THE AMERICAN QUEST TO DREAM:
HOMEOWNERSHIP AND THE PURSUIT OF WEALTH

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ABSTRACT

Throughout the twentieth century, policy makers have portrayed homeownership as an inseparable part of the American Dream and Presidential administrations have aimed to increase homeownership rates. Research has focused on comparing the financial outcomes of homeowners to renters, finding that the purchase of a home is more beneficial. Yet, not least the recent burst of the housing bubble demonstrated that tying all wealth in one illiquid asset can bear significant financial risks. Due to higher house price appreciation, regressive federal subsidies, and lower exposure to predatory lending practices, higher income households might benefit from homeownership disproportionately. To analyze the relationship between homeownership and wealth, I compiled a dataset using data from the American Community Survey and Census to match with home value and mortgage debt data at the county level and MSA level. Examining homeownership rates in 2000 and changes in housing wealth 2000-2014, I analyze the financial merits of homeownership for lower and higher income Americans, taking local housing markets into consideration. I find that higher homeownership rates increase housing wealth in higher income counties only and find no effect of homeownership rates on wealth inequality.

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List of Acronyms

ACS – American Community Survey

ACS 2014 – American Community Survey, 5-year Estimates for 2010-2014

CBSA – Core Based Statistical Area

Census – Decennial Census of Population and Housing

Census 2000 – Decennial Census Survey of 2000

Census 2010 – Decennial Census Survey of 2010

Fed – Board of Governors of the Federal Reserve System

FHA – Federal Housing Administration

FHFA – Federal Housing Finance Agency

FRBNY – Federal Reserve Bank of New York

FRBNY Credit Panel – New York Fed Consumer Credit Panel / Equifax

MSA – Metropolitan Statistical Area

OLS – Ordinary Least Squares

OMB – United States Office of Management and Budget

PSID – Panel Study of Income Dynamics

US – United States

ZHVI – Zillow Home Value Index

1 INTRODUCTION

If "you own your own home, you're realizing the American Dream", President George W. Bush claimed in 2002.[1] By promoting homeownership as a means of stimulating the economy and improving socio-economic outcomes of homeowners, particularly for minority and low-income Americans, President George W. Bush continued the tradition of a policy objective set high on the political agenda by most Presidents of the United States of America (henceforth: US) in the 20th century. Presidential administrations on both sides of the aisle prioritized homeownership (Kiviat, 2010).

As Secretary of Commerce in the Harding administration, Herbert Hoover actively promoted the "Own Your Own Home" campaign launched by the National Association of Real Estate Boards after World War I, because he deemed homeownership to be the "foundation of a sound economic and social system and a guarantee that our society will continue to develop rationally".[2] Presidents Hoover and Roosevelt backed a series of legislation that encouraged bank lending for mortgages, most importantly legislation creating the Federal Housing Administration (FHA) and the Federal National Mortgage Association (Fannie Mae), which essentially created a secondary market for mortgages (Kiviat, 2010). In the 1990s, President Bill Clinton sought to facilitate house purchases for millions of new homeowners and successfully achieved unprecedented growth in the US homeownership rate.[3]

For both sides of the political aisle, the political rhetoric accompanying this policy goal has consistently been along the lines of the American Dream: Homeowners are said to be likely to experience social mobility and wealth accumulation, enabling them to lead

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[1] https://georgewbush-whitehouse.archives.gov/news/releases/2002/06/20020617-2.html (last accessed December 30, 2016)
[2] http://www.nationalaffairs.com/publications/detail/a-home-of-ones-own (last accessed December 30, 2016)
[3] https://www.washingtonpost.com/opinions/why-the-decline-of-the-homeownership-rate-is-good-news/2016/08/03/c6b8bf7c-58d1-11e6-9767-f6c947fd0cb8_story.html?utm_term=.5d5b457a5109 & http://www.valuewalk.com/2015/05/homeownership-by-president/ (last accessed December 30, 2016)

a stable and prosperous life, committed to their community, neighborhood, and American society in general.[4]

The recent Great Recession signified a blow to the American dream: Home values to decline by more than 22 percent between 2006 and 2011 (Brown & Matsa, 2016). Starting December 2007, 3.6 million workers were laid off (ibid.). The consequences for many American homeowners were dire: Over the course of the recession, 4 million experienced the loss of their homes to foreclosure and 10 million homeowners were underwater, i.e. they owed more than their homes were worth (Herbert et al., 2014).

Yet, US administrations' policy priorities do not seem to have changed: In 2013, former President Barack Obama reasserted former Presidents' declarations stating that "the most tangible cornerstone that lies at the heart of the American Dream, at the heart of middle-class life […] [is] the chance to own your own home".[5] According to President Obama, "a home is the ultimate evidence that here in America, hard work pays off, that responsibility is rewarded" (ibid.).

Suggesting that homeownership is most crucial to the American Dream is not unique to Presidents and other policy-makers in the US. Large parts of the general American population, regardless of race, ethnicity, socio-economic class, or political affiliation, believe that homeownership is a positive and desirable, if not indispensable, aspect of a good life (Schwartz, 2015, pp. 379-380).

And even academic researchers are quick to accept the premise that homeownership is the path to achieving the American Dream. For instance, Grinstein-Weiss et al. (2015) and Masnick (2004) stress the importance of homeownership as core of the American Dream, as well as its potential for social and economic mobility. A variety of authors

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[4] Senator Elizabeth Warren, for instance, declared that homeownership "produces the stable communities that are the backbone of this country". http://readersupportednews.org/opinion2/277-75/20152-focus-elizabeth-warren-addresses-mortgage-bankers (last accessed February 15, 2017).
[5] https://obamawhitehouse.archives.gov/the-press-office/2013/08/06/remarks-president-responsible-homeownership (last accessed January 2, 2017)

study the difference in socio-economic outcomes between renters and homeowners, some studies controlling for self-selection, and conclude that buying a home is more beneficial to wealth accumulation than renting and that this holds true for all income classes (Herbert, McCue, & Sanchez-Moyano, 2014; Schwartz, 2015; T. M. Turner & Luea, 2009). Another group of research studies racial and ethnic disparities in homeownership, their causes and effects, and potential mechanisms of alleviating these disparities (DeSilva & Elmelech, 2012; Masnick, 2004). This line of research implicitly assumes that a smaller gap in homeownership rates across ethnicities and races would reduce other racial/ethnic socio-economic inequalities, because it enables disadvantaged ethnicities/races to "catch up".

However, there is dissent both in academic and in popular debates. Dickerson (2009) emphasizes the financial risks and opportunity costs homeowners, especially lower-income homeowners, face. The author argues that the burst of the housing bubble proved that federal subsidies for homeownership encourage excessive risk-taking and homebuyers facing mortgages they can hardly afford. As I will outline in the next section, homeowners can be financially challenged when they tie up most of their net wealth in one illiquid asset. House prices might fail to appreciate beyond inflation, high interest payments hinder wealth accumulation, and failure to maintain homeownership often signifies financial ruin. Low-income and minority homeowners are disproportionately exposed to these financial risks, because they are more exposed to subprime lending (i.e. higher interest payments) and tend to buy homes in housing markets that experience slower house price appreciation.

Lane (2016) shares Dickerson's concern about lower- and middle-income homeowners tying up all their wealth in the same illiquid asset. He points out that we should not measure homeownership rates in terms of how many American households hold that legal title but in terms of home equity held by households, as the latter is a proxy for the

sustainability of homeownership and the extent to which households reap financial benefits from owning a home.

Kiviat (2010) agrees that American policy makers subsidized homeownership beyond what she considers reasonable, because these regressive housing subsidies and tax breaks exacerbate economic inequalities, yet the federal government spends approximately $80 billion a year on mortgage interest deductibility alone. The author adds that homeownership decreases mobility, which could significantly reduce employment opportunities for homeowners. Indeed, Brown and Matsa (2016) confirm that homeownership impedes household mobility and find that homeowners in distressed housing markets accept lower level positions in their area in order to avoid relocation. Kiviat (2010) concludes: "Homeownership has let us down".

This paper attempts to study the relationship between homeownership and wealth from a different angle than previous studies have. First, I will focus on the geographic location of homes, accounting for the importance of local house price developments for wealth accumulation. To do so, I will analyze homeownership rates, median income, net housing wealth, and wealth inequalities at the US Metropolitan Statistical Area (MSA) level, differentiating between counties that lie within the borders of the same MSA.

Second, instead of comparing homeowners to renters, I will examine homeownership rates with a special focus on wealth inequality. Considering homeownership an inseparable part of the American Dream and socio-economic mobility means to assume, whether explicitly or implicitly, that homeownership somehow decreases wealth inequalities. I intent to put this very common assumption to test. Therefore, I will test the hypothesis that higher rates of homeownership among lower-income households will be associated with a decrease in wealth inequality, which corresponds to the general assumption of American policy-makers and researchers.

The alternative (null hypothesis) is that mechanisms for wealth accumulation through homeownership do not work as efficiently for lower-income homeowners, thus

higher homeownership rates are not correlated with a decrease in wealth inequality. Low-income homeowners are disproportionately exposed to the financial risks of homeownership. For low-income homeowners, a larger fraction of their wealth is tied up in one illiquid asset, their mortgages' conditions are not as favorable as those for higher income homeowners (they are more exposed to subprime lending), their homes tend to be located in areas that do not see the same house price appreciation as those of wealthy and middle-income homeowners, and they hardly benefit from government subsidies for homeowners.

Figure 1 below depicts the hypothesis to be tested, and how this household-level hypothesis is translated into a MSA level hypothesis that can be tested with the MSA-level data analyzed in this paper. I will describe the data and variable measurements in detail in the respective section below.

Understanding homeownership and how it relates to household wealth is highly relevant for policy-making and research, because it relates to contemporary academic and popular debates on wealth accumulation, wealth inequalities, and social welfare in Western democracies. First, home equity is the most important asset form in which households hold net wealth. In the US, the lowest 80 percent of the wealth distribution hold more than two thirds of net wealth in the form of home equity (Wolff, 2010, p. 55). Another 15 percent are held in pension accounts, but corporate stocks and financial securities are not a significant fraction of assets held by households (but for the top 20 percent of the wealth distribution).

Furthermore, Doling & Ronald (2010) point out that there is a policy shift from social transfers allotted by governments (e.g. pension payments) to "asset-based welfare", i.e. increasing reliance on individual investments in financial products and property assets as a means of meeting individual welfare needs. Households' housing assets can supplement consumption and welfare needs in the event of income shocks or retirement, or they can

1) Household Level
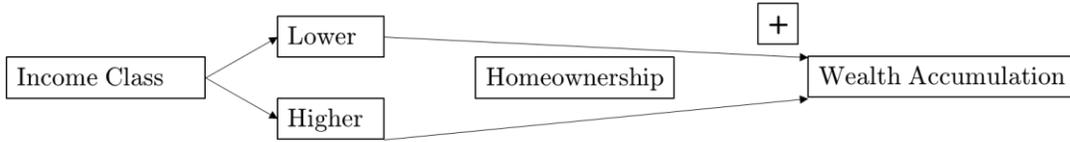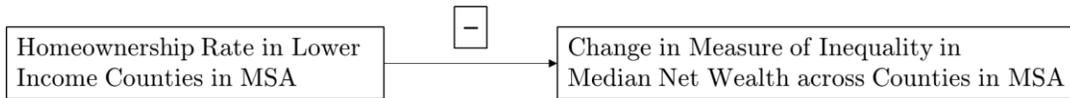

2) County Level

3) MSA Level

Figure 1: Theory of Change

be used towards other investments, for instance education. Doling and Ronald argue that demographic change and reductions in public expenditures in most Western democracies have led to this shift to asset-based welfare. If this housing wealth is indeed supposed to supplement or even substitute social transfers from the government, it will have important implications for homeownership and welfare in the US.

Second, the role of housing wealth in US wealth inequalities remains a controversial topic of academic debates. Concern about rising income and wealth inequality in the US has been a widely discussed issue (Heathcote et al., 2010; Saez & Zucman, 2016; Sommeiller et al., 2016). While most authors agree that disparities in US households' net worth have increased over past several decades, there are different theories as to the causes and underlying dynamics. Piketty (2014, p. 67), for instance, asserts that institutional changes and political shocks have perpetuated wealth inequalities. Furthermore, he notes that the rate of return on capital r exceeds the growth rate of the economy g (ibid., 2014), thus accumulated capital could grow faster than total production and wages, deepening the gap between asset holders and those who do not have capital. Yet, in a widely recognized response to Piketty, Rognlie (2014) concludes that this rise in net capital share

of aggregate income is due first and foremost to capital accumulation in the housing sector – housing wealth represents an important part of the composition of household wealth in the US. In contrast, Heathcote et al. (2010, p. 41) identify rising transitory labor market risks, as well as the booming stock market in the late 1990s that benefited the upper 20 percent of the wealth distribution (among whom stock-ownership is concentrated) as the main causes for rising wealth inequalities. They note that "housing is a relatively more important component of net worth for those in the middle of the net worth distribution than for households in either tail", hence it is not evident how a housing boom would affect the wealth gap.

This paper intends to contribute to research in a substantial way. I will analyze the correlation between income, homeownership and net housing wealth at the county and MSA level. For that purpose, I compiled a new dataset, combining variables from various sources. To the best of my knowledge, this is the first paper studying the relationship between homeownership rates and net wealth with such aggregate data, accounting for variations in MSA's different housing markets and house price developments.

As I will discuss in the next section, the role of time and location of the home purchase are essential determinants of a homeowners' wealth accumulation. Therefore, analyses of national household-level survey data without geo-coded observations offer very limited insights. Nevertheless, this is the kind of analyses that most previous research has brought forward. Certainly, a lack of data remains a main challenge of my research, but this paper represents an important milestone in examining the relationship between homeownership and wealth in the context of local house price developments.

This paper is structured as follows: In the following section, I will outline the financial benefits and risks of homeownership. I will then proceed to describe the data used for analysis and present regression results. In the latter, I could not find a negative effect of

homeownership on housing wealth inequalities. I will discuss these results, their policy implications, and limitations in the last section of this paper.

2 HOMEOWNERSHIP AND WEALTH

2.1 Financial Benefits of Homeownership

Herbert et al. (2014) list five mechanisms through which homeownership can drive wealth accumulation. First, real house price appreciation: The Federal Housing Finance Agency (FHFA) estimates that between 1975 and 2012, the annual growth rate in home values exceeded inflation by 0.8 percentage points (Herbert et al., 2014, p. 53). While this rate might seem low, even an annual house price growth of 0.8 percent would signify that a homeowner experiences a real gain of about 26 percent in the total home value. Real house price appreciation is assumed to occur due to population growth and rising incomes, while land supply is relatively fixed (ibid). This explains why house price appreciation is particularly strong in urban areas, where economic activity is concentrated, and even more so in urban areas with limited possibilities for expansion. Hence, it is important to note that the extent to which homeowners will experience real gains in their home value largely depends on the local housing market.

Second, mortgage financing mechanisms help homeowners accumulate wealth through forced savings (ibid.). If a home is finances through a mortgage, homeowners-to-be will accumulate significant savings over a short period to be able to make the down payment. In addition, a fraction of the monthly mortgage amortizing cost will reduce the principal. The share of a monthly payment that goes towards principal reduction will increase over time. Thus, over the course of a few decades, a homeowner will have accumulated large savings.

Third, mortgage financing helps leverage gains in home values (ibid.). After homebuyers makes the down payment, they receive all benefits of increases in home

values, despite owning but a small share of the home at that point. Consider, for instance, a buyer who made a down payment of ten percent of the home value and experiences a house price appreciation of 4.5 percent annually. The home value will have increased by nearly 25 percent over a period of five years – two and a half times the initial down payment. Homebuyers' whose property experiences an appreciation might therefore benefit from investment returns so high that they offset the interest payment (Di, Yang, & Liu, 2003).

A fourth factor contributing to wealth gains through homeownership is protection against inflation. While housing costs for renter are assumed to be adjusted for inflation in housing prices. In contrast, fixed-rate mortgages in an economy that experiences inflation lead to a decline in real terms of monthly housing costs over time.

Lastly, it is important to note that there are various federal income tax benefits for homeowners that renters do not benefit from, thus further increasing the financial merits of homeownership (ibid.). Most importantly, homebuyers can deduct mortgage interest from their income when calculating their federal income tax. Every household can deduct up to one million dollars for both their primary and secondary home (Schwartz, 2015, p.118). The mortgage interest deduction is the largest housing-related tax expenditure of the US federal government, and second largest tax expenditure overall (ibid.). In addition, homeowners can deduct property taxes on the primary home from their taxable income and benefit from the exclusion of some, if not all, capital gains on the sale of a principal residence from capital gains taxation.

The above outlined mechanisms of wealth accumulation through homeownership indicate that the extent to which these financial benefits are realized by a homebuyer depend on various factors beyond the home's geographic location. First, the timing of the purchase of the home relative to house price developments is crucial (this is evidently true for homebuyers affected by the burst of the housing bubble in 2006). Figure 2 illustrates
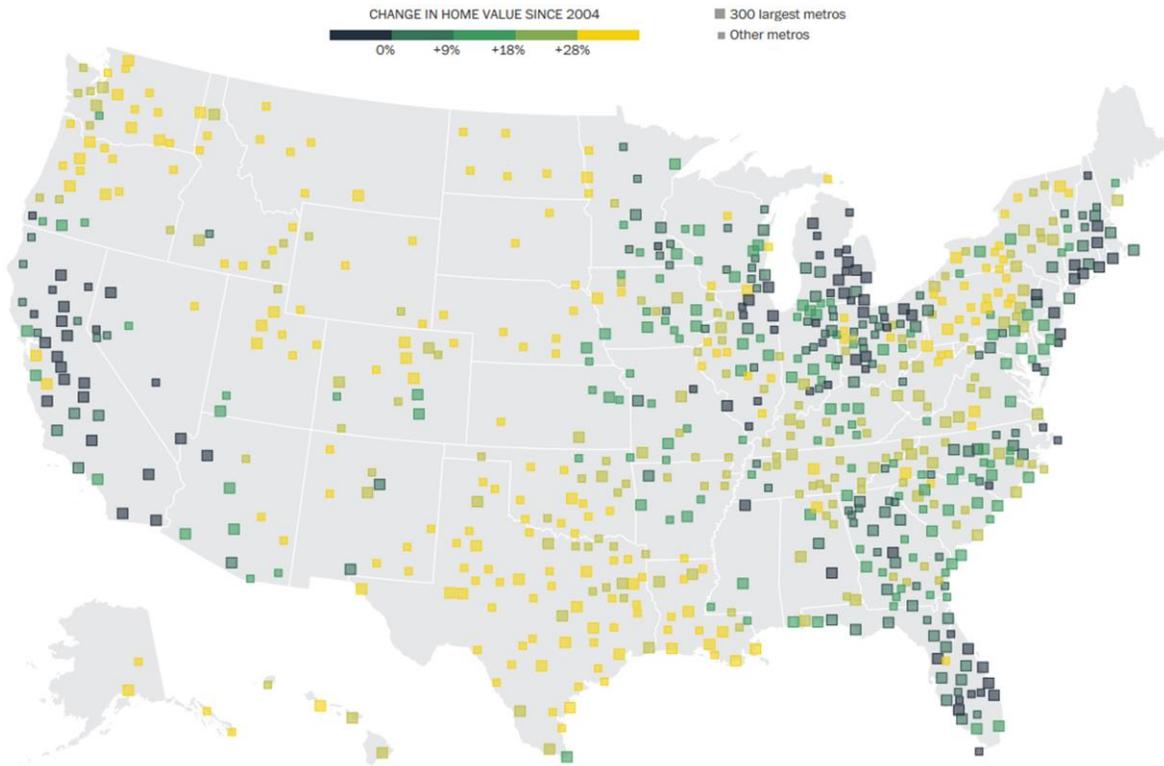
Figure 2: Change in Home Values in US Metropolitan Areas 2004-2015
Source: Mellnik, Cameron, Lu, Badger, & Downs, 2016

how differently housing markets have evolved over the past 15 years in US metropolitan areas. At the ZIP code level, disparities are even starker. For instance, house prices in 20002 Washington, DC are 91 percent higher in 2015 compared to their 2004 level. In contrast, in 30034 Atlanta, home values are 25 percent down (Mellnik, Cameron, Lu, Badger, & Downs, 2016). Furthermore, a homebuyers' choices as to the form of financing (and refinancing) of mortgages can have a large impact on how much wealth is effectively accumulated, as well as the age of the homebuyer, i.e. the period over which the homebuyer accumulates wealth (Herbert et al., 2014, p. 58). More importantly, it is essential whether a homebuyer will be able to sustain homeownership in the long term (ibid., p. 59). In the worst case of foreclosure, homebuyers not only lose all accumulated wealth, but face additional financial burdens related to their highly damaged credit history.

Aside from the financial benefits of homeownership in terms of investment into an asset, tax benefit, and hedge against inflation and rent fluctuations, literature on housing finds an array of additional social and economic benefits which are more or less directly related to homeownership. Amongst them, Schwartz (2015, p. 380) cites neighborhood stability, civic engagement, health outcomes, children's education, a sense of personal satisfaction, and control over one's environment.

However, Schwartz points out that these positive outcomes are hardly directly attributable to homeownership. First, these correlations might be found due to self-selection. If those who enjoy higher job security and are more successful in accumulating savings are also more likely to buy a home, homeowners' better overall life outcomes might be due to these professional and financial conditions rather than to owning a home. Indeed, Rappaport (2010) compares homeowners and renters making the exact same investment in terms of financial commitment, but the homeowners investing in their homes and renters investing in stocks. He concludes that the results are ambiguous and largely depend on the timing of the investment, because of high variation in the respective rates of returns to the two alternative investments. Rappaport's findings are corroborated by Schwartz (2015, pp. 382-385) who outlines significant variation in the developments of the S&P Case-Shiller National House Price Index and the S&P 500 Stock Index over time.

Second, homeownership might lead to better socio-economic outcomes because homeownership tends to be associated with higher residential stability (this is particularly important for child development) and better environment and physical characteristics for the house (for instance, if homeownership is associated with qualities like safe residential suburban settings and single-family housing in low-density areas with better amenities). In this case, those outcomes could also be achieved through renting in equivalent settings. Indeed, Schwartz (ibid., p. 381) cites research that attempts to control for these spurious variables. The respective results are less enthusiastic: For instance, these studies find that

increased civic engagement is only observable for neighborhood organizations, not all other types of organizations, and psychological well-being is not higher for homeowners who face financial challenges regarding maintenance cost.

2.2　Financial Risks of Homeownership

Despite the various mechanisms through which a homeowner can accumulate wealth, there are significant financial risks to homeownership. Households in the United States hold the most of their wealth in home equity (Di et al., 2003; Grinstein-Weiss et al., 2015). This is true for low- and middle-income households in particular — in 2010, households with net worth between $0 and $373,000 (middle three quintiles of the wealth distribution) had tied up 66.6 percent of their net wealth in their principal residence, while ownership of corporate stocks, financial securities, mutual funds, and personal trusts amounted to only 3.1 percent of net wealth in that wealth class. In contrast, for the top one percent and the next 19 percent of the US wealth distribution in 2010, these fractions were 5.5/25.4 and 6.8/15.9 respectively (Wolff, 2012, p.55). Thus, homeowners in the lowest eighty percent of the wealth distribution tie up most of their wealth in one illiquid asset, so there is hardly any risk diversification in investment. Not least the recent housing bust in 2006 has shown how financially risky homeownership can be because of house price volatility. In some housing markets, house price growth has been slower than inflation in the long run (Herbert et al., 2014, p. 55). Furthermore, both maintenance cost and high transaction costs in the purchase and sale of houses can pose further financial risks to homeownership (ibid., pp. 56-57).

Financial risks associated with homeownership are highest for minority and low-income Americans, a fact painfully illustrated by how disproportionately hard these groups of homeowners have been hit by the recent burst of the housing bubble and the ensuing foreclosure crisis (Schwartz, 2015, pp. 411-437, and Desmond, 2016). There are

several reasons for the higher vulnerability of minority and low-income homeowners to financial risks.

First, several studies analyzing data from the Panel Study of Income Dynamics (PSID) have shown that they are less likely to maintain homeownership in the long run and spend longer periods as renters before owning a home for the second time (ibid., pp. 60-63). In addition to the added financial burden of foreclosure, such an experience often causes significant psychological distress (Desmond, 2016). A higher prevalence of subprime lending among minorities and low-income borrowers and communities (i.e. higher mortgage interests and less wealth accumulation), as well as the lower probability of respective homeowners to refinance their mortgages when interest rates decline can explain both lower chances of wealth accumulation and higher difficulties in maintaining ownership (Herbert et al., 2014, pp. 61-62). In addition, Kiviat (2010) argues that homeownership decreases mobility and therefore reduces employment opportunities. If this is true, low-income Americans with higher job insecurity face yet another additional challenge.

Furthermore, tax benefits to homebuyers are regressive, in that low-income households benefit little from the ability to deduct mortgage interest and property taxes from federal taxable income. Since the value of federal tax deductions depends on the marginal tax rate of the household, homeowners with higher income benefit more from these tax benefits (ibid.). Additionally, available deductions for low-income homeowners hardly exceed standard deductions, so that the low-income taxpayers derive little benefit. Poterba and Sinai (2011, p. 46) find that mortgage interest deduction in 2010 was worth $542 annually to households with income between $40,000 and $75,000, while households with income above $250,000 could save an average $5,408 per year. Unsurprisingly hence, the Joint Committee on Taxation found that 77 percent of 2012 federal mortgage interest benefits were spent on households earning $100,000 annually and above, but only 3 percent on households earning under $50,000 (U.S. Congress, 2013).

Finally, low-income and minority households tend to own homes in markets that experience lower house price growth, due to persistent racial/ethnic and income segregation in a wide range of U.S. housing markets (Herbert et al., 2014, pp. 62-63 and Schwartz, 2015, p. 385-386). These observations are consistent with recent developments of the US housing market since the crash of the housing market in 2006.[6]

3 DATA

Examining whether purchasing a home facilitates social mobility, i.e. helps a lower-income American to accumulate wealth and transition to middle class (or higher) in the wealth distribution calls for individual or household level panel data. Such data allows to trace individuals' and households' demographic and socio-economic characteristics, as well as income, assets, and wealth. For instance, Herbert et al. (2014, pp. 76-92) and Turner & Luea (2009) conduct such analyses with data from the Panel Study of Income Dynamics and conclude that households, including low-income households, accumulate more wealth if they own a home.

However, asserting that homeownership therefore facilitates prosperity would be a premature conclusion to draw, for two reasons. First, it is important to distinguish between two different approaches to studying the benefits of homeownership. Research like Herbert et al. (2014) and Turner & Luea (2009) compares homeownership to renting and conclude that homeownership is more favorable. Yet, if it is true that homeownership is preferable for households regardless of their income, renting might simply put a lower-income household even further at a disadvantage than owning a home. This does not answer the question whether homeownership is a driver of social mobility. If homeownership helps fulfill the American Dream, it will help a lower-income American

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[6] https://www.washingtonpost.com/graphics/business/wonk/housing/overview/ (last accessed March 10, 2017)

move up the wealth distribution, i.e. homeownership will reduce the wealth gap between a lower-income household and a higher-income household. In this paper, my aim is to analyze the assertion that homeownership drives social mobility. I will not study the effects of renting on net wealth.

Second, as outlined above, how much wealth is accumulated through homeownership is highly influenced on the location of the house and time of purchase. Therefore, an analysis at the national level without consideration of local housing markets can only serve as broad intuition, but is hardly generalizable to the experience of homeowners across the US. Ideally, the hypothesis put at test in this paper should be analyzed with household/individual level data that is geocoded, so it could be linked to data on local housing markets and their development. But due to concerns for privacy protection, such data is not publicly available for analysis.

Therefore, I will analyze aggregate data. I chose the lowest level of aggregation at which sufficient data is available, US counties. Since the interest of this paper lies in studying levels of inequality in net wealth, I matched county level data with MSA delineations. This allows for the construction of measures of inequality within a MSA.

Metropolitan Statistical Areas (MSAs) are delineated by the United States Office of Management and Budget (OMB) and applied to Census Bureau data. MSAs are a type of Core-Based Statistical Area (CBSA), which is defined as a "core area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core".[7] Urbanized areas of 50,000 or more inhabitants are labeled Metropolitan Statistical Area. Following this definition, the OMB adjusts MSA delineations regularly. The dataset I constructed follows the 2009 delineations that identify a total of 381 in the US (excluding Puerto Rico) [8], regardless of

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[7] https://www.census.gov/programs-surveys/metro-micro/about.html (last accessed April 10, 2017)
[8] https://www2.census.gov/programs-surveys/metro-micro/geographies/reference-files/2009/historical-delineation-files/list1.txt (last accessed April 10, 2017)

a variable's year of measurement. 233 out of these 381 MSAs include more than one county in their borders and more than one observation per MSA is a necessary condition for inequality measurements. Thus, I collected data for these 233 MSAs that encompass a total of 1018 observations (individual MSAs encompass between two and 29 counties).

The MSA-level data includes MSA-level observations, as well as aggregates (averages and inequality measures) based on county-level observations. Considering the heterogeneous development of house prices across urban areas in the US, this data allows for a new and more differentiated approach to studying homeownerships' financial merits.

The most important sources of the dataset I assembled are the Decennial Census of Population and Housing (Census)[9] and the American Community Survey (ACS)[10], both administered by the US Census Bureau. The U.S. Decennial Census counts each resident of the country, every ten years ending in zero, and collects a range of demographic, socio-economic, and housing-related characteristics. The ACS is an ongoing survey that samples about 3.54 million addresses each year with methodological rigor[11] and provides a wide range of population, housing, and socio-economic estimates. Data is collected via Internet, Mailout/Mailback, Computer Assisted Telephone Interview (CATI), and Computer Assisted Personal Interview (CAPI).[12] ACS provides 5-year estimates for all areas, and 1-year estimates for areas with populations of 65,000 or more.[13] Due to the population threshold, 1-year estimates are available for a little more than one thousand counties out of a total of 3,142 counties in the United States (Puerto Rico excluded). Thus, I analyze ACS 5-year estimates.

Since wealth accumulation and socio-economic consequences of homeownership evolve over years, most research on homeownership and wealth has studied households'

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[9] https://www.census.gov/programs-surveys/decennial-census.html (last accessed April 5, 2017)
[10] https://www.census.gov/programs-surveys/acs/about.html (last accessed April 5, 2017)
[11] https://www.census.gov/programs-surveys/acs/guidance.html (last accessed April 5, 2017)
[12] https://www2.census.gov/programs-surveys/acs/tech_docs/accuracy/MultiyearACSAccuracyofData2014.pdf (last accessed April 5, 2017)
[13] https://www.census.gov/programs-surveys/acs/guidance/estimates.html (last accessed April 5, 2017)

portfolio over a period of ten to twenty years (see, for instance, Belsky, Herbert, & Molinsky (2014), or T. M. Turner & Luea (2009)). Similarly, I will compare Census 2000 data to ACS 2010-2014 5-year estimates (henceforth: ACS 2014). This time span should capture crucial developments in homeownership rates, wealth, and wealth inequality. Furthermore, by 2010-2014, the Great Recession in the United States has officially ended (NBER Business Cycle Dating Committee, 2010). Thus, studying changes between 2000 and 2010-2014 should be mostly reflective of longer-term developments, rather than temporary and exceptional shocks.

3.1   Data Sources

In the following, I will briefly describe the sources and measurements of variables of interest, as well as the level at which they are observed.

Homeownership Rates: Both Census 2000 and ACS 2014 indicate the percentage of owner-occupied housing units in every county. For county-level analysis, this percentage is used as explanatory variable of interest. To distinguish between lower-income homeownership rates and higher-income homeownership rates, I label counties with median income lower than the average of median incomes in all counties in the same MSA as "lower-income" and those with median income higher than the average as "higher-income". I then construct two different measures of homeownership at the MSA-level. First, I measure the average of homeownership rates in all counties in the MSA that are labeled "lower-income". Second, I measure the ratio of the average homeownership rate in counties labeled "lower-income" in the MSA to the average homeownership rate in counties labeled "higher-income".

Number of Houses: Census 2000 and ACS 2014 measure the total number of housing units per county. However, housing units can be part of multi-unit structures. Measuring housing wealth using the number of housing units would overestimate housing wealth in

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counties with high-density multi-unit structures compared to suburban areas with detached one-unit houses. Census 2000 and ACS 2014 give a breakdown of the number of housing units in a county by structure. For a proxy of total number of independent houses, I add the number of housing units in 1-unit detached structures, the number of housing units in 1-unit attached structures, as well as the number of housing units in 2-unit structures, divided by two. For structures with more than two units, the estimates are only brackets, so it is not clear by which number the estimate should be divided to get an estimate of the number of independent structures. Furthermore, multi-unit structures tend to be rental housing and are often owned by real-estate business or owners outside the county.

Zillow Home Value Index: To measure a home price index for all homes sold that is robust to changing compositions of properties sold in different periods, I retrieved Zillow Home Value Index data that is made available to the public by Zillow. The index leverages the Zillow's valuations on all homes (called "Zestimates"). The index is created from estimated sale prices on every home (as opposed to actual sales prices), where the expected error (the mean of errors) is zero. Furthermore, the ZHVI estimates sale prices for all homes, independently of whether the homes were sold in that period.[14] To harmonize the ZHVI data with Census 2000 and ACS 2014 data, I averaged monthly ZHVI per year. In addition, I compare the 2000 average to a ZHVI average for 2010-2014. ZHVI estimates are available for 1,173 counties (out of 3,142).

Mortgage Debt: I retrieved per capita mortgages at the county level from "New York Fed Consumer Credit Panel / Equifax". The mortgage debt estimates include first mortgages, home equity loans and home equity lines of credit. The data is collected by the FRBNY Consumer Credit Panel, which constitutes a 5% random sample of the US population of individuals who have credit reports with Equifax. Mortgage debt data is

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[14] https://www.zillow.com/research/zhvi-methodology-6032/ (last accessed March 20, 2017)

available for 2,220 counties (counties with an estimated population of at least 10,000 consumers with credit reports in 2010Q). Data collection was discontinued after 2011, hence I could only average the yearly estimates for 2010-2011 for harmonization with ACS 2014 and Zillow 2014 data. Mortgage debt data in most counties rose in the mid 2000's and peaked in 2009, after which mortgage debt decreased continuously. Therefore, this proxy for mortgage debt data for 2010-2014 is likely to be an overestimate.

Gross Housing Wealth: Following Kaplan, Mitman, & Violante (2016), as well as from Mian, Rao, & Sufi (2013), I estimate Gross Housing Wealth per county by multiplying the number of houses per county with corresponding ZHVI data. I do not include non-housing wealth in my analyses. As I argued above, wealth held in financial assets is only relevant to the top twenty percent of the US wealth distribution. Furthermore, I do not expect there to be a relevant correlation between homeownership rates and non-housing wealth.

Net Housing Wealth: For net housing wealth estimates, I subtract mortgage debt values from gross housing wealth estimates, in accordance with Kaplan, Mitman, & Violante (2016), as well as from Mian, Rao, & Sufi (2013).

Gini Index (Dependent Variable of Interest): The Gini Coefficient is a measure of Inequality based on the Lorenz Curve. For a positive Income distribution, the Gini Coefficient is 0 if every individuals of a group has the same income and 1 if the group's entire income is confined to one individual. Mathematically, the Gini Index is the mean of the difference between every possible pair of individuals, divided by the mean size. In the dataset, there are various observations of negative net housing wealth estimates for counties. For distributions with negative values, the Gini Index will take on values higher than one. This creates a bias in regression results, because Gini values far above one would be given much more weight in Ordinary Least Squares (OLS) models. Therefore, I calculate the Gini Index with negative net housing wealth observations given the value of zero. This facilitates analyses, but due to confining all net housing wealth to a lower limit

of zero, results need to be interpreted with caution. Consider a case where all counties in a MSA but one have negative net housing wealth estimates (i.e. will be counted as disposing of zero net housing wealth). Even if the one county with positive net housing wealth shows but a small estimate of net housing wealth, the Gini Index estimate will be high, because this county disposes of all positive net housing wealth in the MSA.

Absolute Difference in Net Wealth: As alternative dependent variable measurement, I measure the absolute difference in net wealth between the lowest income and highest income county in the MSA. In the case where a MSA encompasses only two counties, the difference in variable measurement will lie in the measurement of inequality, the label "lower income"/"higher income" and "lowest income"/"highest income" will be the same. Since the absolute difference in net wealth only takes into account two counties, I adjust the explanatory variable of interest such that I measure the homeownership rate in these models either as the homeownership rate of the lowest income county or as the ratio of the homeownership rate in the lowest income county to the homeownership rate in the highest income county. For MSAs encompassing no more than two counties, the measurements of the explanatory variable of interest will be the same in models with Gini Index as independent variable as in those with Absolute Difference in Net Wealth.

Median Income at the MSA level: The ACS 2014 estimates for MSAs' Median Income correspond to the OMB delineations for MSAs in 2009. However, MSA delineations in 1999 are very different, so it is not possible to compare Census 2000 MSA Median Income data. I solved this issue by averaging the median income of counties within the MSA. For ACS 2014, the mean of all counties was closer to the MSA's Median Income than the median. To minimize bias, I compare the average of counties' median income 2000 to the average of counties' median income 2014 (rather than to the actual MSA Median Income). To adjust for inflation, I multiplied 2000 incomes with the Consumer Price Index

Adjustment Factor of 1.42133224.[15] A change in median income of a MSA will influence both homeownership rates and change in net housing wealth disparities.

Saiz Index of Housing Supply Elasticity: Saiz (2010) developed an index of housing supply elasticity for the 95 largest metropolitan areas. The Index captures that housing supply is constrained by water and sleep-sloped terrain, as well as the regulatory framework. Both geography and regulation determine house price developments, but regulatory constraints are also endogenous to demand (i.e. demographic growth) and house prices. I retrieved the Housing Supply Elasticity estimates Saiz (2010) calculated from pages 1283-1284. The Saiz Index influences both homeownership rates and change in net housing wealth disparities. Since Saiz' definition of metropolitan areas diverges from the US Census delineations of 2009, Housing Supply Elasticity could only be measured for 79 MSAs.

3.2   Descriptive Statistics and Trends

Table 1 shows all variables included in the MSA-level dataset, as well as relevant measures of concentration and dispersion. The last column depicting the number of observations available in the dataset illustrates that only Census 2000 and ACS 2014 data is available for all 233 MSAs with at least two counties within their borders. ZHVI, mortgage debt, Saiz Housing Supply Elasticity ("selas"), and net housing wealth data are available for no more than a few dozen MSAs.

Before outlining my regression models and analyses, I will briefly illustrate the distribution of main variables of interest in the dataset, as well as trends and developments over time. Figure 3 depicts the density distribution of Gini values for 2000, compared to 2014. The three horizontal blue lines in the violin plot depict the 25%, the 50%, and the

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Table 1: Statistical Description of the Data

| Variable Name	Mean	Standard Deviation	Median	Min	Max	Number of Observations
"msa.median.inc"	50628.19	8645.75	49417.00	36289.00	92960.00	233
"mean.median"	50545.78	9324.70	49890.67	32066.50	82980.40	233
"mean.2000"	55382.76	9774.35	53837.93	36847.33	93278.48	233
"mean.mdebt.00"	13364.53	6165.43	12132.08	3973.33	41912.00	170
"mean.mdebt.14"	27976.75	12612.21	25844.90	9304.17	90852.80	170
"mzillow.00"	128870.25	58808.88	114054.17	65945.83	419101.67	43
"mzillow.14"	175036.54	97408.24	141007.50	70045.00	612834.67	57
"diff.14"	4561.53	11643.63	2087.01	-12665.02	48970.62	84
"diff.00"	6023.33	11472.17	4160.89	-38537.99	59137.26	65
"d.net.wealthpp"	0.90	1.92	0.81	-3.44	13.54	65
"gini.14"	0.21	0.17	0.16	0.00	0.87	128
"gini.00"	0.11	0.07	0.10	0.01	0.27	111
"d.gini"	2.85	3.59	1.82	0.14	26.82	108
"gross.gini.14"	0.06	0.06	0.05	0.00	0.26	196
"gross.gini.00"	0.06	0.06	0.04	0.00	0.29	175
"d.gross.gini"	1.30	0.91	1.08	0.09	6.13	112
"homeowner.poorest"	0.71	0.12	0.74	0.00	0.87	233
"homeowner.poor.rich"	0.98	0.13	0.99	0.00	1.28	233
"homeowner.all.poor"	0.72	0.08	0.74	0.29	0.86	233
"homeowner.poor.rich.all"	1.00	0.09	1.00	0.58	1.28	233
"d.mean.median.inc"	0.91	0.07	0.91	0.69	1.19	233
"d.median.inc"	0.92	0.09	0.92	0.69	1.34	233
"d.mdebt"	2.13	0.33	2.11	1.44	3.17	170
"d.zillow"	1.37	0.21	1.41	0.98	1.87	43
"selas"	1.97	1.01	1.76	0.63	5.45	79
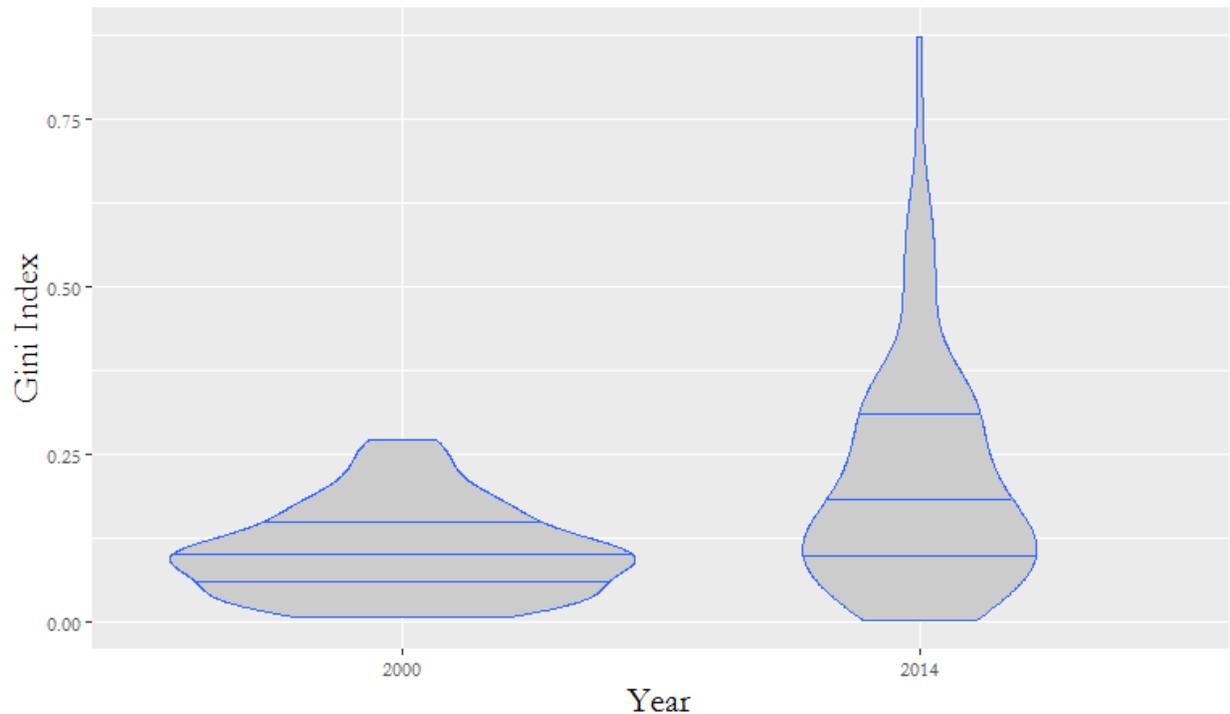
Figure 3: Gini Index in 2000 and in 2010-2014
Violinplots with 25%, 50%, and 75% Quartiles

75% quartiles respectively. As illustrated in this Figure, the range of Gini values is much broader in 2014 than in 2000 and the quartile values are higher. Indeed, a paired T-Test with 107 Degrees of Freedom rejects the hypothesis that the true difference in Gini values between 2000 and 2014 is zero, with a P-Value of less than 0.001. A 95% Confidence Interval for the true difference ranges from 0.087 to 0.149. Lastly, Figure 4 plots Gini Index estimates for 2000 against the factor change in Gini between 2000 and 2014. Values smaller than 1 signify that the Gini Index has decreased between 2000 and 2014, while Values greater than 1 show an increase in Gini. Figure 4 illustrates that most observations show an increase in the Gini measure of inequality between 2000 and 2010-2014 and that this is the case for both high and low initial Gini values. I will henceforth assume that net housing wealth inequality has increased between 2000 and 2010-2014, but note that Gini estimates for 2014 might be upwardly biased because of the correction for negative net housing wealth values (see discussion above).
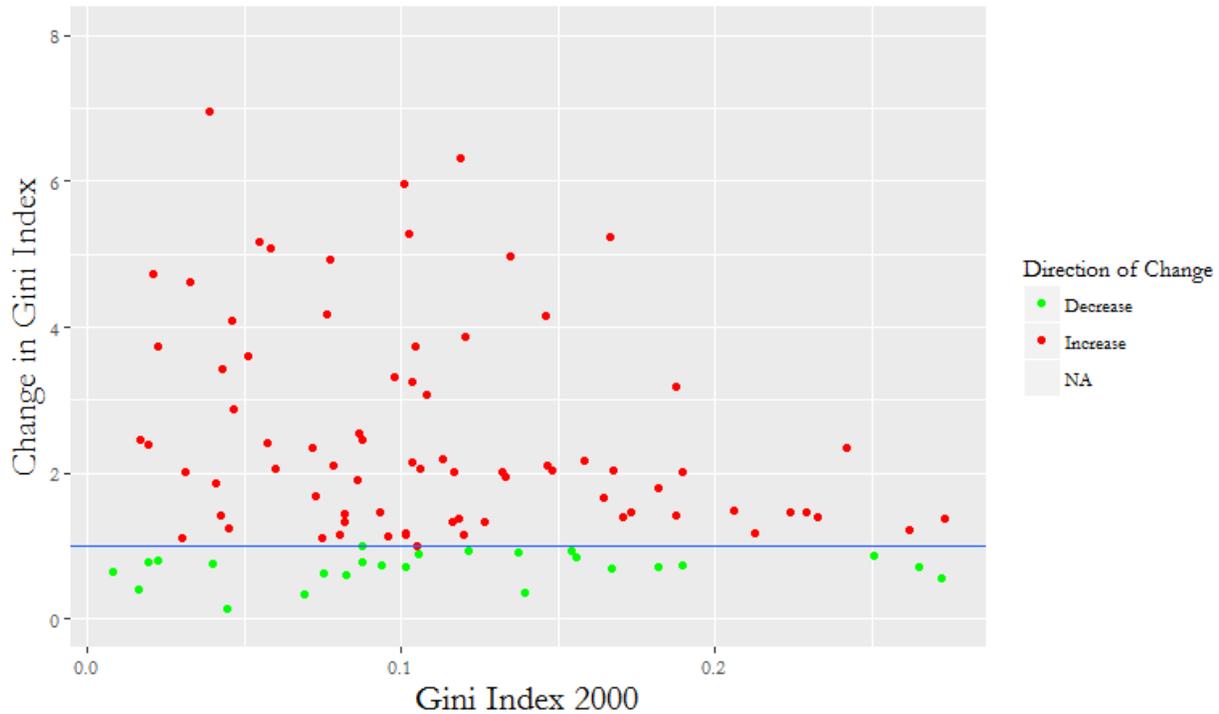
Figure 4: Gini Index in 2000 and Change in Gini Index 2000-2014

As to the main explanatory variable of interest, homeownership rates vary more across lower income counties than across higher income counties. This is illustrated by Figure 5 that depicts violin plots for the density of homeownership rates for lower and higher income counties both in 2000 and in 2014. Again, the three horizontal lines in blue represent the 25%, the 50% and the 75% quartile of the respective distribution. T-tests for the difference in means indicate that homeownership rates are on average lower for lower-income counties (p-value smaller than 0.001). Furthermore, homeownership rates are significantly lower in 2010-2014 than in 2000 (p-value smaller than 0.001) in both income groups.

For the following analyses, I always analyze the influence of the homeownership rate (different measurements) *in 2000* on the *change* in wealth inequalities (different measurements) *between 2000 and 2014 (Fixed Effects Regression)*. The logic behind that is that a higher homeownership rate in lower-income counties in 2000 should help them accumulate more wealth, i.e. decrease inequalities between 2000 and 2014.
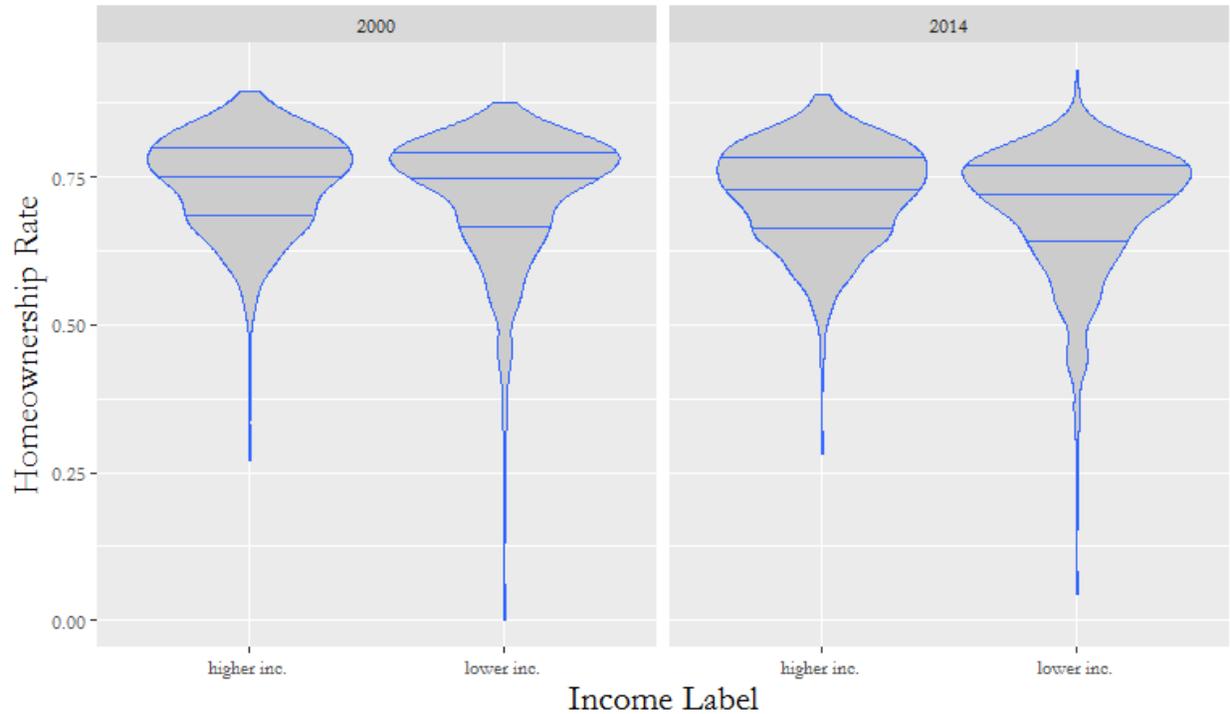
Figure 5: Homeownership Rates by Income Label and Year

4 ANALYSES

4.1 County-Level Analyses

First, I examine the relationship between homeownership rates in 2000 and change in net housing wealth per capita between 2000 and 2014. The aim is to find out, in a first step, whether higher homeownership rates lead to a higher increase in net wealth per capita in general. In a second step, I analyze whether the effect of homeownership rates on wealth accumulation differs between lower income and higher income counties. Table 2 lists the results of four different OLS regression models. The first model conducts a multivariate regression analysis, separately including homeownership rates and a dummy variable that labels a county as higher income or lower income. The second model includes an

interaction effect between these two variables. Lastly, Model III a. and III b. estimate separate regressions for higher income counties and lower income counties separately.

Table 2: County-Level Models for Change in Net Housing Wealth

standard errors in brackets;
Significance levels: '***' for ≤ 0.01; '**' for ≤ 0.05; '*' for ≤ 0.1

	Model I: Simple OLS	Model II: Interaction Effect Homeowner & High Inc.	Model III a: OLS for Higher Inc.	Model III b: OLS for Lower Inc.
Homeownership Rate	0.38326 (0.19461) **	0.11280 (0.26184)	0.80271 (0.28212) ***	-0.007428 (0.279056)
Fraction of Homeowners with Mortgage	-2.09078 (0.23550) ***	-2.14593 (0.23789) ***	-2.21517 (0.29788) ***	-2.048084 (0.386784) ***
Change in Median Income	0.31197 (0.31126)	0.28162 (0.31146)	0.04496 (0.43844)	0.331241 (0.443545)
Change in Home Value	1.03956 (0.09358) ***	1.04208 (0.09346) ***	1.27513 (0.13229) ***	0.800797 (0.132148) ***
"Higher Income" = TRUE	0.07770 (0.03919) **	-0.32655 (0.26518)		
Homeownership Rate x "Higher Income"		0.59112 (0.38350)		
Adjusted R-Squared	0.3876	0.3893	0.4586	0.2929
N	509	509	295	214

It is notable that both the homeownership rate and the dummy for higher income counties have a small but significant positive effect on net housing wealth growth. Hence, net housing wealth growth is higher if, ceteris paribus, the homeownership rate is higher. And net housing wealth growth is higher if a county has a median income above the MSA's average. However, when I include the interaction effect between these two variables into Model II, both effects and the interaction are not statistically different from zero.

Figure 6: Homeownership and Wealth for Higher and Lower Income Counties

Models III a. and III b. could explain this phenomenon. Estimating a different OLS regression model for the subset of counties that is labeled higher income and for lower income counties respectively, I find that the marginal effect of homeownership rate on housing wealth accumulation is significant and more than twice as large than in Model I. In contrast, the coefficient is insignificant for lower income counties. I illustrate this finding in Figure 6. It plots homeownership rates and change in net housing wealth per capita both for higher income counties (in blue) and lower income counties (in red). The blue and red line represent the marginal effect of homeownership rate on wealth accumulation for each group (at the point where all other covariates are controlled at their mean).

These findings indicate that wealth accumulation trajectories could differ between lower and higher income counties, potentially because of different exposure to financial benefits and risks related to the income class of homeowners. Analyses at the MSA level

will give insights into net housing wealth inequalities and how these relate to homeownership rates.

4.2   MSA-Level Analyses

The first models to analyze simply include homeownership rates in lower income counties, the change in median income, and the Saiz Index of housing supply elasticity. Models I include the average homeownership rate in lower income counties as explanatory variable of interest, while Models II measure the ratio of homeownership rate in lower income counties to higher income counties. As Table 3 shows, I find a significant *positive* effect of homeownership rates on the change in the Gini index for inequality in net housing

Table 3: Models for Change in Gini Index for Net Housing Wealth
linear models with OLS and robust standard errors respectively; standard errors in brackets;
*Significance levels: '***' for ≤ 0.01; '**' for ≤ 0.05; '*' for ≤ 0.1*

		Independent Variable: Net Housing Wealth			
		Model I a): Change in Gini	Model I b): Robust Standard Errors	Model II a): Change in Gini	Model II b): Robust Standard Errors
Home Ownership Measure	Homeownership Rate in Counties with Median Income Lower than the Average Income in MSA	12.5040 (6.8775) *	12.5040 (6.4466) *		
	Ratio of Homeownership Rate in Counties with Median Income Lower than Average Median Incomes to Counties with Higher Income			14.1090 (7.4730) *	14.1090 (6.9165) **
Change in Average Median Income in MSA		-18.8611 (8.4755) **	-18.8611 (8.0000) **	-20.0150 (8.3844) **	-20.0150 (7.6593) **
Saiz Index of Housing Supply Elasticity		-0.4254 (0.6264)	-0.4254 (0.5278)	-0.3322 (0.6065)	-0.3322 (0.4691)
Adjusted R-Squared		0.1082	0.1082	0.1119	0.1119
N		63	63	63	63

wealth per capita. In other words, I do not only fail to reject the null hypothesis that higher homeownership rates will decrease net housing wealth inequalities, but I even find an effect in the inverse direction, i.e. inequalities are on average higher in MSAs where low-income counties have a higher homeownership rate, ceteris paribus.

For analyzing the robustness of these results, I estimate the same models as in Table 3, but replacing Change in Gini Index as independent variable by the change in the absolute difference in net housing wealth per capita between the lowest and highest income county in the MSA. As explained above, for consistency purposes, the homeownership rates are now measured through the rate of the lowest income county alone, or the ratio of homeownership in the lowest income county to homeownership rate in the highest income county. I find no significant effect of the two measurements of homeownership rate and the change in absolute difference, as Table 4 illustrates. However, curiously, the effect of median income on the change in absolute difference is now positive, large and

Table 4: Models for Change in Absolute Difference in Net Housing Wealth
linear models with OLS and robust standard errors respectively; standard errors in brackets;
*Significance levels: '***' for ≤ 0.01; '**' for ≤ 0.05; '*' for ≤ 0.1*

		Independent Variable: Net Housing Wealth			
		Model III a): Change in Absolute Difference	Model III b): Robust Standard Errors	Model IV a): Change in Absolute Difference	Model IV b): Robust Standard Errors
Home Ownership Measure	Homeownership Rate in Lowest-Income County	2.9937 (3.1452)	2.9937 (2.9331)		
	Ratio of Homeownership Rate in Lowest-Income County to Highest-Income County			2.3852 (3.3593)	2.3852 (2.5945)
Change in Average Median Income in MSA		15.6371 (7.0498) **	15.6371 (12.2479)	14.5846 (6.9601) **	14.5846 (11.5080)
Saiz Index of Housing Supply Elasticity		0.1957 (0.4598)	0.1957 (0.3360)	0.2509 (0.4569)	0.2509 (0.3668)
Adjusted R-Squared		0.056	0.056	0.04532	0.04532
N		39	39	39	39

significant if the model is estimated with OLS standard errors rather than robust standard errors. The models with robust standard errors indicate no effect.

Table 5 estimates the same models as in Table 3, but I regress the Gini Index for gross housing wealth per capita on homeownership rates. Again, these models do not find significant results for homeownership rates, but change in median income is found to have a positive significant effect on gross housing wealth inequality. The estimated coefficients are smaller than those in the OLS models in Table 4, but they are consistent across OLS standard errors and robust standard errors.

Table 5: Models for Change in Gini Index for Gross Housing Wealth
linear models with OLS and robust standard errors respectively; standard errors in brackets;
*Significance levels: '***' for ≤ 0.01; '**' for ≤ 0.05; '*' for ≤ 0.1*

		Independent Variable: Gross Housing Wealth			
		Model V a): Change in Gini	Model V b): Robust Standard Errors	Model VI a): Change in Gini	Model VI b): Robust Standard Errors
Home Ownership Measure	Homeownership Rate in Counties with Median Income Lower than the Average Income in MSA	1.39357 (0.91099)	1.39357 (1.10762)		
	Ratio of Homeownership Rate in Counties with Median Income Lower than Average Median Incomes to Counties with Higher Income			0.16302 (1.00158)	0.16302 (0.95242)
Change in Average Median Income in MSA		2.41336 (1.13082) **	2.41336 (1.12851) **	2.20764 (1.14405) *	2.20764 (1.10471) *
Saiz Index of Housing Supply Elasticity		-0.02629 (0.08359)	-0.02629 (0.10010)	0.02005 (0.08207)	0.02005 (0.08186)
Adjusted R-Squared		0.04832	0.04832	0.01282	0.01282
N		66	66	66	66

Finally, Table 6 show Models V through VI, but including change in average mortgage debt as covariates. Again, no significant effect for homeownership rates can be found, but an increase in median income in the MSA is associated with a higher increase in wealth inequalities.

Table 6: Models for Change in Gini Index including Mortgage Debt
linear models with OLS and robust standard errors respectively; standard errors in brackets;
*Significance levels: '***' for ≤ 0.01; '**' for ≤ 0.05; '*' for ≤ 0.1*

		Independent Variable: Gross Housing Wealth			
		Model VII a): Change in Gini	Model VII b): Robust Standard Errors	Model VIII a): Change in Gini	Model VIII b): Robust Standard Errors
Home Ownership Measure	Homeownership Rate in Counties with Median Income Lower than the Average Income in MSA	0.77216 (0.89898)	0.77216 (0.84254)		
	Ratio of Homeownership Rate in Counties with Median Income Lower than Average Median Incomes to Counties with Higher Income			-0.01350 (0.95400)	-0.01350 (0.89532)
Change in Average Median Income in MSA		3.39531 (1.33557) **	3.39531 (1.37559) **	3.19977 (1.33125) **	3.19977 (1.35291) **
Saiz Index of Housing Supply Elasticity		0.04313 (0.08324)	0.04313 (0.07351)	0.07095 (0.08104)	0.07095 (0.06810)
Change in Average Mortgage Debt		-0.51703 (0.31463)	-0.51703 (0.31253)	-0.52025 (0.31743)	-0.52025 (0.30051)
Adjusted R-Squared		0.06182	0.06182	0.04644	0.04644
N		50	50	50	50

Figures 7 through 9 offer some insight into the regression analyses described above. First, Figure 7 illustrates how higher homeownership rates are associated with higher increases in the Gini Index for net housing wealth inequality, as shown in Table 3. The two measures of inequality in net housing wealth which I constructed are not highly correlated however. Figure 8 plots the two measurements, with a smoothed linear model line (standard errors in grey). Visibly, the correlation between these two measurements of inequality is not more than moderate. Lastly, Figure 9 shows the difference in effects of a change in average median income in a MSA on the change in Gini and the change in the absolute difference in net housing wealth. While the former is negative, the latter is positive.
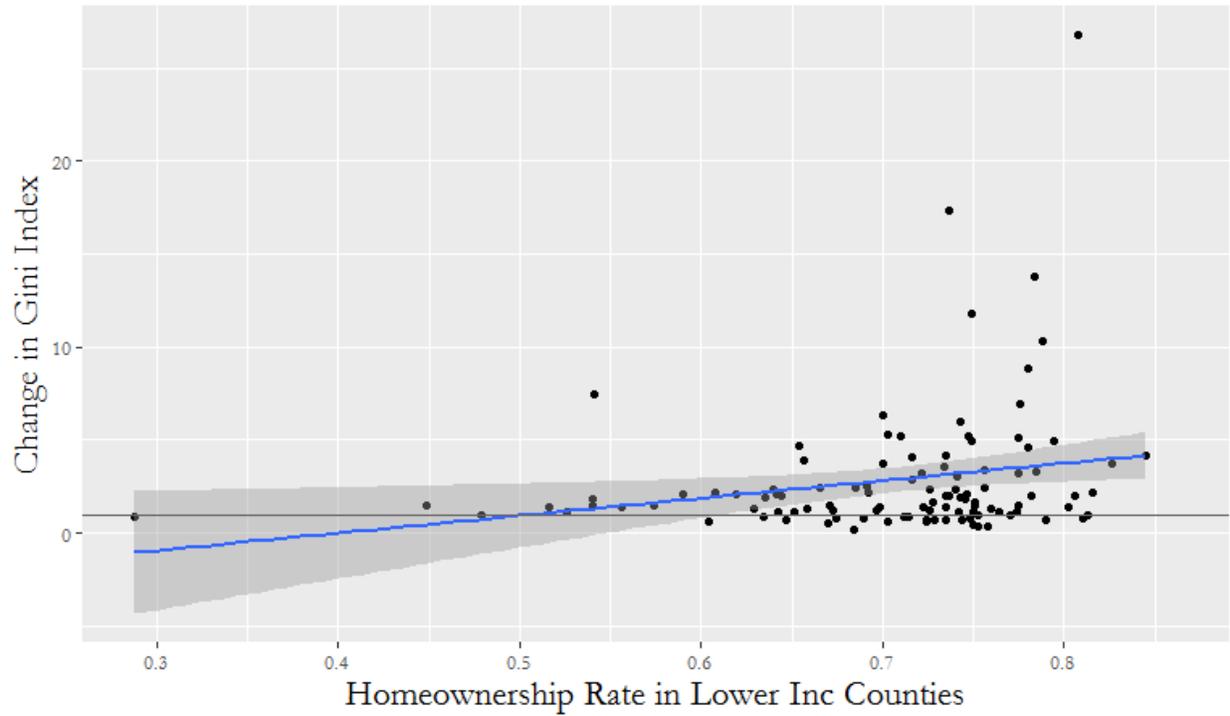
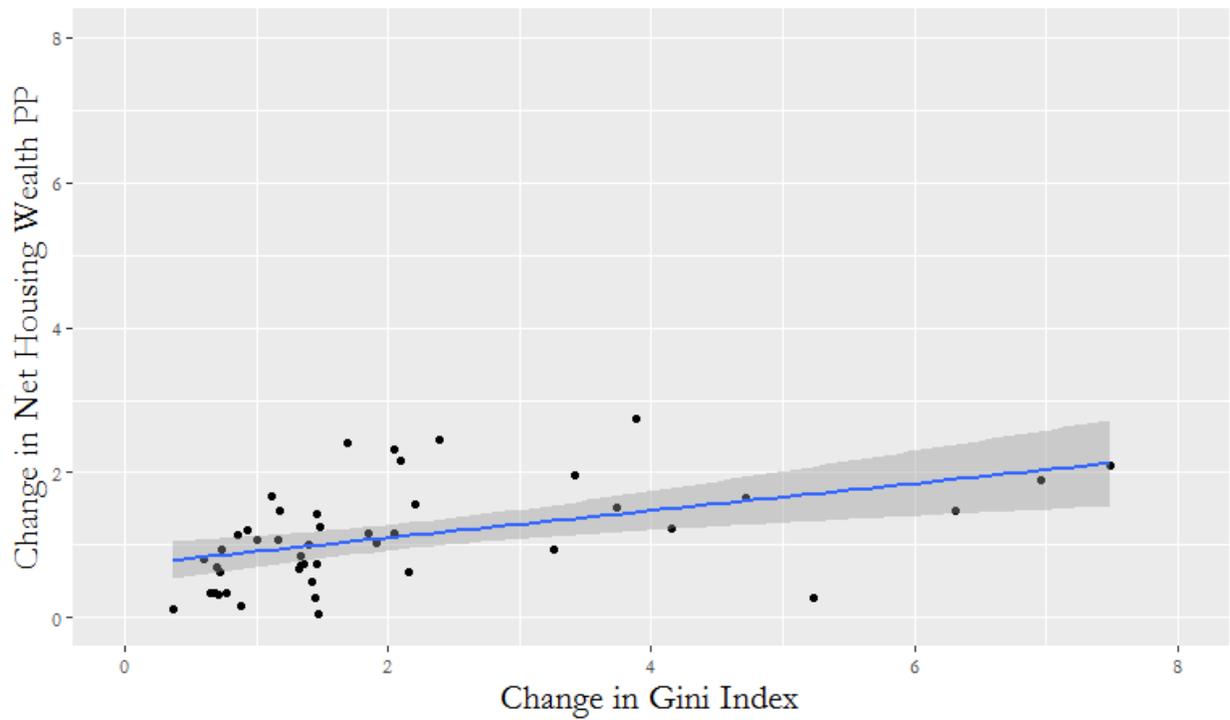Figure 7: Homeownership Rates in Lower Income Counties and Gini

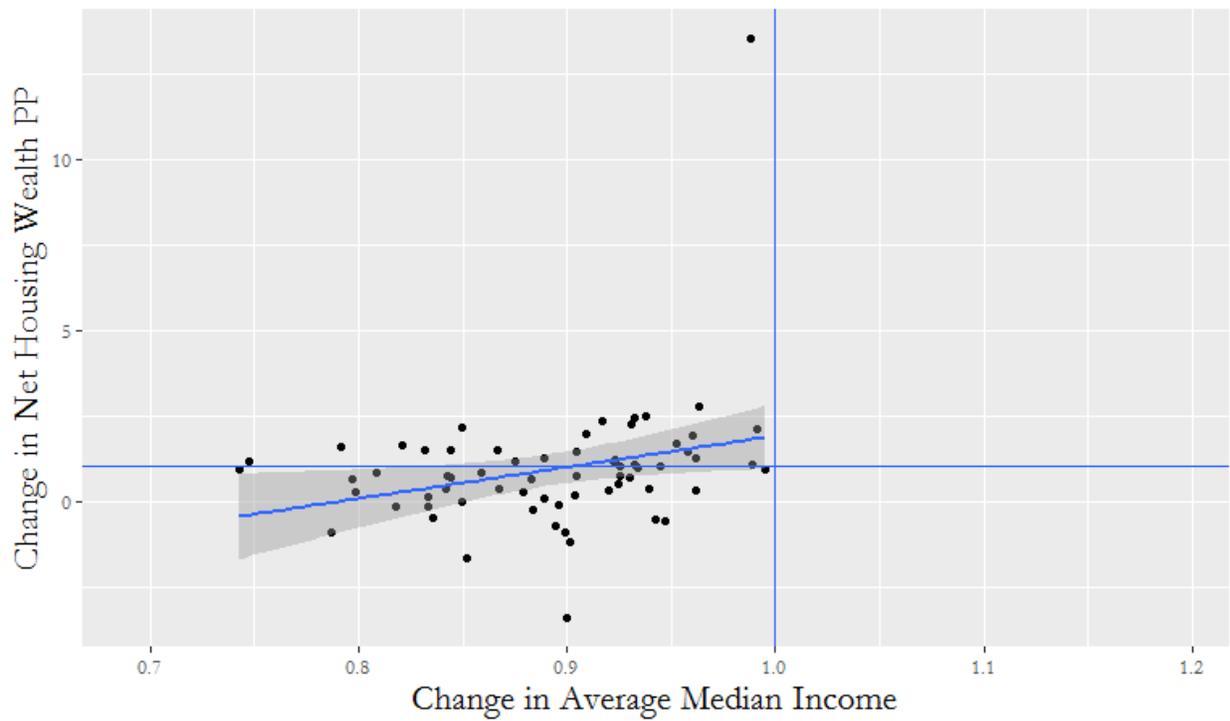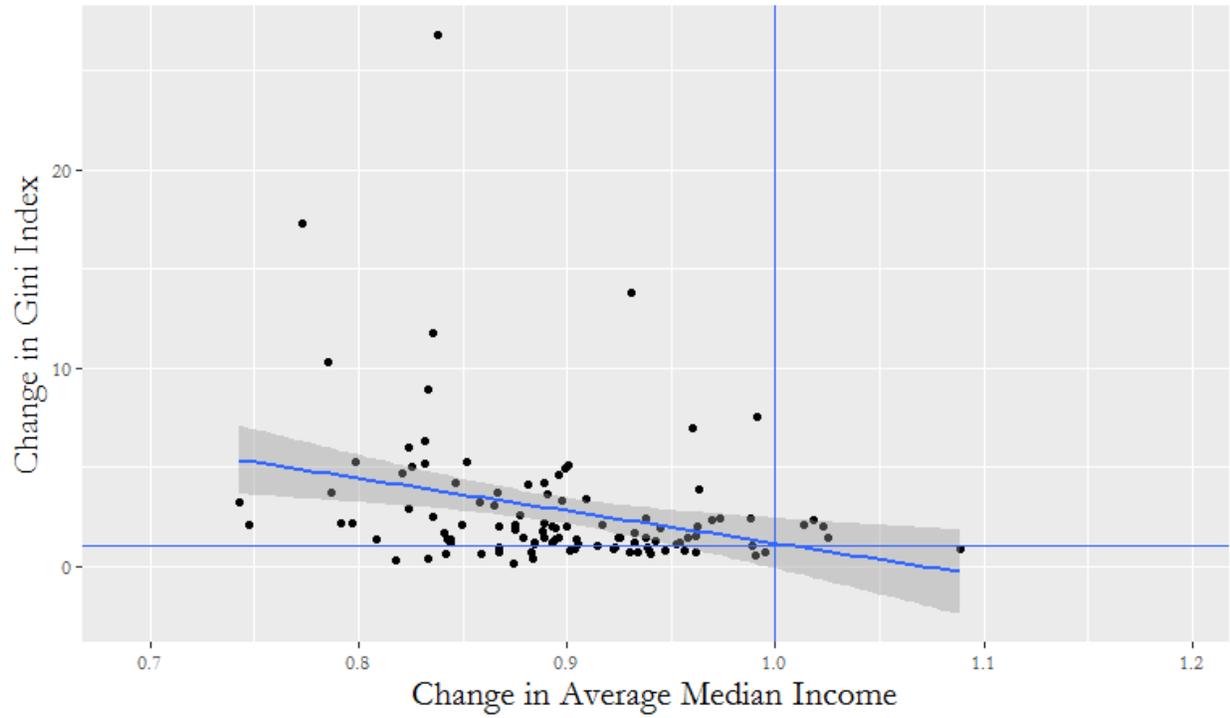Figure 8: Gini Index and Net Housing Wealth

Figure 9: Median Income and Gini Index / Net Housing Wealth

5   Concluding Remarks

As outlined above, net housing wealth inequalities increased significantly over the period of 2000 to 2010-2014. I could not find any indication for a negative effect of homeownership on housing wealth inequalities. If measured through the Gini Index, the findings even indicate the contrary. Analyses at the county level suggest that the implications of homeownership for wealth accumulation might differ across income groups. These findings are in line with the argument that lower income homeowners are disproportionately exposed to the financial risks of homeownership and benefit less than higher income homeowners from the various financial benefits linked to owning a home.

This is not to say that homeownership is not a valid policy goal to pursue. Further attention should be paid to the remaining racial and ethnic disparities in homeownership and housing wealth. It is known that minorities especially still face discrimination in the housing market (Turner et al., 2013). Hence, combating predatory lending practices and discrimination is important. Legislation such as the Fair Housing Act, as well as regulation aimed at enforcing it (the Community Reinvestment Act, or the Affirmatively Furthering Fair Housing Rule) promote higher equality in the path to homeownership across racial/ethnic and income groups. This is an important aspect of homeownership that this paper does not touch upon.

A second merit of homeownership-promoting policies are stimulating effects for the economy through stimulating the construction and real estate sector, especially in the wake of the Great Depression (Kiviat, 2010). In fact, the housing sector accounts for one fifth of US Gross Domestic Product (GDP) (Schwartz, 2015, p. 4 and Rappaport, 2010). This underlines the economic importance of housing in the US, American Dream aside.

But what my conclusions question is whether political rhetoric can credibly defend homeownership as the fulfillment of the American Dream per se. Does it in fact promote social and economic mobility for all income groups? Should homeownership be promoted

as asset-based welfare, and complement or even replace social transfers, like pensions? This papers suggests that the benefits of homeownership are ambiguous, especially so for lower income Americans. Thus, there is no empirical evidence backing up these strong claims made by American Presidents on both sides of the political spectrum.

Albeit not examined in this paper, previous research consistently finds homeownership more favorable than renting, including for low income Americans, but the net wealth inequality gap is widening despite higher homeownership rates. It is likely that the wealth gap would simply be larger if homeownership rates of lower income Americans were even lower. Hence, facilitating homeownership alone is likely to be an insufficient solution to rising wealth inequalities in the US.

Higher-income Americans own homes in areas where house prices appreciate more (i.e. both house price appreciation and financial gains through leverage are higher for higher income Americans). In addition, federal government homeownership subsidies disproportionately benefit higher income Americans. In contrast, low-income Americans own homes in less appreciating markets, in particular African-Americans (Schwartz, 2015, p. 385). Low-income Americans receive significantly less federal subsidies towards homeowners (i.e. federal subsidies are regressive). Lastly, low-income Americans disproportionately subject to predatory lending practices and foreclosure risk.

Hence, the way current US policies are designed to subsidize homeownership has regressive distributive effects rather than progressive distributive effects, and policy makers should be aware of this fact. Again, the conclusions of this paper do not signify that all homeownership-promoting policies are ill designed. But the conclusions do suggest that it is problematic to rely on homeownership as a means of closing the wealth gap or supplementing social transfers.

This paper offers new and important insights into the merits of homeownership, but there are important limitations to my analyses. First, a lack of data was an important challenge to constructing a dataset that would be a satisfying basis for analysis. The

dataset used offers no insights into rural areas, and cannot examine micro-level mechanisms such as the process of wealth accumulation at the household level.

The number of observations with complete information in my dataset is quite low (for instance, analyses of changes in the Gini Index are based on 66 MSAs). While this is a large enough sample to detect covariations, the omission of more than 300 MSAs might have caused a selection bias, such as geographic location. In the analyses discussed above, I do not control for regions of the US (East Coast, West Coast, South, Midwest, etc.).

Furthermore, since I analyze data at the county level and the MSA level, and compare two cross-sections at different points in time, I cannot solve the endogeneity issue of self-selection into counties. It is likely that households who are successful accumulating wealth tend to move into higher income areas, thus exacerbating wealth inequalities between counties. Note that this should be true for all lower income counties though, therefore finding how differences in homeownership rates in lower income counties relate to changes in wealth outcomes (rather than absolute outcomes) remains meaningful.

The period analyzed also poses some challenges as to the generalizability of my conclusions. Some counties have not fully recovered from the recent Great Recession yet and the mortgage debt data was not available post 2011. Thus, it is likely that I overestimated mortgage debt and underestimated net housing wealth. In addition, the measure of absolute difference in net housing wealth between the lowest and the highest income counties was negative in some instance, i.e. the lowest income county would show higher net housing wealth. This might be due to the method of measuring net housing wealth that weighs counties with a higher number of houses more heavily.

Future research should analyze geo-coded micro-data, preferably a panel, which would solve most of the issues outlined above. For instance, it would be ideal to examine the hypotheses of this paper with PSID data together with PSID Geocode Match files that link the PSID data to Census data. This could help determine the process of wealth accumulation and how it relates to the purchase of a home, including the time and location

of the home purchase. Such a dataset would also be valuable in overcoming some endogeneity issues. Furthermore, future research could conduct a wide range of robustness tests for my results, such as varying time spans, varying the definition of lower income Americans, or analyzing different covariates (e.g. subprime lending).

More importantly, if the finding that lower income Americans face higher challenges reaping the financial merits of homeownership is not rejected by future research, analyses should include the causes of these disadvantages (for instance, disparities in housing markets, federal subsidies, and predatory lending) and how to address them. For instance, reducing income segregation, as well as racial/ethnic segregation, could facilitate home purchases of lower income Americans in areas that see higher rates of house price appreciation.

In summary, the mechanisms of homeownership and wealth accumulation need to be further examined, with in-depth breakdowns for income groups, as well as racial and ethnic disparities. This paper points to the importance in the time and location of home purchase and calls for research to shift from the US nation-wide level to more disaggregated housing markets. Lastly, it is a call for caution among researchers and policy-makers when assessing the merits of homeownership. If the objective is to alleviate wealth disparities, it is important to note that the welfare effects of homeownership might be skewed towards the upper side of the wealth distribution.

Bibliography

Belsky, E. S., Herbert, C. E., & Molinsky, J. H. (2014). *Homeownership Built to Last: Balancing Access, Affordability, and Risk after the Housing Crisis*. Washington, DC: Brookings Institution Press, Harvard Joint Center for Housing Studies. Retrieved from http://www.jstor.org/stable/10.7864/j.ctt6wpj09

Brown, J., & Matsa, D. A. (2016). *Locked in By Leverage: Job Search during the Housing Crisis* (No. 22929). Cambridge, MA.

DeSilva, S., & Elmelech, Y. (2012). Housing Inequality in the United States: Explaining the White-Minority Disparities in Homeownership. *Housing Studies*, *27*(1), 1–26. https://doi.org/10.1080/02673037.2012.628641

Desmond, M. (2016). *Evicted: Poverty and Profit in the American City*. New York: Crown Publishers.

Di, Z. X., Yang, Y., & Liu, X. (2003). The Importance of Housing To the Accumulation of Household Net Wealth. *Harvard University, Joint Center for Housing Studies*, *WP 03-5*(November).

Dickerson, A. M. (2009). The Myth of Home Ownership and Why Home Ownership Is Not Always a Good Thing. *Indiana Law Journal*, *84*(189), 189–237. https://doi.org/10.1525/sp.2007.54.1.23.

Doling, J., & Ronald, R. (2010). Home ownership and asset-based welfare. *Journal of Housing and the Built Environment*, *25*(2), 165–173. https://doi.org/10.1007/s10901-009-9177-6

Grinstein-Weiss, M., Key, C., & Carrillo, S. (2015). Homeownership, the Great Recession, and Wealth: Evidence From the Survey of Consumer Finances. *Housing Policy Debate*, *25*(March 2015), 1–27. https://doi.org/10.1080/10511482.2014.971042

Heathcote, J., Perri, F., & Violante, G. L. (2010). Unequal we stand: An empirical analysis of economic inequality in the United States, 1967-2006. *Review of Economic Dynamics*, *13*, 15–51. https://doi.org/10.1016/j.red.2009.10.010

Herbert, C. E., McCue, D. T., & Sanchez-Moyano, R. (2014). Is Homeownership Still an Effective Means of Building Wealth for Low-Income and Minority Households? In

E. S. Belsky, C. E. Herbert, & J. H. Molinsky (Eds.), *Homeownership Built to Last: Balancing Access, Affordability, and Risk after the Housing Crisis* (pp. 50–98). Washington, DC: Brookings Institution Press.

Kaplan, G., Mitman, K., & Violante, G. L. (2016). *Non-Durable Consumption and Housing Net Worth in the Great Recession: Evidence from Easily Accessible Data* (NBER Working Paper Series No. 22232). Cambridge, MA.

Kiviat, B. (2010, September 11). The Case Against Homeownership. *TIME*. Retrieved from http://content.time.com/time/magazine/article/0,9171,2013850,00.html

Lane, C. (2016, August 3). Why the decline of the homeownership rate is good news. *The Washington Post*. Washington, DC. Retrieved from https://www.washingtonpost.com/opinions/why-the-decline-of-the-homeownership-rate-is-good-news/2016/08/03/c6b8bf7c-58d1-11e6-9767-f6c947fd0cb8˙story.html?utm˙term=.117426008fe1

Masnick, G. S. (2004). Home Ownership and Social Inequality in the United States. In K. Kurz & H.-P. Blossfeld (Eds.), *Home Ownership and Social Inequality in a Comparative Perspective* (pp. 304–337). Palo Alto, US: Stanford University Press.

Mellnik, T., Cameron, D., Lu, D., Badger, E., & Downs, K. (2016, April 28). America's great housing divide: Are you a winner or loser? Change in home values since 2004. *Washington Post*. Washington, DC. Retrieved from https://www.washingtonpost.com/graphics/business/wonk/housing/overview/

Mian, A., Rao, K., & Sufi, A. (2013). Household Balance Sheets, Consumption, and the Ecoomic Slump. *Quarterly Journal of Economics*, *128*(4), 1687–1726. https://doi.org/10.1093/qje/qjt020.Advance

NBER Business Cycle Dating Committee. (2010, September 20). Press Statement. *National Bureau of Economic Research*. Cambridge, MA. Retrieved from http://www.nber.org/cycles/sept2010.pdf

Piketty, T. (2014). *Capital in the Twenty-First Century*. Cambridge, MA: The Belknap Press of Harvard University Press.

Poterba, J. M., & Sinai, T. (2011). Revenue Costs and Incentive Effects of the Mortgage Interest Deduction for Owner-Occupied Housing. *National Tax Journal*, *64*(June), 531–564. https://doi.org/http://ntj.tax.org

Rappaport, J. (2010). The Effectiveness of Homeownership in Building Household Wealth. *Federal Reserve Bank of Kansas City, Economic Review*, *4*, 35–66.

Rognlie, M. (2014). *A note on Piketty and diminishing returns to capital*. Cambridge, MA. Retrieved from http://pds25.egloos.com/pds/201408/19/49/MR.pdf

Saez, E., & Zucman, G. (2016). Wealth inequality in the united states since 1913:evidence from capitalized income tax data. *Quarterly Journal of Economics*, *131*(May), 519–578. https://doi.org/10.1093/qje/qjw004.Advance

Saiz, A. (2010). The Geographic Determinants of Housing Supply. *Quarterly Journal of Economics*, *125*(3), 1253–1296. https://doi.org/10.1162/qjec.2010.125.3.1253

Schwartz, A. F. (2015). *Housing Policy in the United States* (3rd Ed.). New York: Routledge.

Sommeiller, E., Price, M., & Wazeter, E. (2016). *Income inequality in the U.S. by state, metropolitan area, and county*. Washington, DC.

Turner, M. A., Santos, R., Levy, D. K., Wissoker, D., Aranda, C., & Pitingolo, R. (2013). *Housing Discrimination Against Racial and Ethnic Minorities 2012*. Washington, DC.

Turner, T. M., & Luea, H. (2009). Homeownership, wealth accumulation and income status. *Journal of Housing Economics*, *18*(2), 104–114. https://doi.org/10.1016/j.jhe.2009.04.005

U.S. Congress. (n.d.). *Present Law and Analysis Relating To Tax Incentives for Residential Real Estate*. Washington, DC.

Wolff, E. N. (2010). Recent Trends in Household Wealth in the United States: Rising Debt and the Middle - Class Squeeze — a n Update to 2007. *Levy Economics Institute Working Paper*, (589), 1–58. https://doi.org/10.2139/ssrn.1585409

Wolff, E. N. (2012). *The Asset Price Meltdown and the Wealth of the Middle Class* (No. 18559). *NBER Working Paper Series*. Cambridge, MA. https://doi.org/10.1017/CBO9781107415324.004

Appendix

Table 7: Variables in Dataset and Sources

Variable Name	Definition	Measurement	Source
"MSA.id"	Five-digit Core Based Statistical Area Code for MSA (as defined by historic delineations of 2009)	Range of 10000-499999	ACS 2014
"MSA.label"	Metropolitan Area Names (as defined by historic delineations of 2009)	/	ACS 2014
"state"	Names of 50 States of the US and the District of Columbia	/	ACS 2014
"state.abbr"	Last two letters of "state's" ISO 3166-2 Code	/	ACS 2014
"msa.median.inc"	Median Household Income in the Past Twelve Months	MSA Median Income is derived directly from MSA-level ACS 2014 data	ACS 2014
"mean.median"	Mean of County Median Income 2014	Average of Median Household Income in the Past Twelve Months in Counties within MSA	ACS 2014
"mean.2000"	Mean of County Median Income 2000	Average of Median Household Income in the Past Twelve Months in Counties within MSA	Census 2000
"mean.mdebt.00"	Mean Mortgage Debt 2000	Average Outstanding Mortgage Debt in Counties within MSA, 2000. Mortgage Debt includes first mortgages, home equity loans and home equity lines of credit.	FRBNY Credit Panel
"mean.mdebt.14"	Mean Mortgage Debt 2014	Average Outstanding Mortgage Debt in Counties within MSA; Average of Yearly Values for 2010 & 2011 Mortgage Debt includes first mortgages, home equity loans and home equity lines of credit.	FRBNY Credit Panel
"mzillow.00"	Mean ZHVI 2000	Average of Zillow Home Value Index of Counties within MSA, Average of Monthly Values 2000	Zillow

Table 7. (cont.)

Variable Name	Definition	Measurement	Source
"mzillow.14"	Mean ZHVI 2014	Average of Zillow Home Value Index of Counties within MSA, Average of Monthly Values 2010-2014	Zillow
"diff.14"	Absolute Difference in Net Wealth Per Capita between highest-income and lowest-income County within MSA 2014	Net Housing Wealth Per Capita Calculated at County Level: Number of Housing Units (ACS 2014) multiplied with ZHVI 2014 (Zillow), Minus Outstanding Mortgage Debt 2014 (FRBNY Credit Panel)	ACS 2014, Zillow, FRBNY Credit Panel
"diff.00"	Absolute Difference in Net Wealth Per Capita between highest-income and lowest-income County within MSA 2000	Net Housing Wealth Per Capita Calculated at County Level: Number of Housing Units (Census 2000) multiplied with ZHVI 2000 (Zillow), Minus Outstanding Mortgage Debt 2000 (FRBNY Credit Panel)	Census 2000, Zillow, FRBNY Credit Panel
"d.net.wealthpp"	Factor Change in Absolute Difference in Net Wealth Per Capita between highest-income and lowest-income County within MSA 2000-2014	"diff.14" / "diff.00"	ACS 2014, Census 2000, Zillow, FRBNY Credit Panel
"gini.14"	Gini Index of Inequality for Net Wealth Per Capita across all Counties within MSA 2014	"the Gini coefficient […] is a summary statistic of the Lorenz curve. The Gini coefficient is calculated as the "relative mean difference" i.e., the mean of the difference between every possible pair of individuals, divided by the mean size mu"[16]	ACS 2014, Zillow, FRBNY Credit Panel
"gini.00"	Gini Index of Inequality for Net Wealth Per Capita across all Counties within MSA 2000	$$G = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} \left| x_i - x_j \right|}{2\,n^2\,\mu}$$ [17]	Census 2000, Zillow, FRBNY Credit Panel
"d.gini"	Factor Change in Gini Index of Inequality for Net Wealth Per Capita across all Counties within MSA 2000-2014	"gini.14" / "gini.00"	ACS 2014, Census 2000, Zillow, FRBNY Credit Panel

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[16]http://mathworld.wolfram.com/GiniCoefficient.html; see also R package documentation: https://cran.r-project.org/web/packages/ineq/ineq.pdf (last accessed February 20, 2017)
[17] Ibid.

Table 7. (cont.)

Variable Name	Definition	Measurement	Source
"gross.gini.14"	Gini Index of Inequality for Gross Wealth Per Capita across all Counties within MSA 2014	Gross Housing Wealth Per Capita Calculated at County Level: Number of Housing Units (ACS 2014) multiplied with ZHVI 2014 (Zillow)	ACS 2014, Zillow
"gross.gini.00"	Gini Index of Inequality for Gross Wealth Per Capita across all Counties within MSA 2000	Gross Housing Wealth Per Capita Calculated at County Level: Number of Housing Units (Census 2000) multiplied with ZHVI 2000 (Zillow)	Census 2000, Zillow
"d.gross.gini"	Factor Change in Gini Index of Inequality for Gross Wealth Per Capita across all Counties within MSA 2000-2014	"gross.gini.14" / "gross.gini.00"	ACS 2014, Census 2000, Zillow
"homeowner. poorest"	Homeownership Rate in County with Lowest Median Income 2000	Homeownership Rate = Fraction of Homeowners of total Homeowners and Renters in County	Census 2000
"homeowner. poor.rich"	Ratio of Homeownership Rate in County with Lowest Median Income to County with Highest Median Income 2000	Homeownership Rate in County with Lowest Median Income in MSA 2000/ Homeownership Rate in County with Highest Median Income in MSA 2000	Census 2000
"homeowner. all.poor"	Homeownership Rate in Counties with Median Income Lower than the Mean of Median Incomes within MSA 2000	Average Homeownership Rate in all Counties with Median Income Lower than the Mean of Median Incomes of all Counties in MSA 2000	Census 2000
"homeowner. poor.rich.all"	Ratio of Homeownership Rate in Counties with Median Income Lower than the Mean of Median Incomes within MSA to Counties with Higher Income 2000	Average Homeownership Rate in all Counties with Median Income Lower than the Mean of Median Incomes of all Counties in MSA 2000 / Average Homeownership Rate in all Counties with Median Income Higher than the Mean of Median Incomes of all Counties in MSA 2000	Census 2000
"d.mean. median.inc"	Change in Mean of County Median Incomes within MSA	"mean.median" / "mean.2000"	ACS 2014, Census 2000

Table 7. (cont.)

Variable Name	Definition	Measurement	Source
"d.median.inc"	Change from Mean of County Median Incomes within MSA 2000 to Median Income of MSA in 2014	"msa.median.inc" / "mean.2000"	ACS 2014, Census 2000
"d.mdebt"	Change in Mean Mortgage Debt 2000-2014	"mean.mdebt.14" / "mean.mdebt.00"	FRBNY Credit Panel
"d.zillow"	Change in Mean ZHVI 2000-2014	"mzillow.14" / "mzillow.00"	Zillow
"selas"	Saiz Index of Housing Supply Elasticity	Index Reflecting Determinants of Housing Supply; Index of amount of developable land in U.S. metropolitan areas; Function of both physical and regulatory constraints, which in turn are endogenous to prices and demographic growth; see Saiz (2010)	Saiz (2010)