

HUD released a 585-page PDF listing 27,999 manufactured home serial numbers in response to a FOIA request for copies of any FEMA-related Cumulative Production Status Reports, or their equivalent, submitted by manufacturers since 2003. Tables 3.15 through 3.18 list the factories identified by HUD, along with the number of released serial numbers, and the first and last released manufacturing date.

Table 3.15
FEMA Production According to HUD - I

Factory	Units	First Manufacturing Date	Last Manufacturing Date
SCBT01	1,315	2005-10-07	2018-02-02
TLIN01	1,270	2008-11-01	2009-08-25
BUCC02	1,137	2004-08-31	2017-01-12
FAIR06	893	2005-10-11	2018-02-20
LBTY11	891	2004-09-15	2005-12-20
LXTG02	647	2005-11-15	2019-02-09
LXTG01	638	2005-09-06	2012-01-27
STHR03	597	2005-10-24	2018-12-19
NHLP01	576	2005-10-02	2009-12-09
HITC01	565	2011-08-07	2013-09-19
STHR04	544	2005-10-19	2017-01-18
OKWD07	509	2005-09-21	2005-12-07
BLCT03	504	2003-05-29	2006-01-20
CHBD13	497	2011-11-02	2016-12-06
LOAK02	475	2016-10-25	2018-01-31
RVRB01	444	2005-09-29	2017-01-23
STHR01	417	2005-10-11	2018-01-18
NRRS01	410	2005-09-20	2006-11-14
CHBD22	402	2016-11-14	2018-01-04
CHBD26	401	2016-11-19	2017-12-18
DTCH05	400	2005-10-03	2005-11-21
LBTY05	397	2004-09-23	2005-12-12
BLCT02	387	2004-10-01	2006-01-13
FAIR05	384	2012-11-01	2018-02-22

Notes: This table lists factories that submitted at least 50 FEMA-related Cumulative Production Status Reports, along with the first and last manufacturing date, according to HUD.

Data: HUD FOIA

Table 3.16
FEMA Production According to HUD - II

Factory	Units	First Manufacturing Date	Last Manufacturing Date
DVHB01	381	2011-08-25	2017-12-11
AMHS03	376	2016-12-21	2019-01-29
HART01	371	2005-10-03	2012-01-25
AMHS01	363	2005-10-18	2017-11-18
REDM09	360	2005-10-07	2005-11-11
DEST21	360	2011-08-29	2018-01-27
PATR05	354	2005-09-29	2006-02-02
FRLN01	346	2014-11-29	2018-02-27
BRIG05	346	2005-09-25	2006-01-17
MRIT03	332	2005-10-08	2005-11-29
CHBD07	303	2016-11-15	2017-12-20
CHBD23	287	2016-11-18	2017-11-21
CPRT01	280	2011-10-07	2017-02-02
HITC02	278	2011-10-03	2011-11-11
CSTT01	246	2016-12-12	2018-01-12
PLAT01	235	2012-10-30	2017-11-30
LBTY12	235	2005-10-10	2005-12-16
FRHO01	229	2011-11-03	2012-01-24
LGCY03	222	2017-10-30	2018-02-08
CLAY02	222	2016-11-03	2016-12-23
GILE01	221	2005-11-15	2006-01-19
TOWN01	221	2005-10-12	2011-11-10
LOAK01	200	2011-10-12	2011-11-12
SHUL14	200	2005-11-01	2005-12-23

Notes: This table lists factories that submitted at least 50 FEMA-related Cumulative Production Status Reports, along with the first and last manufacturing date, according to HUD.

Data: HUD FOIA

Table 3.17
FEMA Production According to HUD - III

Factory	Units	First Manufacturing Date	Last Manufacturing Date
GILE02	200	2005-10-26	2005-12-12
CLAY12	200	2005-09-15	2005-11-28
BUCC04	195	2005-10-02	2006-01-04
LBTY03	193	2005-10-12	2005-12-09
CHBD21	182	2016-12-02	2017-11-27
CLAY13	181	2005-09-15	2005-11-21
CHBD20	179	2016-11-23	2018-01-05
SHUL03	172	2005-10-06	2005-12-07
LBTY06	171	2005-10-06	2005-12-08
CHAM04	168	2005-10-12	2005-12-12
BLCT01	162	2005-11-07	2006-01-13
STHR05	160	2005-10-24	2006-01-06
CVLR04	159	2005-08-24	2005-10-28
CLAY06	155	2005-09-27	2005-11-19
CHAM11	150	2005-10-12	2005-11-28
CLAY20	147	2016-11-21	2016-12-27
STRL09	145	2005-10-10	2008-11-20
PLMH22	143	2005-09-14	2005-11-22
CHAM10	140	2005-10-07	2005-11-14
CHBD90	140	2017-10-27	2018-01-26
FALL02	140	2005-10-11	2005-11-16
CHAM05	138	2005-10-14	2005-12-16
PLMH05	131	2005-10-10	2005-11-10
KABC02	122	2016-11-08	2017-01-18

Notes: This table lists factories that submitted at least 50 FEMA-related Cumulative Production Status Reports, along with the first and last manufacturing date, according to HUD.

Data: HUD FOIA

Table 3.18
FEMA Production According to HUD - IV

Factory	Units	First Manufacturing Date	Last Manufacturing Date
CHBD62	120	2016-11-29	2017-01-27
KARS04	120	2005-10-11	2005-12-09
FUQA04	120	2005-10-18	2005-12-19
CVLR09	112	2005-09-22	2005-10-13
CLAY03	110	2005-09-16	2005-11-04
FLCT03	110	2016-11-23	2016-12-20
APRK01	108	2017-10-27	2018-01-18
CHAM26	106	2005-10-28	2005-11-14
PLVH01	104	2017-10-23	2017-12-13
CMDR15	100	2017-10-25	2018-01-02
CMDR09	97	2017-11-08	2017-12-22
PLMH15	91	2005-10-17	2005-11-11
SKYL19	84	2017-11-17	2018-03-01
PLMH32	83	2005-10-27	2006-01-25
EGLR01	83	2017-10-19	2017-12-19
HOMK01	82	2017-10-30	2018-03-01
CHRT01	81	2017-11-06	2018-02-08
CHAM20	78	2005-10-21	2005-11-22
SNSH02	72	2015-11-16	2016-05-16
REDM20	69	2005-10-17	2005-11-22
CHBD09	55	2016-12-01	2016-12-24
CHBD61	55	2016-11-18	2016-12-19
PLMH07	53	2005-11-01	2005-12-19
CHBD57	50	2016-12-19	2017-01-12

Notes: This table lists factories that submitted at least 50 FEMA-related Cumulative Production Status Reports, along with the first and last manufacturing date, according to HUD.

Data: HUD FOIA

3.5.4 FEMA Production - TDHCA and TxDMV

FEMA production can also be inferred from the sequential ordering of HUD label numbers and serial numbers, in combination with oversize trip permits released by the Texas DMV under the Texas Public Information Act. FEMA staging areas show up in both the source and destination addresses in trip permit data.

3.5.5 FEMA Housing Assistance

Under the Stafford Act,[50] which governs how the US government responds to disasters, the President can authorize federal disaster assistance by declaring emergencies and major disasters.

FEMA's Individuals and Households Program provides help to uninsured or underinsured people and households affected by disasters, including temporary housing assistance and funds to repair or replace primary residences. Tables 3.19 and 3.20 show summary housing assistance data from FEMA's National Emergency Management Information System (NEMIS) for manufactured households.[51]

[50] Robert T. Stafford Disaster Relief and Emergency Assistance Act

[51] FEMA, OpenFEMA Dataset: Disaster Declarations Summaries - v2. This product uses the Federal Emergency Management Agency's OpenFEMA API, but is not endorsed by FEMA. The Federal Government or FEMA cannot vouch for the data or analyses derived from these data after the data have been retrieved from the Agency's website(s).

TABLE 3.19
FEMA HOUSING ASSISTANCE REGISTRANTS - LARGE DISASTERS

Declaration	Disaster	State	Households	MH Owners	MH Renters
2017-08-25	Hurricane Harvey	TX	895,619	42,123	18,321
2017-09-10	Hurricane Irma	FL	2,644,418	132,793	70,701
2018-09-14	Hurricane Florence	NC	139,810	23,875	11,254
2018-10-11	Hurricane Michael	FL	103,285	15,516	6,894
2020-08-28	Hurricane Laura	LA	226,858	27,276	12,105
2021-02-19	Winter Storms	TX	417,716	20,614	6,996
2021-08-29	Hurricane Ida	LA	816,937	46,663	20,693

Notes: This table lists the numbers of households, manufactured homeowners, and manufactured home renters that received FEMA assistance after losses due to disasters.

Data: OpenFEMA

TABLE 3.20
FEMA HOUSING ASSISTANCE RECEIVED BY MANUFACTURED HOUSEHOLDS

Disaster	Insured	Income	Q1	Median	Q3
Hurricane Harvey	23%	25,000	2,237	4,990	14,386
Hurricane Irma	22%	23,354	841	1,000	5,660
Hurricane Florence	30%	21,600	1,028	1,637	5,996
Hurricane Michael	27%	26,000	1,879	3,034	7,764
Hurricane Laura	33%	27,000	3,174	5,492	11,779
Severe Winter Storms	18%	25,000	1,042	2,856	3,723
Hurricane Ida	25%	23,040	3,453	5,136	12,208

Notes: This table lists the percent of assisted households with homeowners insurance, the median self-reported gross income for each assisted household, and summary statistics for the amount of repair or replacement assistance received.

Data: OpenFEMA

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Appendix A

The Starter Home in Context

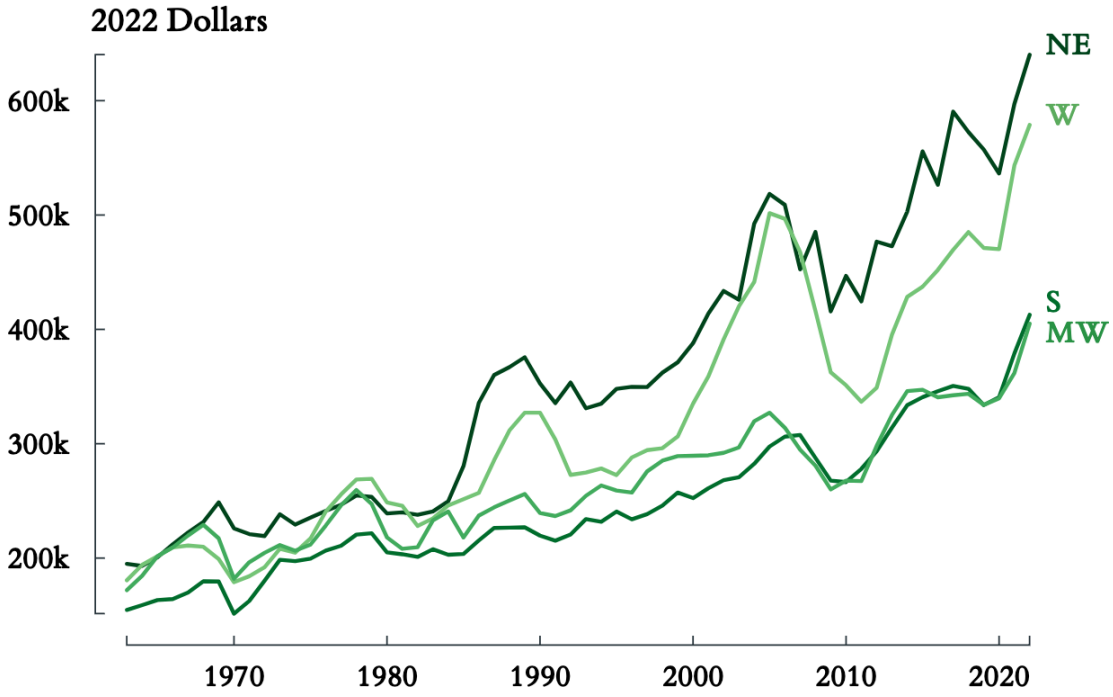

FIGURE A.1 - MEDIAN PRICE OF NEW HOUSES SOLD

Notes: This figure shows the median sales price of new houses in 2022 dollars by Census Region.

Data: US Census Bureau, New Residential Sales

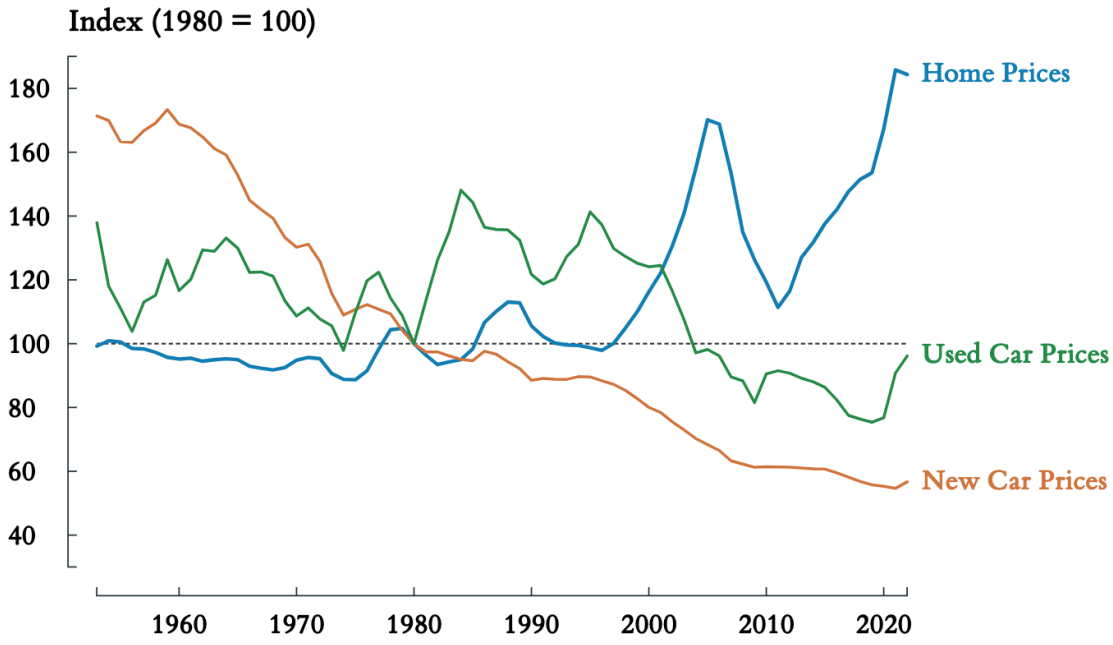

Figure A.2 - Inflation-Adjusted House and Car Prices

Notes: This figure shows the real Consumer Price Indices for new and used cars, alongside the real home price index calculated by Robert Shiller. All series are normalized to 100 in 1980.

Data: Real Home Price Index, Shiller (2015)

US Bureau of Labor Statistics, Consumer Price Index

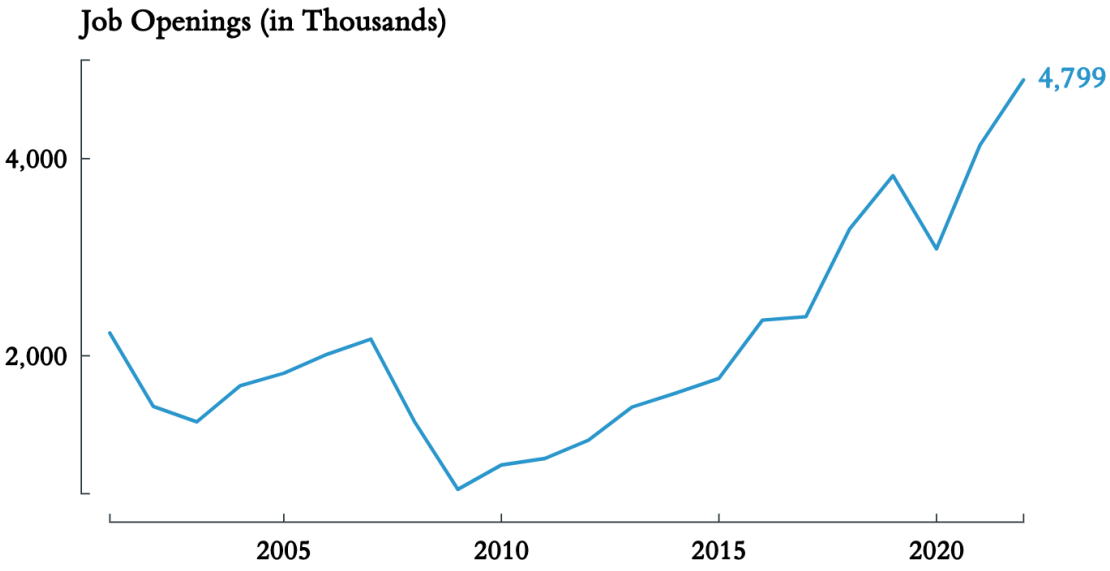

Figure A.3 - Job Openings in Construction

Notes: This figure shows the number of job openings, in thousands, in construction.

Data: US Bureau of Labor Statistics, Job Openings and Labor Turnover Survey

Table A.1
Legal Treatment and Sale Type in Texas, 1982 - 2002

	New Homes (%)		Used Homes (%)			
	Chattel	*Realty*	*Chattel*	*Realty*	Total Sales	New Homes (%)
2002	56	44	77	23	35,391	39
2001	79	21	81	19	44,659	48
2000	87	13	81	19	53,622	52
1999	91	9	84	16	62,579	60
1998	92	8	84	16	63,744	63
1997	92	8	85	15	56,369	63
1996	94	6	86	14	53,195	64
1995	96	4	87	13	44,543	63
1994	96	4	90	10	36,521	53
1993	96	4	90	10	28,370	44
1992	96	4	88	12	23,106	30
1991	95	5	91	9	20,571	20
1990	96	4	93	7	23,939	16
1989	94	6	93	7	26,069	13
1988	91	9	93	7	31,591	16
1987	92	8	91	9	36,914	26
1986	92	8	92	8	44,509	36
1985	89	11	91	9	54,945	46
1984	88	12	92	8	62,829	52
1983	89	11	93	7	62,541	43
1982	88	12	93	7	49,263	19

Notes: This table shows the legal treatment of manufactured homes that changed ownership in Texas from 1982 through 2002, excluding inventory sales to manufactured home dealers.

Data: Statements of Ownership and Location
Texas Department of Housing and Community Affairs (TDHCA)

Table A.2
Legal Treatment of Financed Sales in Texas, 1982 - 2002

	New Loans (%)		New Sales (%)	Used Loans (%)		Used Sales (%)
	Chattel	*Realty*	*Reported Lien*	*Chattel*	*Realty*	*Reported Lien*
2002	96	4	23	98	2	26
2001	98	2	36	98	2	32
2000	98	2	38	98	2	35
1999	99	1	41	98	2	37
1998	98	2	43	99	1	37
1997	98	2	44	98	2	37
1996	98	2	43	99	1	39
1995	99	1	37	99	1	38
1994	99	1	36	99	1	37
1993	99	1	37	99	1	33
1992	99	1	35	99	1	32
1991	100	0	31	99	1	34
1990	99	1	31	99	1	35
1989	97	3	32	97	3	38
1988	96	4	31	96	4	41
1987	95	5	32	93	7	45
1986	93	7	29	93	7	49
1985	90	10	28	92	8	57
1984	88	12	30	94	6	60
1983	88	12	38	95	5	58
1982	87	13	69	94	6	62

Notes: This table shows the legal treatment of manufactured homes with reported financing in Texas from 1982 through 2002, alongside the share of total sales with reported financing.

Data: Released Liens (FOIA) & Statements of Ownership and Location
Texas Department of Housing and Community Affairs (TDHCA)

Appendix B

Vertical Foreclosure

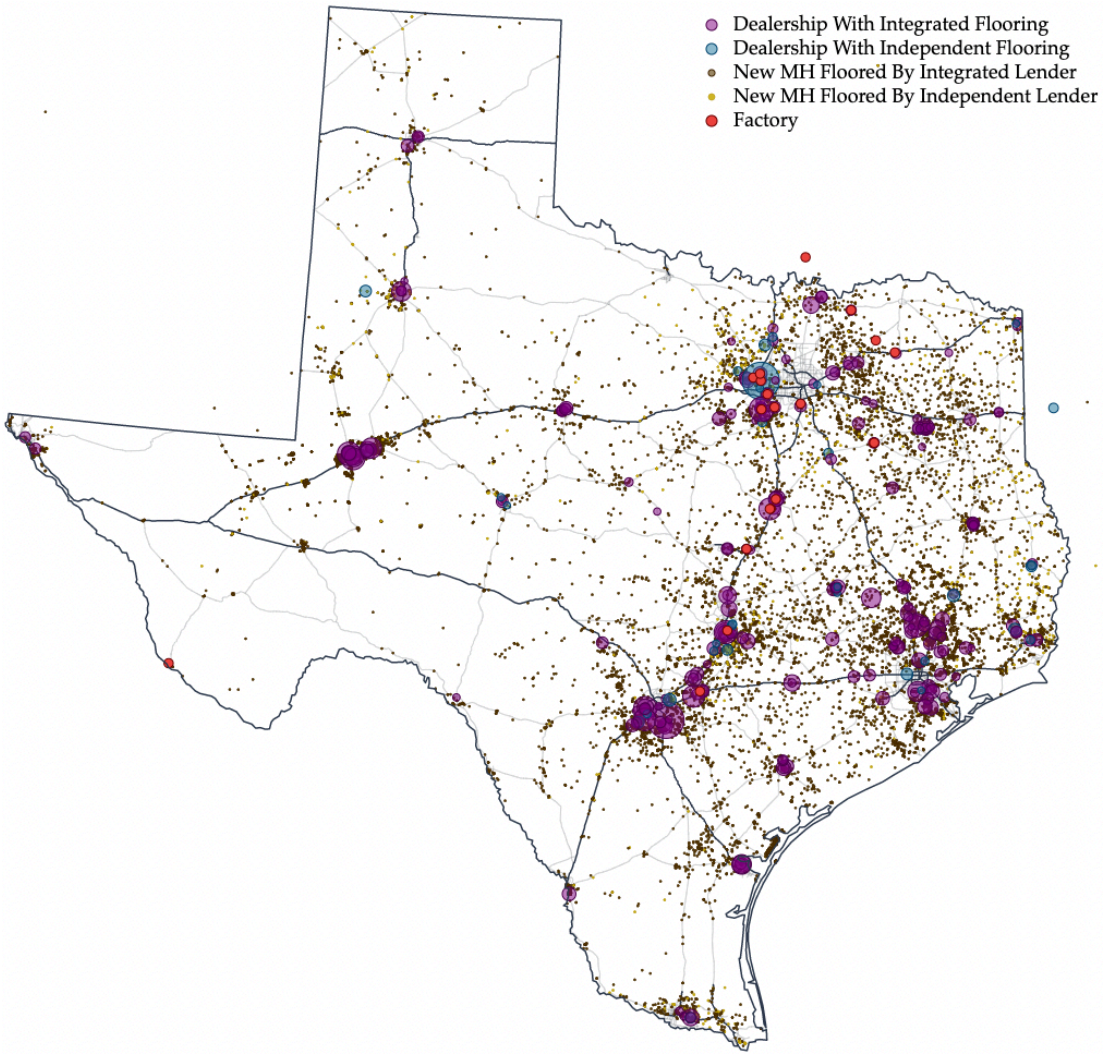

Figure B.1 - The Manufactured Housing Industry in 2018

Notes: This map shows the industry's factories, dealerships, buyers and flooring in Texas in 2018. Dealerships are sized by the number of homes received.

Data: TDHCA, TxDMV, Texas Secretary of State

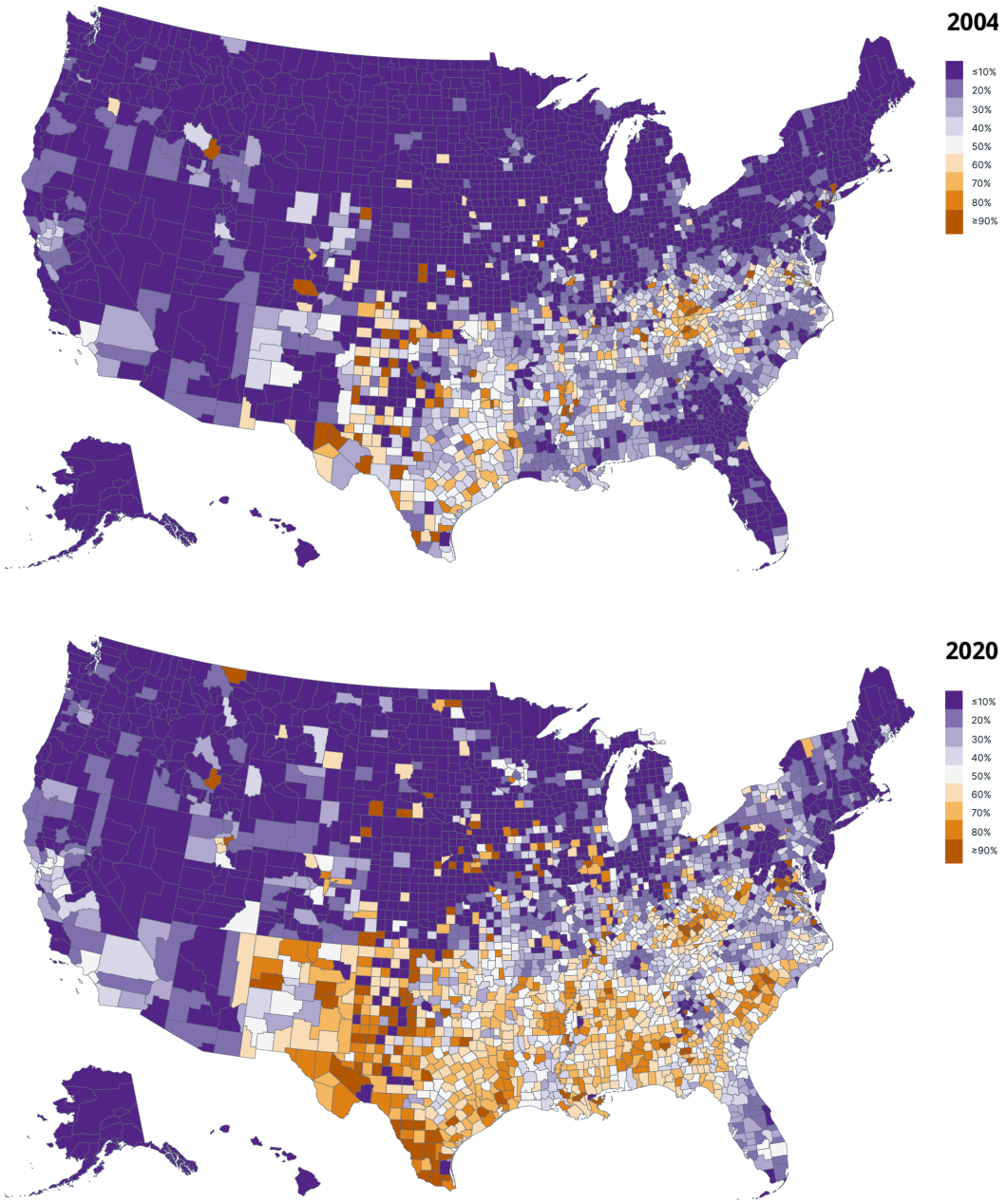

Figure B.2 - HMDA Loans Financed by Integrated Lenders

Notes: This map shows the share of HMDA-reportable consumer loans per county financed by integrated lenders that also provide floor financing for dealerships in Texas in 2004 and 2020.

Table B.1
Reported Floor Lending in Texas by Market Share

	1995		2002	
	Floor Lender	Share	Floor Lender	Share
1	Ford Housing Finance	0.30	Deutsche Financial	0.19
2	Green Tree Financial	0.23	Textron Financial	0.18
3	Transamerican	0.10	Bombardier Capital	0.12
4	Bombardier Capital	0.09	21st Mortgage [Clayton]	0.12
5	Deutsche Financial	0.08	Transamerican	0.10
6	Deere Credit	0.03	Conseco Finance	0.09
7	General Electric	0.03	General Electric	0.05
8	Nationscredit Commercial	0.02	CMH Parks [Clayton]	0.03
9	Associates Housing	0.02	CIT Group	0.02
10	Crestpointe [Champion]	0.01	Bank of America	0.01

	2008		2018	
	Floor Lender	Share	Floor Lender	Share
1	21st Mortgage [Clayton]	0.36	21st Mortgage [Clayton]	0.43
2	General Electric	0.14	CMH Parks [Clayton]	0.20
3	American Homestar	0.10	Bombardier Capital	0.09
4	Textron Financial	0.09	Capital One	0.05
5	Legacy Housing	0.07	Triad Financial	0.03
6	Wells Fargo	0.03	CSL Financial	0.03
7	Transamerican	0.02	Northpoint Commercial	0.02
8	Bombardier Capital	0.01	Affiliates Floorplan	0.02
9	American Bank of Commerce	0.01	Legacy Housing	0.02
10	CIT Group	0.01	TCF Inventory	0.01

Notes: Integrated floor lenders in small caps. Conseco and Deutsche Financial exited the market in 2002. Textron liquidated its floor planning business in 2009. Implied floor lending is excluded (ie, Legacy Homes likely floors homes for Legacy dealerships with no reported flooring).

Table B.2
Manufactured Home Builders in Texas by Market Share

	1995		2002	
	Manufacturer	Share	Manufacturer	Share
1	Fleetwood	0.19	Clayton	0.18
2	Palm Harbor	0.10	Palm Harbor	0.17
3	Redman	0.09	Fleetwood	0.16
4	Clayton	0.08	Champion	0.10
5	Oakwood	0.08	Oakwood	0.09
6	American Homestar	0.07	Cavalier	0.09
7	Champion	0.06	American Homestar	0.07
8	Belmont	0.05	Southern Energy	0.04
9	Cavalier	0.04	Solitaire	0.03
10	Southern Energy	0.04	Patriot	0.03

	2008		2018	
	Manufacturer	Share	Manufacturer	Share
1	Clayton	0.35	Clayton	0.49
2	Palm Harbor	0.14	Cavco	0.17
3	Fleetwood	0.11	Skyline-Champion	0.12
4	Legacy	0.10	American Homestar	0.08
5	American Homestar	0.09	Legacy	0.08
6	Cavco	0.06	Solitaire	0.03
7	Solitaire	0.04	Jessup	0.01
8	Champion	0.03	Hamilton	0.01
9	Patriot	0.02	Kabco	0.01
10	Silver Creek	0.02	New Vision	0.00

Notes: Champion bought Redman in 1996. Cavalier bought Belmont in 1997. Clayton bought Oakwood in 2004, Southern Energy in 2006 and Cavalier in 2009. Cavco bought Fleetwood in 2009 and Palm Harbor in 2011. Skyline and Champion merge in 2018. Bankruptcies: American Homestar in 2001, Oakwood in 2002, Champion and Fleetwood in 2009, Palm Harbor in 2010

Table B.3
Manufactured Home Dealerships in Texas by Market Share

	1995		2002	
	Dealer	Share	Dealer	Share
1	Oakwood	0.11	Palm Harbor Vill.	0.17
2	Nationwide [AH]	0.11	CMH / Luv [Clayton]	0.17
3	Newco [Palm Harbor]	0.10	Nationwide [AH]	0.07
4	CMH [Clayton]	0.08	A-1 / Accent [Champion]	0.04
5	A-1 / Accent [ICA Group]	0.05	Oakwood	0.04
6	Solitaire	0.02	Arc Dealership	0.04
7	People's MH	0.01	Fleetwood	0.03
8	Homes of America	0.01	Solitaire	0.03
9	Mega Housing	0.01	Factory Liquid. [Cavco]	0.01
10	HomeUSA	0.01	Emerson MH	0.01

	2008		2018	
	Dealer	Share	Dealer	Share
1	Clayton	0.25	Clayton	0.25
2	Cavco Home Center	0.15	Cavco	0.17
3	Nationwide [AH]	0.08	Palm Harbor Vill. [Cavco]	0.14
4	A-1 / Accent [Champion]	0.04	Titan Factory [Champion]	0.09
5	Solitaire	0.03	Nationwide [AH]	0.06
6	Worldwide Mobile	0.03	Alamo Homes	0.04
7	Golden Triangle	0.02	Kesterson Retail [Solitaire]	0.02
8	Gauthier Home Inc	0.01	Legacy Housing	0.02
9	American Family Housing	0.01	MH Consultants	0.02
10	Mcdonald Mobile Homes	0.01	Worldwide Mobile	0.01

Notes: This table reports the manufactured home dealerships that sold the most homes to buyers in Texas in 1995, 2002, 2008 and 2018 (years chosen to match Table B.1).

Table B.4
First Stage and Reduced Form Estimates, Acquisition by a Manufacturer

	Integrated Flooring	Shipments	Prices
	(1)	(2)	(3)
$\psi_{<-1}$	0.04	0.19	−0.13
	(0.06)	(0.19)	(0.16)
ψ_0	0.01	−0.03	−0.06
	(0.09)	(0.30)	(0.22)
ψ_1	−0.04	0.43	−0.45
	(0.09)	(0.16)***	(0.20)**
ψ_2	−0.10	1.06	−0.51
	(0.09)	(0.18)***	(0.16)***
ψ_3	−0.17	1.01	−0.28
	(0.09)*	(0.27)***	(0.24)
ψ_4	−0.07	1.85	−0.40
	(0.10)	(0.31)***	(0.14)***

Notes: This table shows estimates of Equation 2.3. The sample consists of 726 market-years. All regressions include the downstream retailer HHI and flooring HHI to control for the horizontal structure of the local market, and market and year fixed effects. Column 1 shows the first-stage relationship between integrated flooring and exposure to an acquisition by a manufacturer. Columns 2 and 3 show the reduced-form relationship between exposure to an acquisition by a manufacturer, and manufactured home shipments and prices, respectively. Hedonic controls in the price regressions include the number of sections, weight and titling of each home, and whether the home is in a manufactured home community. All coefficients are normalized relative to $\tau = -1$, where $\tau = 0$ is the acquisition year. Standard errors are clustered by market. *p < 0.10, **p < 0.05, ***p < 0.01.

Data: TDHCA, TxDMV, Texas Secretary of State, Data provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at http://www.zillow.com/ztrax. The results and opinions are those of the author and do not reflect the position of Zillow Group.

Table B.5
Manufactured Housing Contracts for Hurricane Katrina Relief

Source	Awarded	Manufacturer	Value ($)	Per Unit ($)	Texas
FOIA	Sept 3	Clayton	60,932,395	34,021	Yes
FOIA	Sept 4	Palm Harbor	4,203,881	38,217	Yes
FOIA	Sept 9	Clayton	8,242,183	34,058	Yes
FOIA	Sept 16	Southern Energy	5,269,814	39,922	Yes
Press	Sept 20	Fleetwood			
FOIA	Sept 23	Champion	80,800,000	40,400	Yes
FOIA	Sept 26	Circle B Enterprises	287,515,000		
FOIA	Sept 27	Clayton	69,790,000		Yes
FOIA	Sept 28	Fuqua	4,294,440		
FOIA	Sept 29	Southern Energy	30,917,100		Yes
FOIA	Sept 29	Fuqua	480,000		
FOIA	Sept 30	Silver Creek	4,559,400		Yes
FOIA	Sept 30	American Homestar	4,737,500		Yes

Notes: This table lists information on contracted manufactured home production in support of Hurricane Katrina relief efforts. Travel trailer production is not included. FEMA paid $857.8 million for 24,967 manufactured homes: an average of $34,357 per manufactured home. The recipient of the largest contract, Circle B Enterprises, did not have a license to build manufactured housing in its home state; Circle B outsourced production to licensed manufacturers including Cavalier and Patriot. Patriot produced homes for FEMA in Texas.