Expenditure Cascades in Times of Finance

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The severity of the recent global financial and economic crisis has led to sustained interest in its origins. While commentators continue to debate the core causes, many observers have pointed to the role of changes in Americans' spending, most visibly the bubble in housing spending (Case, Coman and Hepburn 2008; Baily and Elliott 2009), but exemplified also by spending for instant gratification and a lack of restraint in spending on luxury goods. Indeed, some observers suggest a crisis in American consumption – that Americans consume too much, at too great a cost – in brief, that Americans are "overspent" or have "luxury fever" (Schor 1998; Frank 1999).

While the conception of the United States as a consumer society is far from new (Ewen 1976; Featherstone 1991; Calder 1999), recent critiques argue that emulative and competitive consumption has intensified over recent decades, in large part due to increasing income inequality. These critiques link an increase in spending – on housing and other goods – to changes in the distribution of income (Frank 1999, 2007). The theory argues that as the incomes of top earners increase, these households spend more, driving up the price of scarce goods or shifting the preferences of lower-earnings households, which leads households with lower incomes to increase spending.

This theory of "expenditure cascades" suggests that spending cascades downward through the income distribution. This is theorized in some cases to occur through consumer emulation and the legitimation of higher spending. However, it may also occur mechanically, if, as in the case of housing, goods are purchased in a bidding market and the price one household pays influences the price that another household must pay. While neoclassical economic theory sees individuals as isolated actors, theories of expenditure cascades suggest that individual consumption is constrained and influenced by the behaviors of others around them. Thus, the question of whether income inequality leads to expenditure cascades is of theoretical relevance for understanding when and how consumers' behavior is influenced by context.

This theory thus offers an interesting account of a link between changes in income distributions and consumption patterns in the United States over the last portion of the twentieth century. Existing research, however, does not offer a systematic analysis of contemporary American spending patterns to accompany this theoretical development. Existing evidence is instead often anecdotal or fragmentary, as scholars rely on discussions of markets for a few luxury goods or

suggestive evidence that individuals spend more under certain circumstances, although one recent study finds a link between inequality and spending on housing using a sample of 18 metropolitan areas (Charles and Lundy 2013). Certainly, the long-term increase in housing prices is consistent with these accounts. Yet there are other potential explanations for increases in spending on housing, such as changes in per capita income, population growth, and density.

Underlying the increase in both inequality and housing prices has been the decades-long trend toward the financialization of the United States economy (Krippner 2005, 2011; Tomaskovic-Devey and Lin 2011; Volscho and Kelly 2012; van der Zwan 2014). At the same time that finance has become more important for firm profits, consumer lending has increased dramatically, particularly in the years immediately preceding the financial crisis. For example, from 1995 to 2003, the value of originated consumer mortgages increased from $639 billion to $3.76 trillion (Chomsisengphet and Pennington-Cross 2006). County-level analyses suggest that the expansion in mortgage credit, particularly in subprime markets, was closely correlated with the securitization of subprime mortgages (Mian and Sufi 2009). Thus, financialization may have influenced the availability of credit, which should theoretically increase prices as the looser availability of credit introduces the equivalent of more high-income purchasers into any particular market. The increased availability of credit may have shifted households' financial calculations.

This paper examines the determinants of shifts in housing spending across counties in the first decade of the 21st century. I examine how local context influences spending on housing, using Census, American Community Survey, and Home Mortgage Disclosure Act data to generate county level measures of income inequality and credit availability. I test how these are related to individuals' spending on housing, asking how spending differs across the income distribution.

Theory

A baseline expectation about consumer behavior comes from neoclassical economic theories of consumption. The foundation of neoclassical theories lies with the concepts of supply and demand. The joint operation of supply and demand to produce prices and consumption through preference curves is at the heart of an economic understanding of consumption (Deaton and Muellbauer 1980). While in one sense this is inherently social – the price paid for a good depends on the action of all

others – in general, there is little attention paid to social context. In particular, a key assumption of these types of economic theories is that individual preferences are independent of the preferences of other consumers and that they are stable over time. Neoclassical economic theory thus leaves the question of preference determination untouched.

A theory of expenditure cascades is, however, based on a very different conception of motives for consumption. Rather than individuals seeking to maximize their utility based on a set of randomly determined preferences, individuals in a theory of expenditure cascades base their decisions on what others around them are doing. This is the case because expenditure cascades most likely involve goods which are positional in nature. Positional goods are those which Hirsch (1976) and Frank (1999) suggest derive their value not from intrinsic characteristics, but from their ranking relative to goods owned by others. Positional goods are also limited in quantity, as only the good with the most desirable characteristics (or one of several most desirable) brings a positional reward. For positional goods, individuals increase consumption to ensure that their consumption relative to others is maintained or improved. The concept of positional goods is far from new. Veblen (1994[1899]) referred to conspicuous consumption in which individuals displayed status by spending conspicuously, and provided a foundation for present ideas. Duesenberry (1949) also argued that consumers' preferences were socially determined, suggesting that consumers tried to "keep up with the Joneses" in their spending.

What recent scholars argue has changed is the extent to which consumers feel the pressure to keep up with the Joneses. Robert Frank (1999) and Juliet Schor (1998) argue that pressures to consume are more intense now than in the past. As income inequality increases, the consumption "arms-race" intensifies, with top earners spending more on goods which display status or secure positional advantage. Those farther down the income distribution will then increase their own spending in order to keep pace. These processes have arguably become more intense with increasing top incomes, relaxed advertising laws, and more attention paid to the lifestyles of the rich (Frank 1999; Schor 1998). Two separate processes may link shifts in income inequality to increased spending, and I discuss these below.

First, individuals may purchase highly visible goods to display status. Rooted in Veblen's (1994[1899]) discussion of conspicuous consumption, status-based accounts of consumption emphasize the role of display. In Veblen's account, ruling classes originally displayed status through leisure. Over time, spending became more important than leisure because goods could more easily convey status to strangers. By spending – consuming – conspicuously, individuals were able to demonstrate their wealth. Status may still be an important element of consumption decisions, as individuals opt for more expensive versions of a variety of goods: BMWs, expensive grills, or 20,000 BTU kitchen stoves (Frank 1999). Indeed, Frank (1999) argues that Americans are beset by a type of luxury fever - that purchases of expensive luxury goods have skyrocketed as individuals feel greater pressure to consume.

Accounts focusing on luxury goods and display assume the operation of three mechanisms: display, legitimation, and emulation, each of which intensified with income inequality. The process presumably worked in the following fashion: income inequality in the U.S. context increased because incomes rose at the top of the income distribution. As incomes rose, the rich engaged in greater spending on visible luxury goods, which served to display their greater wealth. This legitimated greater spending across the income distribution, as individuals contrasted their own spending with that of the rich. Finally, with emulative consumption, individuals copied the spending of the rich in an attempt to capture some of the same "glamor" of display spending. Thus, the overall effect of increasing inequality was to increase pressures to spend on goods which may be used for display.[1]

A second process applies to positional goods - those in which one person's ownership of a good means that others cannot own a good with identical characteristics, such as a particular house or a one-of-a-kind piece of art - and is more nearly mechanical in operation. For positional goods, prices are largely determined by the amount others will pay in a bidding market.[2] The mechanism is thus not display and emulation, but instead mechanical price increases. For these goods, individuals compete strenuously to obtain the highest relative quality of good and will pay a substantial premium to move

[1] While existing discussions typically argue that income inequality should increase display, an alternative hypothesis is that greater inequality would lead to conditions less suitable for display, as distinctions become apparent even without attempts to display wealth.

[2] While theoretically, the price of all goods is determined in such a fashion, the markets I refer to are strict bidding markets, in which one seller obtains bids from multiple potential buyers, selling to the highest buyer.

up the ranking even when there are only small absolute quality gains. However, because (nearly) everyone wishes to move up in quality for positional goods, this means that increased spending at the top of the distribution drives up prices throughout the distribution, leading to expenditure cascades.

Expenditure cascades presumably occur when top prices increase. Consumers in a market first compete for a most desirable property, driving up price. Those who do not win the first competition turn to the next most desirable property, driving up its price. As the process continues downward through the desirability of properties, bidders who might have otherwise won continue to be displaced, leading to the expectation that the addition of one higher-earning buyer at the top of the income distribution will lead to price increases throughout. Increases in income inequality should thus lead to price increases. Higher incomes at the top of the income distribution will mean that the highest price will increase, and lead to higher prices throughout the income distribution.[3]

In this theoretical perspective, exclusiveness of goods is the key characteristic that a market must have for these processes to occur. Exclusive goods are those for which one person's ownership excludes another person from owning it. Without exclusivity, there is little incentive for consumers to compete for any particular good, suggesting weak competition at the top of the income distribution. Housing meets this criterion, as one person's ownership of a house fundamentally means that someone else can not own a precisely identical good, unlike in the market for many consumer goods, in which there is a theoretically infinite supply of identical goods. In addition, spending on housing allows individuals to not only buy physical characteristics of the home, but also buy access to exclusive contextual characteristics such as safe neighborhoods, good schools, shorter commute times, and possibly views and leisure activities (Frank 1999, 2007). The location of housing is particularly important given the common policy of sending children to neighborhood schools in the United States. This is especially true in cities where the quality of public schools varies substantially across space, as in Chicago (Kozol 1992).

When individuals compete for properties for which ownership is exclusive, there are strong incentives to obtain not simply an adequate property, but to purchase the best possible property one

[3] Of course, income inequality could also increase because of decreasing incomes at the bottom of the income distribution, but in the United States, increases in income inequality have resulted primarily because of rising incomes among those at the top of the income distribution.

can, as benefits of properties are often positional, and one prefers the best position possible (Hirsch 1977; Frank 1999). Thus, intense competition over properties will lead to price increases. In the market for owned homes, it is easy to see how this might occur given the presence of a bidding process which can allow for multiple overlapping and even sequential bids. Inequality shifts prices across the distribution because of the spill-over that occurs when one individual loses a competition. In this case, that individual turns to the next most desirable property and either bids up the price or is willing to accept higher prices. In the United States, income inequality has increased because of higher incomes at the top of the distribution (Levy 1998). A larger concentration of earners at the top of the income distribution, given the same set of houses, means that prices will go up in response to these high earners' ability to out-spend those previously at the top of the income distribution, and these prices should spill over through the income distribution.

However, whether effects take place in terms of higher dollar amounts paid for housing or higher shares of income paid for housing will depend on an individual's position in the income distribution. Those near the top of the income distribution can likely set the share of income they wish to spend, although they do have to compete with others at the top of the distribution. Still, if a second place bidder wishes to only spend 20% of income on housing, they will be able to do so and still out-bid most other competitors. Assuming that those near the top of the income will prefer to spend roughly the same share of income across areas, then inequality will be associated with higher amounts spent at the top of the income distribution as incomes are higher in high inequality areas. In contrast, those at the bottom of the distribution will likely be forced to accept existing prices. Since prices at the bottom of the distribution are linked to the amount spent at the top and middle of the distribution and these prices are higher in high inequality areas, one would expect increasing prices at the bottom. In addition, since the incomes of households at the bottom the income distribution will be no higher in high-inequality areas, there should increases in the share of income spent.

While status-based accounts and expenditure cascade accounts emphasize distinct mechanisms, they make similar predictions about the response of spending to higher inequality. Because they are similar, I make general predictions which apply to both theoretical accounts.

First, both accounts emphasize the importance of a shift in spending among households at the top of the distribution as their income increases. Thus,

1) High-income households should engage in higher spending when there is high inequality. As top earners have higher incomes, spending should increase, and those with lower incomes should increase spending in response as price increases "cascade" through the distribution.

However, lower-income households may be unable to match the spending of the rich because of other demands on their income. Thus, it is unclear to what extent an increase in price will cycle down through the income distribution. Instead, lower income households may spend more as a share of their income as prices are driven higher in response to the overall upward trend, or they may be more likely to live in less convenient areas as they lose price wars and sacrifice their time instead and live farther from the city.

2) Lower-income households' share of income spent on housing should be higher in areas with higher inequality, *or*

3) The trade-off between housing spending and travel time will be greatest for lower-income households in high inequality areas.

Finance and Housing Spending

Longitudinal analyses of the rapid growth in housing ownership and housing prices point to the importance of low credit costs in the form of low interest rates and the growth of sub-prime lending (Case 2006; Garriga, Gavin and Schlagenhauf 2006). Unlike income inequality, there is little evidence variation in interest rates across local areas, suggesting that interest rates may not explain the substantial variation that exists in prices across metropolitan areas (Lee and Pace 2006). However, while the price of credit may vary little across metropolitan areas, there have been tremendous shifts in the cost and availability of credit over the course of the first decade of the twentieth century.

Much of the increase in the availability of credit has come from the extension of credit to the sub-prime market. Households in the sub-prime market were not eligible for financing in the conventional, or "prime" market, either because of a lack of down payment or because of poor credit histories which included foreclosures or bankruptcies (Chomsisengphet and Pennington-Cross 2006). In the beginning of the subprime expansion – in 2000 and other early years, subprime loans thus went

primarily to lower-income and minority households (US Department of Housing and Urban Development 2000). The increasing supply of credit should thus most likely increase home purchases – and potentially spending on housing – among those near the bottom of the income distribution.

However, in later years, subprime loans were increasingly used by higher-income households as well. Roughly one quarter of even high-income whites had high-cost home refinance loans, and one sixth of high-income whites had high-cost home purchase loans. High-income Latinos and blacks had rates of high-cost loans nearly as high as low-income Latinos and blacks, with 54% and 49% of high-income blacks using high-cost loans for purchases and refinancing, respectively, compared to 49% and 39% of Latinos (Rivera et al. 2008). Rugh and Massey (2010) argue that minority neighborhoods were more susceptible to offers of high-cost credit because redlining practices in the past meant that minority neighborhoods had little access to credit and were thus more interested in these products when they became available. The expansion of credit to higher-income household in later years may mean that increases in the availability of credit also increase spending among higher-income households. Thus,

4) Increased credit access in a local area should increase housing spending, and

5) In earlier years, the higher availability of credit should increase spending more among low-income households, and among middle-income and high-income households in later years.

Analytic Strategy

In order to examine the link between inequality and spending, I analyze spending patterns across counties. While national levels of income inequality may be relevant for how individuals consume, especially to the extent that they are aware of consumption patterns throughout the country, the local area still forms the most important reference point when individuals are making consumption decisions. First, for many individuals, the targets of their display behaviors must by necessity be local, as it is visibility to an audience which transmits signals about consumption. Individuals' perceptions of how others consume are likely to be largely, if not primarily, based on the consumption patterns of others who are locally visible. Second, for the case of housing, individuals purchase in a specifically

local markets. Counties should create different and specifically local contexts of consumption within which inequality might strengthen the motive to consume.

An alternative possibility might be to use metropolitan areas for measurement. While this may have some benefits, such as, for example, the possibility that citizens consider a broader context than just the county they live in when considering where to live, it also has several drawbacks. Chief among these is the drawback that metropolitan area boundaries are not constant over time, while county boundaries typically are. In addition, counties are often the political unit responsible for school systems, and as such may indeed carry considerable weight in organizing residential decisions. In addition, given long-lasting patterns of segregation in the United States and matching patterns of credit availability, shifts in the availability of finance may map more closely onto county boundaries than onto metropolitan area boundaries.

Data and Measures

I use data from the Integrated Public Use Microdata sample (IPUMS) from the 2000 Census, as well as data from the 2005-2011 American Community Surveys (ACS) available from the Minnesota Population Center (Ruggles et al. 2010).[4] While there are ACS data from 2001 to 2004, they do not contain geographic identifiers because of small sample sizes, so I am restricted to using later years. Census and ACS data are useful because they consist of nationally representative samples of the US population, have geographic identifiers, and contain a range of useful measures, including the amount spent on mortgages. I use the 1% yearly samples available from the American Community Survey and the 5% sample from the 2000 Census. I selected only households which held mortgages during this time period, in order to avoid additional noise introduced by households which own their houses "free and clear" and potentially different processes which operate in the rental market. I also select households in which the primary respondent is between the ages of 18 and 65 and active labor force participants so that reported household incomes likely represent household resources.

[4] The Consumer Expenditure Survey is another choice for analyzing spending patterns. However, because the Bureau of Labor Statistics only began to release geographic identifiers to accompany the CES data in 2006, and only for 18 identifiable areas, I rely on data from the American Community Survey to investigate local area changes in spending on housing over time.

For the measure of the dependent variable, I use measures of annualized mortgage spending. Respondents are asked, "How much is your total regular monthly payment to the lender?" I multiply this amount by 12 and then subtract annual property tax and insurance costs if they are included in the monthly payment to the lender. I adjust spending to 2011 dollars using the Consumer Price Index (CPI). Descriptive statistics for this and other variables are shown in Table 1. As Table 1 shows, the sample includes some households with substantial annual payments.

[Table 1 about here]

I include a range of individual-level covariates in these regression models. First, I include household income – the total money income all household members age 15 and above in the previous year, also adjusted to 2011 dollars using the CPI. I also include measures of the age, race, and education of the reference person, as well as marital status. I include these to control for the possibility that they are systematically linked to key independent variables – like income and the metro-area supply of credit – and the dependent variable. Finally, I include a measure of travel time to work. I do so in order to capture a different trade-off households may be able to make. Instead of spending more, households may be able to live farther from desirable areas and farther from work. Of course, work sites are decentralized in many cities and so this measure may be somewhat noisy, but it is a rough measure of a potential trade-off households may make. However, whether they do so likely depends on the context they find themselves in. The measures is in response a question asking how many minutes it usually took to get to work last week.

Other independent variables are measured at the county level. To measure inequality, I use the gini coefficient for household income, which I calculate from a full sample of all households living in the county from the American Community Survey and Census data for each year in each county. The gini coefficient is a standard measure of inequality and captures how much a distribution of income deviates from a perfect distribution, where the index takes on values of zero if income is distributed perfectly equally and takes on higher values as inequality increases. It is a broad summary measure of inequality and is useful because of comparability to earlier research. While it is imperfect as a measure of higher incomes at the top of the income distribution, it allows a general examination of whether inequality is related to higher housing prices.

To control for shifts in the demand for housing, I use a measure of population density, dividing population by the area of the county in square miles

I also use two measures of credit availability. These are drawn from aggregate reports from the Home Mortgage Disclosure Act (HMDA) created by the Urban Institute.[5] HMDA data include broad measures of the number of loans originated in different categories along with some characteristics of lenders. For this research, I rely on two measures of credit availability. First, I generate a broad measure of the supply of credit by dividing the number of mortgages originated (for both refinancing and purchase purposes) by the number of housing units in a county. This measure roughly captures how much credit was available in a given area. The second measure is a the approval rates by county in lending patterns, which I obtain by dividing the number of approved loans by the number of loan applications. Because of a potential time lag between the approval of a loan and the beginning of spending on a home, I lag the HMDA measures by one year.

Methods

Because I use individual-level data nested within larger units (counties), I use multi-level models to account for the dependencies in the structure of the data and the smaller number of larger units. Formally, the model takes on the form

$$Spending_{ij} = \beta_{0j} + \beta_{1j} Income_{ij} + \ldots \beta_K X_K + e_{ij}$$

$$B_{0j} = \gamma_{00} + \gamma_{01} Gini_j + \gamma_{02} Supply_j + \gamma_{03} Density_j + \gamma_{04} Availability_j + \gamma_{05} Year_j + \gamma_{06} Year * Supply_j + u_{0j}$$

$$B_{1j} = \gamma_{10} + \gamma_{11} Supply_j + \gamma_{12} Year_j + \gamma_{13} Year * Supply_j + u_{0j}$$

where the dependent variable is spending on housing, and X_K refers to other individual-level variables with non-varying effects on spending. The equations for B_{0j} and B_{1j} show the influences of county context on, respectively, spending and the effect of household income. These specifications thus rely

[5] These HMDA data files (http://www.metrotrends.org/natdata/hmda/hmda_ download.cfm) and the procedures for constructing them were initially developed by the Urban Institute to support DataPlace (www.dataplace.org). The data are licensed under the Open Database License (http:/www.metrotrends.org/natdata/ODbL.cfm).

on cross-level interactions between county characteristics and household income to test key expectations about the links between inequality, finance, and spending on housing.

Results

I begin by presenting descriptive results about changes in spending and loan availability over time. Table 2 shows average values for each year in the sample. Gini values for this sample are somewhat lower than many other estimates, but still show increases throughout the decade that match expectations about shifts in inequality nationally. The number of mortgage originations per housing unit in this sample peaks in 2006 with nearly 1 mortgage origination for every 6 housing units in that period. Originations then sharply drop and continue to decline to the end of the sample period, when there are only .07 mortgage originations per housing unit (or roughly 1 per 14 housing units). Surprisingly, this does not correlate perfectly with increases in selectivity for mortgage applications, as one might expect if the supply of credit were largely determined only by banks approving or rejecting similar numbers of applications of loans. While mortgage originations per application were high in the middle of the decade when the supply of credit was high and declined in subsequent years, selectivity also increased dramatically near the end of the decade, when the supply of credit was its nadir. This suggests that fewer potential borrowers were applying for credit, either because they did not wish to purchase or refinance, or because they believed they would be ineligible given stricter guidelines without any formal application.

[Table 2 about here]

While over-time measures are useful for understanding the general background, this research formally examines variation both across counties and over time within counties. Figure 2 shows a scatterplot of average values for all counties in the data set for the relationship between mortgage availability and housing spending. The relationship is positive, though modest (r=.23). Nonetheless, it is suggestive and shows the wide range of variation in both the availability of credit availability and housing spending.

I next turn to the analysis of spending on housing, beginning with a multi-level regression model which includes all relevant independent variables, but with no interactions. This model, Model

1, as shown in Table 3, shows predictors of household spending across the counties in this sample. Because of the large sample size, nearly all coefficients in the model are statistically significant, and I note those few coefficients which fail to reach conventional levels of statistical significance. I begin by discussing

[Table 3 about here]

The results from the regression model are relatively intuitive and match expectations outlined above, with one important exception. For individual-level variables, household income is positively related to spending. The time to work in minutes is negatively related to spending, representing a general trade-off that individual might make, choosing to live farther from their jobs in order to spend less on housing. For contextual level variables, population density is associated with higher spending, as is mortgage supply, suggesting that areas with higher demand for housing and a higher supply of credit have higher spending on housing.

Contrary to theoretical expectations about expenditure cascades and some earlier research (e.g. Lundy and Charles 2013), however, in this regression model, income inequality is negatively related to spending on housing. The effect is significant at the $p<.001$ level and substantively meaningful (an increase of .1 in gini corresponds to a roughly $1,200 increase in spending). Model 3 also shows a negative coefficient for the share of income spent on housing.[6] Because of the use of a multi-level model with random intercepts, this model accounts for some unobserved variation between counties by allowing each county to have a different intercept. This means that differences across counties in the average cost of housing are accounted for by this model, and the regression coefficient for inequality largely shows the effect of shifts in inequality over time within a given county.[7]

Model 2 shows the effect of ignoring this unexplained variation in the average amount spent on housing, as it shows an OLS regression for the same regression model which does not account for the nesting of individuals within counties. In this regression model, inequality is positively related to

[6] I re-code all observations past the 95th percentile of the distribution for share of income spent on housing to the 95th percentile, which is roughly 60% of income spent on housing.
[7] A fixed-effects model would limit the estimate for county characteristics to solely within-county changes and produces similar estimates for these data.

inequality. This suggests that, on average, counties with higher levels of inequality do have higher levels of spending on housing, but that shifts in inequality within counties lead to declines, rather than increases, in spending on housing. As the theory of expenditure cascades implies a dynamic process, the results from the dynamic, over-time model which accounts for unobserved differences between metropolitan areas is of greater interest. Below, I discuss potential shifts in the effect of income inequality over time in greater detail after discussing remaining predictions.

Models 4 and 5 deal with additional predictions about contextual effects for households at different points in the income distribution. Model 4 is a regression only for households earnings less than $50,000 per year to test for the possibility that lower income households live farther away rather than pay more for housing in higher inequality areas. The interaction term between the gini coefficient and the number of minutes to work suggests that in this case, households do trade off travel time more intensely for housing cost in high-income areas. In counties in this sample, the lowest gini coefficient is roughly .3, so for these areas, an additional minute spent in travel time would be associated with an *increase* of 15.4 dollars per year (.3*-121.1+51.7=15.4). For the highest inequality areas, where the gini coefficient is roughly .6, an additional minute in travel time would be associated with a decrease of roughly 22 dollars (.6*-121.1+51.7=-21.66). For lower income households in low-inequality areas, these results may represent far-flung suburbs in major metropolitan areas, where with longer commutes may commute to a central city to work but live in newer housing stock constructed in these areas compared to households who work outside of the central city.[8]

Finally, due to shifts in the credit market over time, I suggested that areas with more credit available in the early years should increase spending more among low-income households, as these were the first to receive credit through the expansion of sub-prime lending. However, in later years, higher availability of credit should increase spending more among middle and high-income households, as these households began to use sub-prime loans as well. Model 5 tests for this possibility, examining the interaction between year, the county-level availability of credit, and

[8] The four counties with gini < .32 include Carroll county, Maryland, roughly 40 miles northwest of Baltimore, Charles county, Maryland, roughly 30 miles southeast of Washington, D.C., Anoka county, MN, roughly 20 miles northwest of Minneapolis, and Jefferson county, MO, roughly 30 miles southwest of St. Louis. In contrast, the high-inequality area in the sample is New York, NY.

household income. Because of the difficulty of interpreting a three-way interaction term, I present predicted values in Figure 1.

[Figure 1 about here]

The predicted values in Figure 1 suggest moderate support for the notion that credit expansion differentially influenced spending for upper- and lower-income households. While both upper income and lower-income households pend more in the year 2011 than in 2000, and are more responsive to the level of credit in the county, the shift is more pronounced for upper-income households than for lower-income households, suggesting that the expansion of credit throughout the decade ended up in the hands of the rich by the end of the decade.

Robustness: Inequality and Spending over Time

The results I present above suggest that inequality is negatively related to spending on housing. Yet this runs counter to existing theory and some research (Bowles and Park 2005; Cahrles and Lundy 2013). In this section, I examine whether the result holds across units of analysis and at different points in time. First, as I note above, counties may not be the ideal unit of analysis, leading to the possibility that the results I find could differ if analyzed for metropolitan areas rather than counties. An additional important test, then, is to analyze patterns across metropolitan areas, and to see how these change over time. Second, because I use annual data, one possibility is that small samples may lead to additional noise in the estimates, particularly gini coefficients can be influenced by very large values for income in even a small number of cases. Third, results may change over time. Indeed, with the rise of finance, it is possible that dynamics today are very different than in earlier periods. In Table 4, I present two regression models: the first analyzes data from the 2000 Census, the pooled 2005-2007 American Community Surveys, and the pooled 2008-2010 American Community surveys. The second regression model analyzes data from the 1980, 1990, and 2000 Census to examine how inequality in this earlier period is related to spending on housing. Because mortgage data are unavailable in earlier periods, I simply investigate whether the effect of inequality changes.

[Table 4 about here]

These results show that the effect of inequality indeed changes across the two time periods. In the three decades prior to the dramatic increase in mortgage lending and relaxation of terms for

lenders, inequality was positively related to spending on housing. However, in the period from 2000 to 2010 – the time during which the housing bubble in prices expanded most rapidly – inequality was associated with lower spending. Thus, the finding that inequality is negatively associated with spending in recent years is robust to the alternative specification relying on metropolitan areas and is not an artifact of a county-level analysis.

Discussion

These results thus examine some of the determinants of variation across contexts in the amount that households spent on housing. As expected, credit availability was strongly positively related to spending, and appears to be even more positively related in the later portion of the 2000s than earlier. Links between inequality and spending, on the other hand, are much more complex. In recent years, inequality on average was associated with negative spending, though higher levels of inequality meant a sharper trade-off between commuting time and spending on housing for the low-income, suggesting that some types of spill-overs occurred even though prices were lower on average. In addition, while spending was lower on average in recent years, in earlier decades, increases in inequality were related to increases in spending on housing.

While this manuscript is not equipped to offer an explanation of what changed in the housing market, I offer several possible explanations here. First, my results suggest the strong importance of the availability of credit for understanding spending on housing. To the extent, however, that banks expanded credit nearly universally, this could have overwhelmed any existing links between income inequality and spending. Thus, if credit availability is no longer strongly tied to income, then one's position in the income distribution becomes much less relevant for understanding spending on housing, and there is little reason to assume that more spending at any given point in the income distribution will cascade downward. A related point is that the 1990s and 2000s saw a prolonged boom in the construction of new homes. Figure 2 shows the number of new homes built over time. With so many new homes built each year, the exclusivity of homes may have weakened substantially, leading to lower competition for new homes.

Another major difference between the 2000s and the 1980s and 1990s was that this later period saw higher levels of inequality. Even if expenditure cascades generally hold, at some point

inequality may grow to such an extent that there is no possibility for incomes to cascade downward through the income distribution. In an extreme example, if we consider the case where we introduce one household which earns ten times as much as the next household in the income distribution but hold all other incomes constant (and at a low level), there is little reason to expect a great shift in consumption behaviors across the income distribution. For expenditure cascades to work in the presence of higher top incomes, it seems there must be some households which serve to bridge the gap through proximity in income to both higher and lower earning households.

Similarly, while top incomes have increased, another reason for increasing inequality, particularly in the post-Recession period, is declining bottom incomes and increasing unemployment. These sources of increasing inequality should lead to less price competition (to the extent that there is any competition in the housing market) and may also lead households to avoid spending on housing entirely. To the extent that lower-income households are unable to obtain credit in the wake of the recession and they have lower absolute or relative incomes, they may be forced to (or choose to) rent rather than purchase a home. Doing so will mean that they will not be present in the sample I examine.

One final possibility could be due to the peculiar nature of the time period I examine. If the price increases caused by inequality were merely temporary, then any increases in the period before the recession might be matched by substantial declines after the recession in more unequal areas. This could occur if price increases due to inequality fueled more speculative purchases or purchases which households would otherwise be unable to avoid. A more detailed test focusing on the period in the 2000s could help examine this potential effect.

Conclusion

With the rise of income inequality, one of the most important questions has been what effects – if any – increases in income inequality have, beyond simply shifts in income across the income distribution (cf. Jencks 2002; Neckerman and Torche 2007; Kenworthy 2013). While inequality is associated with a range of negative outcomes in cross-sectional research, a number of scholars agree that a more thorough investigation requires examining how *changes* in inequality are linked to

changes in important outcomes. Scholars have suggested a wide range of phenomena which may be influenced by inequality, but in this article I turn my attention to spending on housing.

Housing is important as an area of study on its own. First, American spending on housing has been implicated in the recent financial crisis. Second, housing spending comprises the single largest share of expenditures for American households. Overcommitment to housing has been linked to bankruptcy, as individuals are often unable or unwilling to sell houses in the case of job loss (Sullivan, Warren, and Westbrook 2000).[9] Finally, housing is linked to a variety of what are essentially positional characteristics: access to good schools, a particular view, residence in crime-free neighborhoods, or simply location adjacent to other desirable city features. Thus, understanding why individuals spend more or less on housing has the possibility to shed light on a range of other important outcomes.

Robert Frank (1999, 2007) has most prominently argued that rising income inequality has shifted American consumption through what he refers to as a process of expenditure cascades which are driven by competitive consumption. Only one published article to date addressed this thesis, using a limited sample of American cities, only in the period after the Great Recession, but this research finds support for a link between inequality and spending on housing (Lundy and Charles 2013).[10]

Yet in this research I find that in the period from 2000 to 2011, higher inequality areas do not show growth in housing, suggesting that the role of inequality in generating the financial crisis did not operate through spending on housing. However, for the longer run period of the 1980s to 2000s, I did find a positive effect of inequality on spending on housing. Clearly, better untangling these dynamics is important for understanding when and how inequality has influenced housing prices and spending and whether it is likely to do so in the future.

This research also highlights the tremendous importance of financialization. Scholars of financialization have investigated a diverse range of topics. Some research highlights the process of financialization as it occurs through the increase in firm profits associated with financial activities,

[9] In the housing crisis, overcommitment to housing was linked to bankruptcy as the prices of housing declined, leaving individuals with a greater financial responsibility than the house was worth. Yet even before the creation and bursting of a price bubble, housing was linked to bankruptcy.

[10] However, some recent working papers take up similar questions as addressed in this paper and also find little evidence that inequality produces expenditure cascades (Bordo and Meissner 2012, Coibon et al. 2014).

particularly consumer lending, and the relationship between the increasing importance of finance and firm profits (Krippner 2005, 2011; Tomaskovic-Devey and Lin 2011). Firms interested in expanding profits securitized mortgages and bought and sold these securities, and the securitization of mortgages was associated with the expansion of credit, particularly in the sub-prime mortgage market (Mian and Sufi 2009). The net effect of this increase plays out in local markets by increasing spending on housing.

Finally, incentives and the structure of financial markets likely also play a role. Policies of the Federal Housing Administration (FHA) and the Internal Revenue Service (IRS) both reward homeownership. Home mortgage interest is tax deductible, and capital gains from the sales of homes are tax exempt. This set of policies encourages purchases of more expensive homes, as those with the highest valued homes benefit most (Garriga, Gavin, and Schlagenhauf 2006). Thus, the particular institutional arrangement in the United States may also influence spending and be important for understanding general patterns.

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Table 1: Means for Variables

Variable	Mean	SD	Min	Max
Annual mortgage spending	18486	12733	0	202300
Household income (in 1000s)	113.89	95.21	0	2571.39
Minutes to work	26.01	24.04	0	200
# of rooms in house	6.66	1.93	1	28
Gini	.42	.04	.31	0.60
Population density (per square mile)	2024	5028	6	70172
# of mortgages per housing unit	.11	.05	.008	0.396
Race=black	.09	.28	0	1
Race=asian	.06	.23	0	1
Race=other	.05	.22	0	1
Married	.70	.46	0	1
High school graduate	.27	.45	0	1
Some college	.25	.43	0	1
College	.45	.50	0	1
Age	45	10	18	65

n=2697396

Table 2: County averages over time

Year	Gini	Mortgage originations per housing unit	Mortgages granted per application	Housing spending
2000	.418	.099	.546	17131
2005	.422	.155	.541	18273
2006	.421	.163	.524	19321
2007	.425	.143	.515	20190
2008	.425	.102	.489	20008
2009	.426	.066	.499	19863
2010	.429	.085	.591	19135
2011	.436	.064	.603	18171

Notes: Mortgage origination figures refer to the previous year, as I lag these by 1 year in analysis. Figures calculated from sample matched to individuals. Values represent the context representative for the population of individuals rather than, for example, the average metropolitan area or the average for all mortgage applications. Exceptions include figures displayed for mortgages from 2001 to 2004 mortgage figures, which are representative of the population of counties.

Table 3: Key county-level variables and interactions

	Model 1 Multi-level model	Model 2 OLS	Model 3 Share of income spent	Model 4 Incomes less than $50,000	Model 5 Mortgage supply change	
Household income	41.4	49.5	-0.07	-17.3	11.2	٦
Minutes to Work	-1.2	12.8	-0.02	51.7	-1.2	
Income inequality (gini)	-21775.2	17009.0	-4.97	-15703.6	-22339.7	
Population density	0.3	0.2	0.00	0.4	0.3	
Mortgage supply	11361.6	24526.4	7.38	8276.2	6426.5	
Year	255.5	210.7	-0.21	169.5	202.7	
Gini x Minutes to Work				-121.1		
Mortgage supply x income					-9935.8	
Income x year					0.0	٦
Mortgage supply x income x year					5.0	
Intercept	-506397	-435869	445.91	-333658	-399812	

Note: all models include demographic controls. Full coefficients listed in Appendix 1. All regression coefficients are significant, except when noted as٦, when p-values are greater than .05.

Table 4: Regressions for changes over time

Years: 2000-2010	Beta
Gini coefficient	-36947
Sample (reference is 2008-10 ACS)	
2000 Census	2164.5
2005-7 ACS	-899.8
Household income	0.058
Married	2080.9
Male	649.1
Number of children	467.5
Age	392.4
Age squared	-4.704
Education (reference is no high school)	
High school	1103
Some college	2266
College	5775
Hispanic	-1012
Race (reference is white)	
Black	-970
Asian	667
Other	-587
Metropolitan average income	0.11
Population change from previous period	-0.23
Population density	-0.07
Rate of paid off mortgages	4767
Intercept	10886

Years: 1980-2000	Beta
Gini coefficient	22508
Sample (reference is 2000 Census)	
1980 Census	-2134.6
1990 Census	440.6
Household income	0.050
Married	1022.6
Male	420.3
Number of children	138.1
Age	148.7
Age squared	-2.631
Education (reference is no high school)	
High school	357.4
Some college	1139.1
College	2717.8
Hispanic	-685.3
Race (reference is white)	
Black	-810.5
Asian	715.7
Other	-521.8
Metropolitan average income	0.28
Population change from previous period	0.83
Population density	1.25
Rate of paid off mortgages	-11720
Intercept	-18654

Notes: all regression coefficients significant at $p<.05$.

Figure 1: Predicted values, spending by credit supply

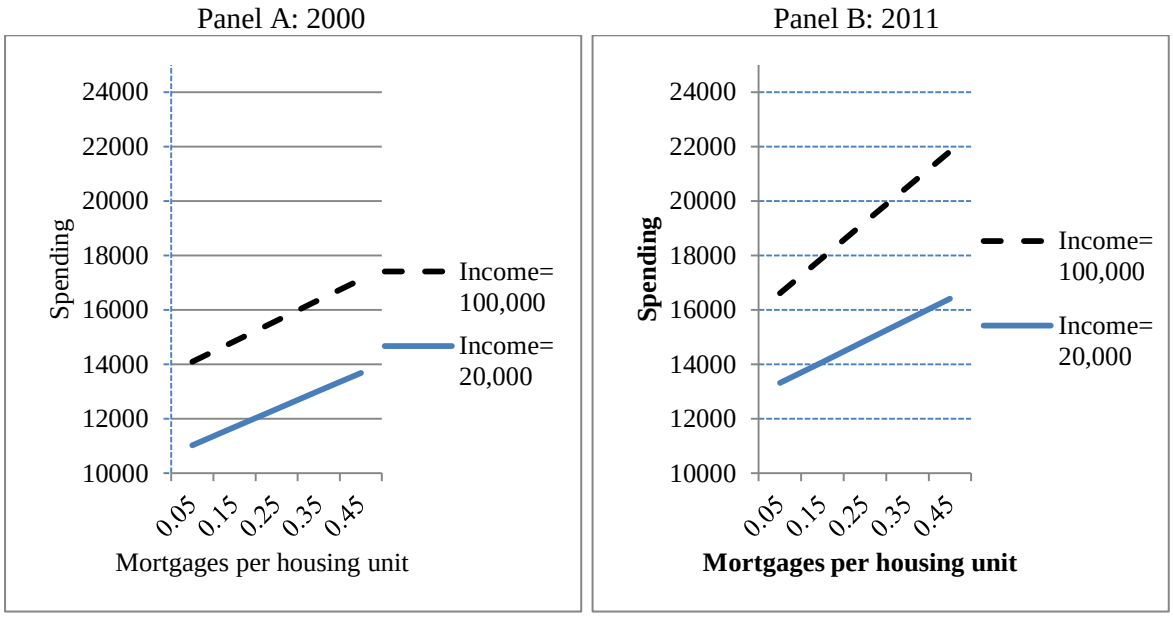

Figure 2: New homes built by year (in 1000s)

Notes: Data from United States New Residential Construction – Completed Series.

Appendix 1: Full regression models from Table

	Model 1 Multi-level model	Model 2 OLS	Model 3 Share of income spent	Model 4 Incomes less than $50,000	Model 5 Mortgage supply change
Household income	41.4	49.5	-0.07	-17.3	11.2 ϡ
Minutes to Work	-1.2	12.8	-0.02	51.7	-1.2
# of rooms in house	1317.6	1104.7	1.01	1162.4	1312.8
Income inequality (gini)	-21775.2	-17009.0	-4.97	-15703.6	-22339.7
Population density	0.3	0.2	0.00	0.4	0.3
Mortgage supply	11361.6	24526.4	7.38	8276.2	6426.5
Race (reference is white)					
Black	-566.0	-916.2	0.38	-668.5	-577.5
Asian	1389.0	4621.0	2.13	908.3	1379.1
Other	-29.5 ϡ	1987.1	1.47	-22.8 ϡ	-26.8 ϡ
Married	930.7	826.6	-2.44	1613.4	923.1
Education (reference is no high school)					
High school	487.1	202.0	-2.08	690.5	490.4
Some college	1081.6	1184.8	-2.37	1301.3	1091.7
College	2593.4	2876.1	-2.25	2946.5	2598.1
Age	265.6	377.6	-0.02	218.0	265.2
Age squared	-4.1	-4.9	0.00	-3.0	-4.0
Sex=male	-687.1	-501.4	-0.18	-558.5	-692.0
Year	255.5	210.7	-0.21	169.5	202.7
Gini * Minutes to Work				-121.1	
Mortgage supply * income					-9935.8
Income * year					0.0 ϡ
Mortgage supply * income * year					5.0
Intercept	-506397	-435869	445.91	-333658	-399812
R-sq: within	.259		0.248	0.1131	0.26
between = 0.4600			0.146	0.1443	0.4559
		R-squared =.294			
overall = 0.2713			0.202	0.1104	0.271