

# Collateral Damage: House Prices and Consumption During the Great Recession

Did a decline in house prices cause the Great Recession? And if so, how? Credit constraints may be the key to answering those questions.

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BY RONEL ELUL

The U.S. economy experienced a severe financial crisis together with a housing bust in 2007-2008. The subsequent recession significantly affected the economy, which saw the deepest declines in consumption, investment, and employment since the Great Depression.

Can we pin the blame for this recession, and in particular the decline in household consumption, on the collapse in house prices? If we can understand whether—and how—a collapse in house prices triggers a decline in consumption, thus precipitating a recession, we can better formulate policies to prevent and mitigate future crises.

We focus on this link between housing and consumption because of housing's prominent role in the run-up to the Great Recession; because consumption represents by far the largest component of GDP, and the one that impacts the well-being of U.S. households most directly; and because housing itself makes up a large share of U.S. households' net worth.

In contrast to influential studies suggesting that a decline in house prices leads households to reduce their consumption because they feel poorer, we find that these wealth effects are modest. Instead, we identify an important role for the effect that house price declines have on making credit constraints more severe. In particular, we identify a novel channel of influence: Financially vulnerable households reduce their consumption because the decline in house prices leads to missed payments—which, in turn, reduce their access to credit. We call this the credit score channel.

## Precrisis Studies

There appears to be a strong empirical link between house prices and consumption, particularly in the period following the Great Recession (Figure 1).

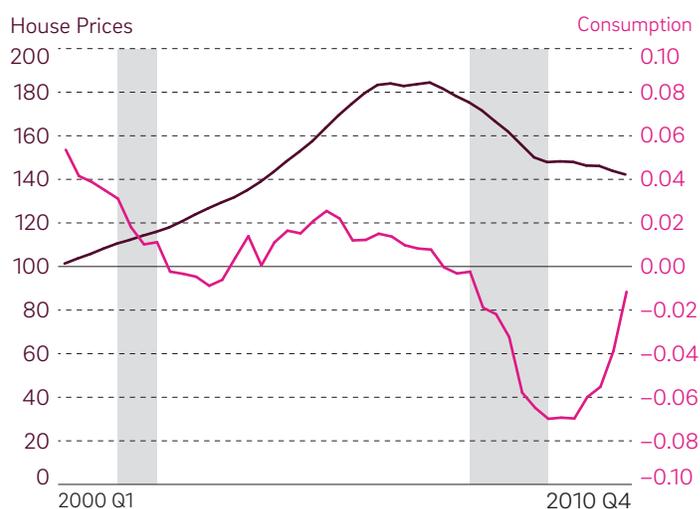
However, it is not obvious that changes in house prices should have a large effect on consumption. According to Milton Friedman's permanent-income hypothesis (1957), only changes

in wealth that households perceive as permanent should lead to large changes in household consumption. If households perceive a drop in house prices as temporary, it should not affect consumption. In addition, while housing—as an asset—is an important source of wealth, it is also consumed. That is, while a decrease in house prices may make some households poorer, it may also make housing more affordable (directly for home purchases but also indirectly through its effect on rents). More than one-third of U.S. households are renters, and renters are often financially vulnerable, young, or credit constrained. Any benefit they receive from declining house prices may be significant.

**FIGURE 1**  
**House Prices and Consumption**

During the Great Recession, there appears to be a strong empirical link between house prices and consumption.

House prices: 2000–2010, January 2000=100, not seasonally adjusted;  
Consumption: 2000–2010, personal consumption expenditures, Hamilton filter



Source: Case-Shiller National Home Price Index and U.S. Bureau of Economic Analysis.

Although the housing bust and Great Recession inspired economists to better understand the channels linking house prices and consumption, economists have actually been studying these channels for many years. In one of the first papers to identify a quantitative impact of changes in housing wealth on consumption, Bhatia (1987) used a time series of changes in housing wealth at the national level to explain changes in aggregate consumption. There are some limitations, however, to using aggregate data: Changes in housing wealth are correlated with other macroeconomic factors that might affect consumption; it is difficult to identify the channels through which such a link might occur; and different groups of consumers (for example, renters versus homeowners) might be impacted differently.

Later studies used disaggregated data and found differing effects. In one interesting study using microlevel data from the UK, Campbell and Cocco (2007) found substantial heterogeneity—for example, house price changes had a big effect on consumption among older homeowners, while those same changes had essentially no impact on young renters. They also showed that some of the measured impact of house prices on consumption may be due to the correlation between the health of the aggregate economy and house prices, rather than through the house prices themselves.

During the Great Recession, house prices experienced a large sustained drop, something that until then had been rare in most countries. In addition, the coincidence of the housing market collapse and the onset of the recession suggested an important connection between the two. Finally, the severity of the recession itself highlighted the importance of understanding its determinants.

## Consumption During the Great Recession

In an influential study, Mian et al. (2013) articulate the connection between a drop in house prices and a decline in consumption in the context of the Great Recession. They show that zip codes in which the value of housing dropped the most between 2006 and 2009 are also those in which consumption fell the most.

Actually, they use a proxy for consumption, auto sales. They also show that the impact of falling house prices was stronger when households in the zip code had higher loan-to-value ratios, i.e., when households borrowed a greater share of their housing value.

See *Auto Sales as a Proxy for Consumption.* →

Mian et al. suggest several channels through which this link might operate. First, there's a wealth effect, in which declines in house prices make households poorer. If households are able to borrow freely, however, they should be better able to weather such wealth shocks, particularly if the shocks are temporary. But housing has also traditionally served as collateral for borrowing (for example, via home equity loans). For households that had already borrowed more against their house, this decline may aggravate credit constraints, making it more difficult or expensive for a household to borrow. In addition, the reduction in household consumption may also affect the local economy: If employers hire fewer workers, this aggravates the drop in consumption.<sup>1</sup> Finally, the health of the financial sector may also

drive consumption: If banks suffer losses on their residential loans, they may cut back on making auto loans or on other types of consumer lending.<sup>2</sup>

Mian et al.'s analysis hasn't gone unchallenged. Dupor et al. (2018) use county-level data to challenge their claim that declines in house prices were responsible for the dramatic decline in auto sales during the Great Recession. Dupor et al. argue that most of the decline in auto sales occurred at the national level and was relatively unaffected by local changes in house prices. They show that the decline in auto purchases can instead be explained in large part by households becoming more pessimistic about their future income prospects. They support this conclusion with a calibrated theoretical model. Individual-level data, as discussed below, can help clarify the extent to which house prices affect consumption, as well as identify those households that are most impacted, and the channels through which this occurs.

A reader of Mian et al.'s analysis might ask several questions. How important are these various channels? Can we quantify their contributions to the severity of the Great Recession? How exactly do they work? And who is most affected by them?

One way to answer these questions is by building a theoretical model that incorporates one or more of these channels and use available data to fit the parameters of the model. Berger et al. (2018) develop a model in which house price declines impact consumption by tightening credit constraints. In contrast, Kaplan et al. (forthcoming) construct a model that incorporates both wealth effects and credit constraints. They show that a decline in house prices does indeed contribute to a large decline in consumption, with the wealth effect playing the largest role (particularly for older households that expect to downsize in the near future). According to their model, credit constraints are relatively unimportant.

## Measuring the Links: Individual-Level Data

Without individual-level data or a model, it's difficult to disentangle these different channels. For example, credit-constrained households might be hard hit by declining house prices, but they

### Auto Sales as a Proxy for Consumption

Although auto sales make up only about 10 percent of consumption, they have been widely studied because they account for a large share of the decline in consumption during recessions (and, conversely, the increase in recoveries). In addition, Aruoba, Kalemli-Özcan, and I use auto loan originations as a proxy for auto sales in our paper. Doing so allows us to use our credit bureau data to estimate the change in consumption for every consumer in our data set and relate that data to other information we have about them. It is true that some auto purchases are purely cash-financed, which our measure of auto loans would miss. But Johnson et al. (2014) have shown that the share of auto purchases purely financed with cash varies little over a business cycle, and so this does not have a significant impact on our analysis.

may just as well be less likely to own their homes. We have already discussed several papers that develop models to distinguish these; the approach that I take in my paper with Aruoba and Kalemli-Özcan is to use individual-level data.

In our paper we use anonymized credit bureau data linked with more detailed information on mortgages.<sup>3</sup> Credit bureau data typically do not contain very detailed information on loan terms or consumer assets, but our data set links detailed information on the consumer’s mortgages to their credit bureau record. This allows us, for example, to link the homeowner’s loan-to-value ratio to the homeowner’s other obligations. Our data set also contains a credit risk score, a summary measure of the consumer’s risk of default similar to those used by many lenders when considering whether to extend credit, and the terms at which to do so.

To quantify the contribution of each channel, we compute the change in the relationship between house prices and our measure of consumption each time we add an explanatory variable associated with each channel. We begin by showing that, on average, a homeowner who experienced the average decline in house prices over the housing bust (roughly 20 percent) would have seen their likelihood of taking out an auto loan decline by roughly 10 percent.

We then add county unemployment rates, which are a measure of the impact of the recession on the local economy. We find that a homeowner whose county experienced the average increase in unemployment over this period would have seen their likelihood of taking out an auto loan decline by roughly 5 percent.<sup>4</sup> In addition, adding unemployment reduces the direct impact of house prices by approximately one-sixth, demonstrating that some of the effect of house price declines occurs through local labor markets.

Next, we add a measure of the health of the banking system in the county in which the homeowner is located. This also has significant explanatory power for declines in auto loan originations, and, furthermore, adding this variable reduces the direct effect of house prices by another sixth, to approximately two-thirds of the effect’s original value.

To what can we attribute the remaining

impact of house prices on auto loan originations? The two channels that remain are wealth effects and household credit constraints. But it is tricky to distinguish why a household whose house has declined in value has reduced its consumption. Is it because the household feels less wealthy, or because it can’t borrow as much?

To disentangle these two effects, we use what we know about the characteristics of individuals in our data set. Individuals with good credit scores and plenty of home equity are unlikely to be constrained, even when house prices drop. Thus, the channel through which house prices affect them is a wealth effect. We find that these individuals are essentially unaffected by house price declines: Although they may become poorer, they can still borrow, so their consumption doesn’t change much. We can conclude that the pure wealth effect is likely relatively modest.

In contrast, we show that for individuals with poor credit or large mortgages relative to the value of their house, the effect of house price declines is large. This reflects credit constraints: They are unable to

borrow as readily or as cheaply as they would have been able to, had the value of their house not dropped.

What is it about house prices that affects the ability of households to borrow? One possibility is that individuals borrow against their house in order to finance vehicle purchases, either directly or indirectly. For example, they may undertake a cash-out refinancing of their home or take out a home equity loan, to either buy a car outright or make a down payment on a new car. But others, such as McCully et al. (2019), have argued that this is not a large effect (and our analysis generally confirms this). We show that a new—hitherto unexplored—mechanism may be at work: a “credit score channel” (Figure 2).

We show that house price declines lead households—particularly less creditworthy ones and those with high loan-to-value ratios—to fall behind in their mortgage payments. One reason for this is that homeowners with little—or, even more so, negative—equity have less incentive to continue making their mortgage payments.<sup>5</sup> This in turn hurts their creditworthiness

FIGURE 2

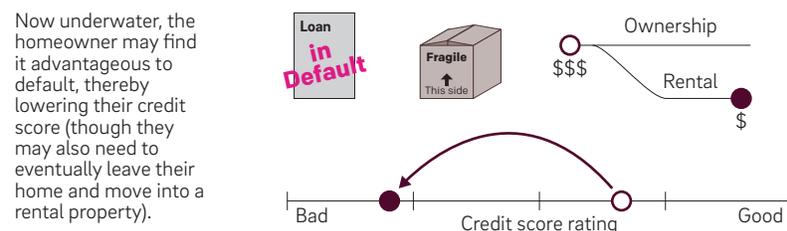
### The Credit Score Channel

Thanks to its effect on credit scores, a decline in home values can lead to a decline in auto sales.

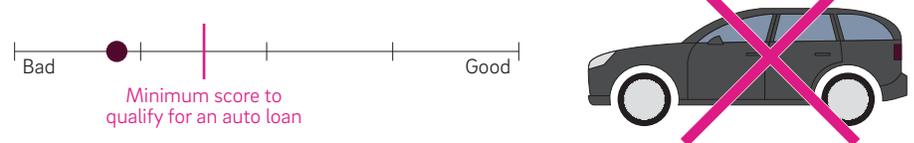
#### 1 High loan-to-value homes can lead to...



#### 2 Falling credit scores if homeowners default and...



#### 3 That can make auto loans harder to obtain.



and makes it difficult to qualify for auto loans. Adding this new channel helps reduce the direct effect of house prices by one-quarter, to less than half its original value (Figure 3).

We also explore the link between house price declines, refinancing, and consumption. We do find that house prices affect refinancing options: Homeowners with high loan-to-value ratios are especially hard hit when house prices fall. They are much less likely to refinance if house prices fall, and particularly less likely to undertake a cash-out refinancing. This is most likely because they now find it difficult to qualify for a refinancing and certainly do not have enough equity for a cash-out refinancing. However, we find that the effect of house prices, through refinancing, and then onto auto purchases, is relatively modest, reducing the remaining effect of house prices by 6 percent.<sup>6</sup>

Other recent work also takes a more micro perspective to examine the connection between house prices and consumption. Aladangady (2017) uses data from 1986–2008 (prior to the financial crisis) and finds that consumption responds strongly to house prices.<sup>7</sup> He also finds substantial heterogeneity, much as we do. Three groups respond more than others: homeowners overall, who respond more than renters; homeowners with higher loan-to-value ratios; and households that are likely to be credit constrained along a number of dimensions. However (and unlike us) he finds an important role for cash-out refinancing. There are several important differences between his work and ours. First, he does not decompose the relative weight of each channel toward the total effect of house prices. In addition, he has much less detailed

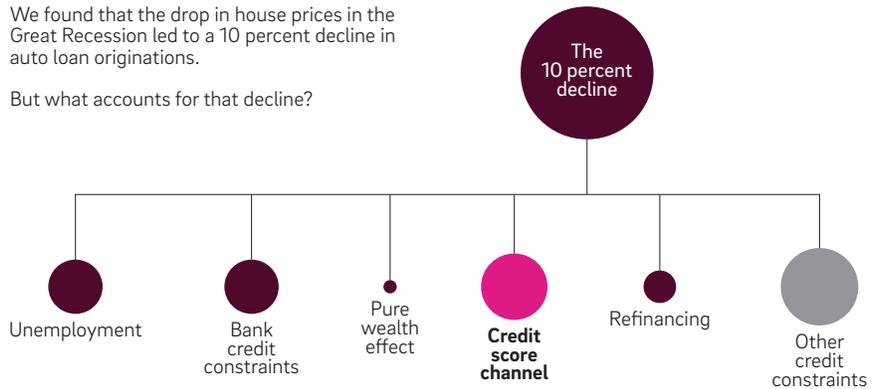
FIGURE 3

### Falling Credit Scores Can Affect Consumption

The credit score channel is one of the biggest contributors to the 10 percent drop in consumption that results from house price declines.

We found that the drop in house prices in the Great Recession led to a 10 percent decline in auto loan originations.

But what accounts for that decline?



Source: Aruoba et al. (2019); some details from unpublished revision.

information on household creditworthiness, which does not allow him to break down the overall effect of credit constraints as richly as we do. Finally, given the span of his data, he is not able to weigh in directly on how house price declines affected the decline in consumption during the Great Recession. (This may also explain why he finds a significant effect for refinancing, as the period he considers was one of rising house prices.)

### Conclusion

The decline in house prices made a substantial contribution to the severity of the Great Recession. The literature has outlined several channels through which this may have occurred. Our own work confirms this contribution and also allows us to quantify the importance of these channels. The most important channels are through household credit constraints,

banks' supply of credit to households, and the impact (direct or indirect) of house prices on the local economy. In contrast, there is little direct wealth effect. We also shed light on which individuals see their creditworthiness most severely impacted.

There are at least two policy implications of this work. First, consumers are particularly vulnerable when house prices decline. And second, two important channels through which this effect occurs may be mitigated through public policy: the health of the banking sector (which lends to consumers to allow them to weather these shocks) and mortgage defaults (which reduce future creditworthiness). By ensuring that the banking sector is appropriately capitalized, and through policies to mitigate the risk of mortgage default, we can help protect consumers and the economy as a whole. ■

## Notes

**1** The decline in house prices may also affect the local economy by making it harder for small entrepreneurs to start new businesses. This link has been explored by Adelino et al. (2015), who show that an increase in house prices during the boom helped small businesses start up (for example, through their owners borrowing against the rise in the value of their own home).

**2** Gilchrist et al. (2018) write that the causation may run in the other direction. They argue that a shock to the health of banks that operate in a particular area may have a negative impact on mortgage credit in that region. A decline in available mortgage credit may then affect the local economy in many different ways, including declines in house prices, retail sales, and employment.

**3** Credit bureaus are private-sector firms that collect data on individuals' credit obligations and provide that information to current and prospective lenders. Recently, researchers have also used this data, in anonymized form. In our paper we use a match between Equifax Credit Risk Insight Servicing (credit bureau) and Black Knight McDash (mortgage) data. The credit score we use is the Equifax Risk Score. Please see our paper for further details.

**4** A high local unemployment rate could reduce the likelihood of taking out an auto loan for two reasons: The high rate implies that the particular homeowners we consider in our sample are more likely to themselves be unemployed (and thus unable to purchase a car), and they may perceive that they are at a higher risk of being laid off in the future and thus scale back their consumption.

**5** See Elul et al. (2010) for a study of the interaction between the influence of negative equity and liquidity constraints on mortgage default.

**6** The effect is concentrated in those homeowners with high LTV, whose ability to refinance might indeed be expected to be the most affected by house price declines.

**7** One attractive feature of his paper is that Aladangady uses census data, which has a much broader measure of consumption. His approach also allows him to better separate the direct effect of housing from the effects observed in the data simply because economic declines cause house price declines.

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