How Mortgage Debt is Holding Back the Recovery

Mike Konczal | The Roosevelt Institute

Last Updated: June 28, 2012

Key Findings

• Several years into this recession, the overall amount of underwater mortgage debt is still very high. Recent estimates show that a third of all houses with a mortgage owe more than the home is worth, and the total amount of underwater mortgage debt could come to $1.2 trillion.

• The most recent empirical evidence, from academic quarters to the IMF, shows that underwater mortgage debt is creating a drag on the economic recovery. The recovery is weaker in places where mortgage debt is the highest, as more mortgage debt results in lower consumption and higher unemployment.

• Other explanations of the relationship between the housing crash and the weak economy, such as structural unemployment created by the house bubble, contain serious weaknesses.

• Debt writedowns, foreclosure mitigation, and other housing sector specific policies are a crucial tools in dealing with this "balance-sheet recession" and getting the economy started again.

• Foreclosures exacerbate these problems by creating vicious cycles of destructive economic activity. Some estimate that foreclosures have caused an additional 25 percent of the decline in economic activity.

• The market is not likely to sort this out by itself. There are numerous conflicts within the system of servicers that manage mortgage debt that incentivize saddling consumers with greater burdens.

MICHAEL KONCZAL is a fellow with the Roosevelt Institute, where he works on financial reform, unemployment, inequality and a progressive vision of the economy. His blog, Rortybomb, was named one of the 25 Best Financial Blogs by *Time Magazine*. His work has appeared at *The American Prospect*, Slate, *Boston Review*, *Washington Monthly*, *Dissent*, the *Financial Times*, and *The Nation*.

To contact the author, call 212.444.9140 or email mkonczal@rooseveltinstitute.org.

Background

The United States experienced a major housing bubble over the past 10 years. From 2006 to 2009, housing prices dropped 28 percent across the United States.[1] This has led to a widespread collapse in the value of assets for U.S. households. Estimates of the number of households that owe more on their mortgages than their houses are worth range from 23 percent to 31 percent, while the total amount of underwater mortgage debt ranges from $715 billion to $1.2 trillion.[2]

Unemployment has stayed stubbornly high in the aftermath of a recession that started in December 2007 and officially ended in March 2009. Peaking at 10 percent in October 2009, unemployment still remains above 8 percent. There are still more than 12.5 million unemployed people in the United States, up significantly from the 7 million who were unemployed before the recession. Unemployment has fallen much more slowly than originally projected, including projections by the Federal Reserve. The unemployment picture is even grimmer when it includes discouraged workers who have given up looking for work – some estimates show unemployment approaching 9.6 percent.[3]

The source of this slow growth and persistently high level of unemployment has been strongly debated among economists. Some believe it is the result of structural issues within the economy, the composition of the unemployed, or uncertainty resulting from the Obama administration's policies. Others believe it has to do with the nature of recessions that follow a financial crisis, citing historical relationships between the two.[4]

But a wave of research has recently found that unemployment and slow growth are connected to the aftermath of the housing bubble collapse as well as the deleveraging resulting from dealing with bad debts. This research, which is often referred to as a "balance-sheet recession" view of the economy, is quickly becoming very important in discussions over the bad economy. This paper seeks to summarize this latest research. As this research is forming opinions at the IMF and the White House, it is important to be familiar with how it views the economic slump.

Three Stories About The Relationship Between Mortgage Debt and Unemployment

Figure 1 shows the relationship between underwater homes and the unemployment rate. The underwater data is taken from CoreLogic, and the unemployment numbers are from the Bureau of Labor Statistics. This relationship remains consistent whether you look at the percent that are underwater or the percent that are deeply underwater. It also holds if you look at foreclosures versus unemployment, as foreclosures and deeply underwater homes are tightly linked. As we shall see, this relationship also holds more broadly. We see similar relationships between household debt and slow growth and high unemployment at the county level in the United States. We also see this relationship internationally.

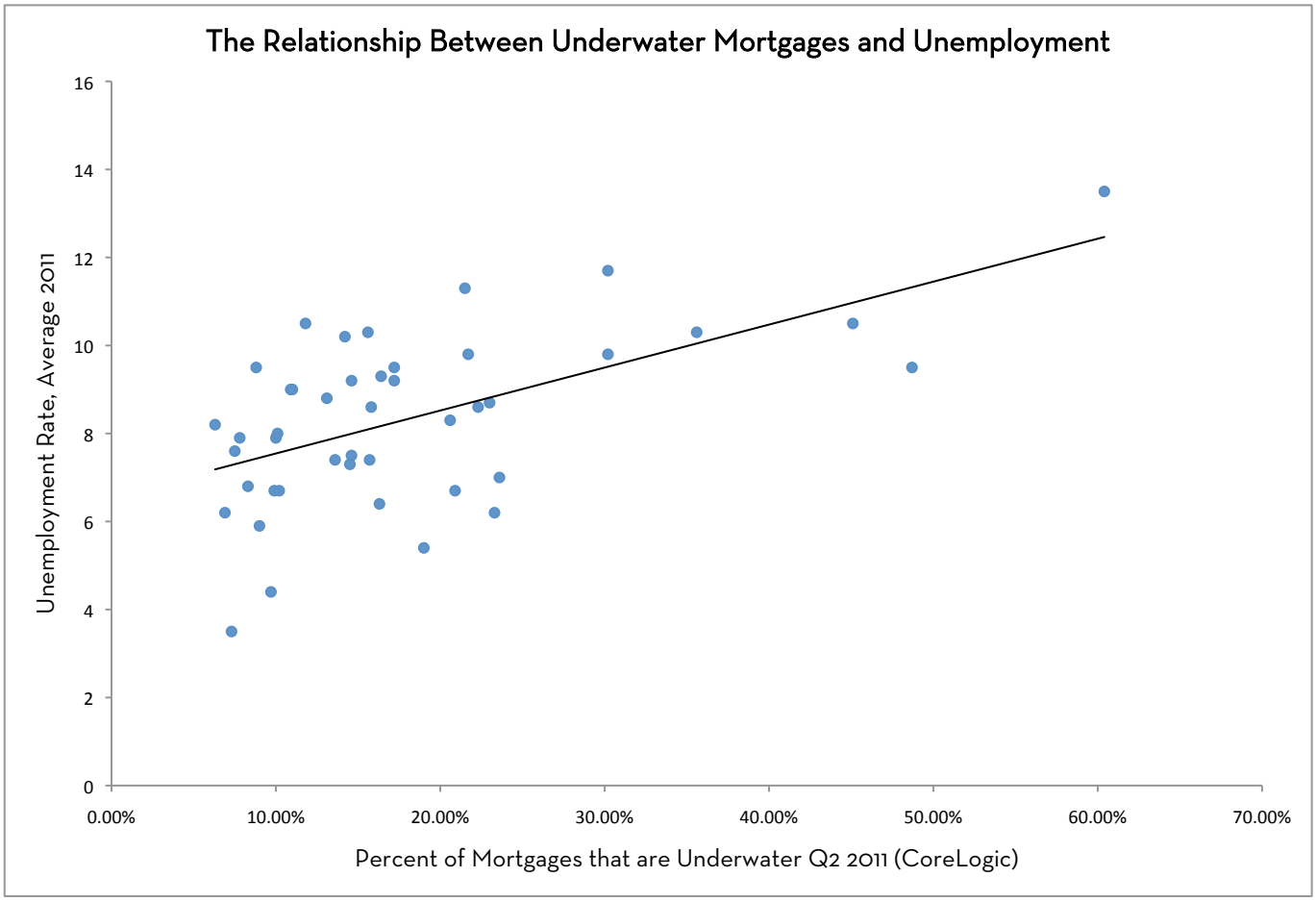
There are three theories that try to explain this relationship. The first two have to do with structural unemployment and with the wealth effects of a decline in housing values. The third theory is the balance-sheet recession argument. This argument holds that the debt overhang itself is driving the decline in demand, which generates high levels of unemployment. This is the theory that is supported by current research.

Structural Unemployment

The first theory that seeks to explain this relationship is that it is evidence of "structural unemployment." Usually economic writers are referring to one of two possible scenarios in this situation. In the first, the economy's ability to match workers and jobs has broken down. In particular, it usually refers to a situation in which the unemployed are incapable of working the available jobs. A range of issues can cause this, from a lack of geographic mobility to the unemployed lacking necessary skills. In the second, concerns about the government's impact on the economy, from deficits to tax and regulatory policy, is what is holding back the economy.

It does not appear that a lack of skills or other workforce related characteristics are keeping the unemployed from finding work. Unemployment is up across all categories of industry and occupation. Quit rates are low and wage gains sluggish, which shows that the labor market is not strong for those currently with jobs. Employers are not showing an increased intensity in searching to fill new jobs. A recent Federal Reserve Bank of Chicago research letter found "limited evidence of skills mismatch" in the United States' labor market.

Figure 1:



Crucially, there's little evidence that underwater mortgages are slowing moving and mobility rates - if anything there is some evidence that mobility might be higher in states with more underwater mortgages. Underwater mortgages are not slowing the labor market by keeping people from moving. Though there are no doubt some regions and some people who are affected by this phenomenon, we do not see a large enough increase in vacant job openings to justify this as an argument overall.[5]

Negative Wealth Effect

There's a second theory that attributes the above graph to a "wealth effect." In this theory, as housing prices rose, people spent more because they felt wealthier. When housing values collapsed, people felt poorer, so they spent less. But the latest Economic Report of the President argued that the "severity of losses experienced during the recession that began in December of 2007 in both national output and in labor markets makes these [wealth effect] estimates appear too small." Households are spending significantly less than what is implied from the fall in value of housing.

Households are both the net seller and the net buyer of housing. So although some people who intend to sell their homes in the short-term will experience a decline in the wealth effect as a result of the housing crash, it is offset by other households, like renters, who now can purchase more housing than they could before. It isn't clear that this should have an impact across the country as a whole.[6]

Recent research which will be discussed in the next section, Mian and Sufi's "Household Balance Sheets, Consumption, and the Economic Slump," finds that the wealth effect would have to be significantly higher than any reasonable previous estimate to account for the decline in spending we've seen in this recession. The elasticities, or the quantified measure of the wealth effect, would have to be "on the order of 0.3 to 0.5 for non-durable goods and 0.5 to 0.7 for durable goods. Previous research suggests an elasticity of consumption with respect to housing wealth of 0.05 to 0.10."

They also find that households with fewer financial savings and assets had a much larger decrease in consumption, controlling for household prices. This means a decline in spending isn't just related to household values, but more largely to debt.

Balance Sheet Recession

There's a third theory that explains the relationship between the housing crisis, underwater mortgages, and mass unemployment. It is often referred to as a "balance-sheet recession."

Under this theory, households look to maintain a certain leverage ratio, or a certain ratio of debt to income. A household balance sheet, like any balance sheet, has two sides: assets and liabilities. As housing values increased, people borrowed against those increases. This means that liabilities also increased in the form of more mortgage debt.[7]

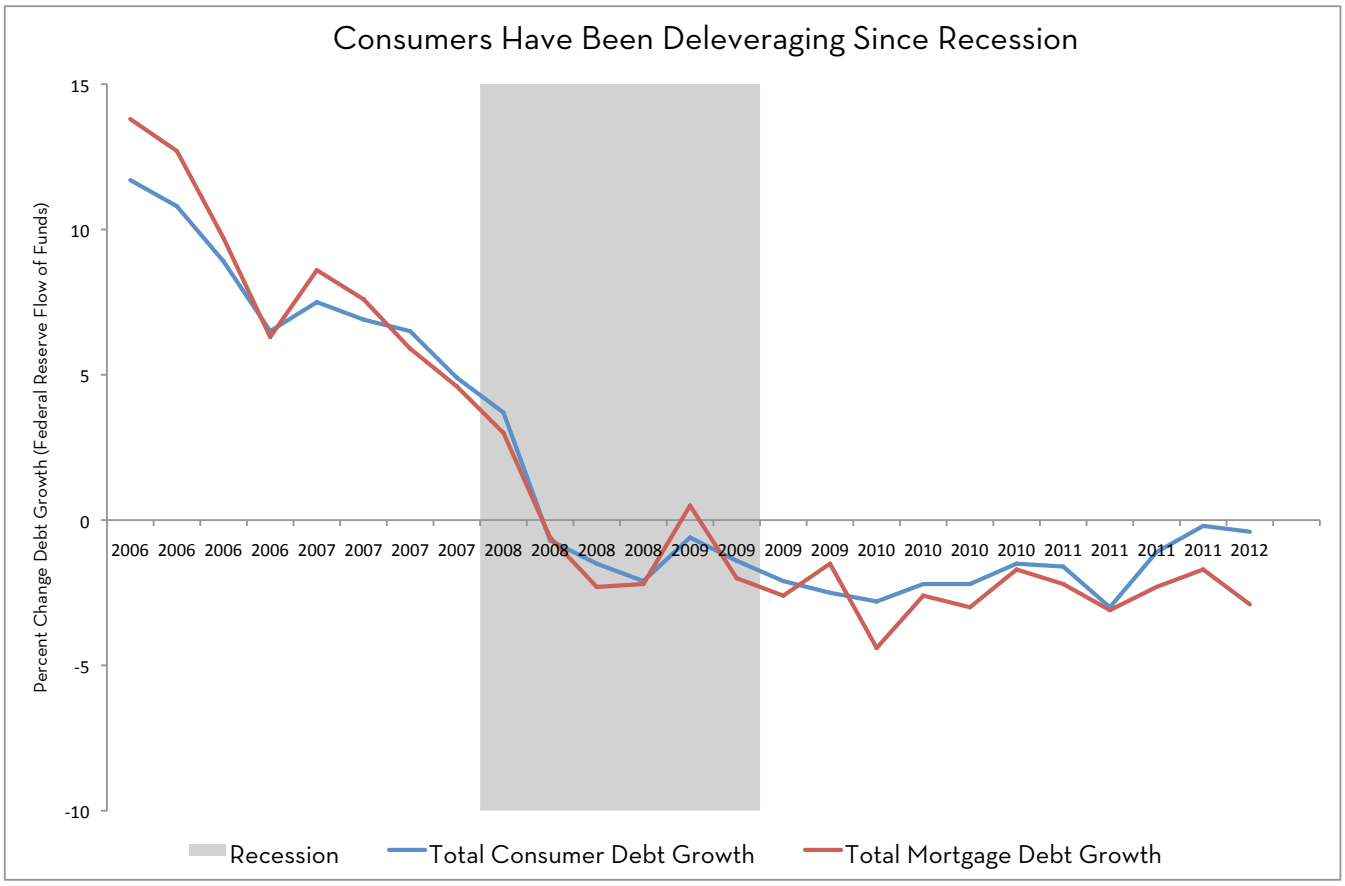
A balance-sheet recession requires three conditions: (i) sufficient inequality so that creditors and debtors are two distinct groups, (ii) a negative shock to the assets of the debtors so that debtors start to pay down debts quickly in the form of deleveraging , and (iii) the inability of creditors to make up the difference in consumption, an inability usually triggered by a "zero lower bounds" on monetary policy.

When it comes to condition (i), household debt doubled from $7 trillion to $14 trillion from 2001 to 2007. Meanwhile, debt-to-GDP went from 0.7 to 1.0 over the same period. This increase in debt was mostly related to the housing bubble. Holding income constant, research finds that the rise in debt was due to households borrowing against increased housing prices.[8]

Assets also increased during this time period. Housing values experienced double-digit yearly growth from 2003 to 2005, with a 15 percent national increase in 2005 alone. Thus the rise in mortgage debt was balanced by a rise in housing values. However, starting in 2006, housing values peaked and then began to crash. [9] For the purposes of condition (ii), this left household balance sheets distorted, with households carrying far more debt as a portion of their assets.

The balance-sheet recession theory argues that as consumers' balance sheets shift to having far more debt than assets as a result of the collapse in housing prices, they will cut back on consumption until their household balance sheets are "repaired." Precautionary savings will increase household savings even further, which can further hinder the potential output of the economy. A shock to the net worth of debtors, who previously had a high propensity to consume, can lead to a decline in economic activity. We can see this deleveraging by examining the Federal Reserve's Flow of Funds data, in Figure 2, which shows the quarterly percentage in growth of credit by sector. This is even more remarkable

Figure 2:



given that conventional monetary policy has made it as attractive to borrow as possible.

This decline will be matched by a decrease in consumption. The normal mechanism for responding to this decline in spending is a decrease in the interest rate. When kept low, it is normally able to balance out this effect and push those with savings to spend more, keeping the economy at full employment. However, in the theory mentioned above, a problem arises when interest rates hit the zero lower bound. Since rates can't go below zero, demand can't be maintained. As a result, unemployment will rise. This is the "paradox of thrift" popularized by John Maynard Keynes during the Great Depression.

Empirical Evidence: Four Studies

How does empirical evidence stack up against this theoretical evidence? If the balance-sheet theory is driving the problem, we should see a strong relationship between high leverage, low consumption, and unemployment. There are four main studies to examine, summarized in Figure 3, that walk through this argument.

Both the rise and the drop in housing prices were uneven across the country and across the population. As such, empirical research can look at these differences and examine the consequences for consumption, traded goods, and unemployment.

In the first study, "Household Balance Sheets, Consumption and the Economic Slump," Mian, Rao, and Sufi (2011) examine debt, default, and home equity limits at the zip code level that come from Equifax Predictive Services. This data is combined with individual-level data based on a random sample of 266,005 individuals. They also utilize consumption data from Mastercard Advisors, which allows them to see total debit or credit card consumer purchases that are processed by Mastercard, based on a 5 percent sample of all transactions.

This data allows the authors to examine the relationship between the relative drop in consumption in high-debt counties versus the relative drop in low-debt counties. When they compare households with the highest decile of leverage against those with the lowest decile, durable consumption dropped 20 percentage points more in high-debt households from 2007 to 2009 than in low-debt households.

How does this impact unemployment? Consumption can decline in one of two ways. There are goods referred to

Figure 3:

Title	Household Balance Sheets, Consumption, and the Economic Slump	What Explains High Unemployment? The Aggregate Demand Channel	Is A Household Debt Overhang Holding Back Consumption?	Dealing with Household Debt
Author	Atif Mian, University of California, Berkeley Kamalesh Rao, Mastercard Advisors Amir Sufi, University of Chicago Booth School of Business	Atif Mian, University of California, Berkeley Amir Sufi, University of Chicago Booth School of Business and NBER	Karen Dynan, Brookings Institution	IMF
Date	November, 2011	November, 2011	May, 2012	April, 2012
Data Sets	Equifax for county-level debt/defaults, Mastercard Advisors, for consumer consumption data	Equifax for county-level debt/defaults, Census and ACS for jobs by industry and wages	United States, Household Survey data (PSID), 2005-2011	24 OECD economics and Taiwan Province of China from 1980 to 2011
Conclusion	Moving from low to high leverage results in "18 to 28% drop in durable consumption and a 10 to 19% drop in non-durable consumption."	Reduced aggregate demand due to high leverage can account for 4 million of the 6.2 million jobs lost between 3/07 and 3/09	"Highly leveraged homeowners had larger declines in spending."	Housing busts with "larger household debt tend to be followed by more severe and longer-lasting declines in household consumption."
Notes	This study confirms a relationship between the balance-sheet effects and a drop in consumption.	This study confirms a relationship between the balance-sheet effects and a drop in employment and wages.	"U.S. households, on the whole, have made very limited progress in reducing leverage over the past few years."	This study confirms a balance-sheet effect internationally following housing busts, shows sluggish growth not driven by financial crisis.

as "non-tradable" goods, those that are produced and consumed locally. Some non-tradable goods include local restaurants and retail. Tradable goods are those that are traded around the country. This study finds that moving from the low to high (10th percentile to 90th percentile) part of the household leverage distribution results in "an 18 to 28% drop in durable consumption and a 10 to 19% drop in non-durable consumption." In other words, the more leverage a household has, the less it consumes products made both locally and nationally.

In the second study, "What Explains High Unemployment? The Aggregate Demand Channel," Mian and Sufi (2011a) use employment data by county and industry from County Business Patterns (CBP), published by the U.S. Census Bureau. The American Community Survey (ACS) supplements this with hourly

wage data. This is combined with Equifax data on consumer debt and credit.

In this paper, they find that one standard deviation in the 2006 debt-to-income ratio of a county corresponds to a three percentage point drop in non-tradable employment. This standard deviation is also associated with a one-fifth standard deviation reduction in wages. This means that counties with higher debt as a proportion of income experience higher unemployment and lower wages.

Mian and Sufi extrapolate this estimate to estimate the total effect of the decline in aggregate demand across all sectors. They find that reduced aggregate demand due to high leverage can account for 4 million of the 6.2 million jobs lost between March 2007 and March 2009. Here we see that, in addition to consumption, the housing debt hangover played a role in increased unemployment and reduced wages. These results are replicated from their IMF summary in Figure 4.

The third study is by Karen Dynan of the Brookings Institute from May 2012. Dynan uses household survey data from the Panel Study of Income Dynamics (PSID) ranging from 2005 to 2011. This allows her to examine household-level behavior in both borrowing and deleveraging. Household-level data gives us the ability to get past limitations in aggregate data or data aggregated by location. The PSID data has detailed mortgage data, as well as data from other debt sources.

Dynan finds that consumption in highly leveraged households fell by 15 percent, twice the median for other households. On top of this, leverage in 2007 was a good predictor of whether a household would have difficulty making its mortgage payment in 2009.

It is difficult to assume what the "normal" leverage ratio would be. Yet it is clear that households had not been able to significantly reduce their leverage ratios by 2011.

The fourth study, "Dealing with Household Debt" by the IMF team of Daniel Leigh, Deniz Igan, John Simon, and Petia Topalova, is from the April 2012 World Economic Outlook. They focus on a sample of 24 Organization for Economic Cooperation and Development (OECD) economies and Taiwan Province of China from 1980 to 2011.

They identify 99 housing busts based on drops in nominal housing prices. They took this sample and created two sub-groups, one with high housing debt and one with low housing debt. High housing debt is defined as an increase above the median for all of these housing busts.

Figure 4:

(Source: Mian, Atif, and Amir Sufi, 2011, "Consumers and the Economy, Part II: Household Debt and the Weak U.S. Recovery")

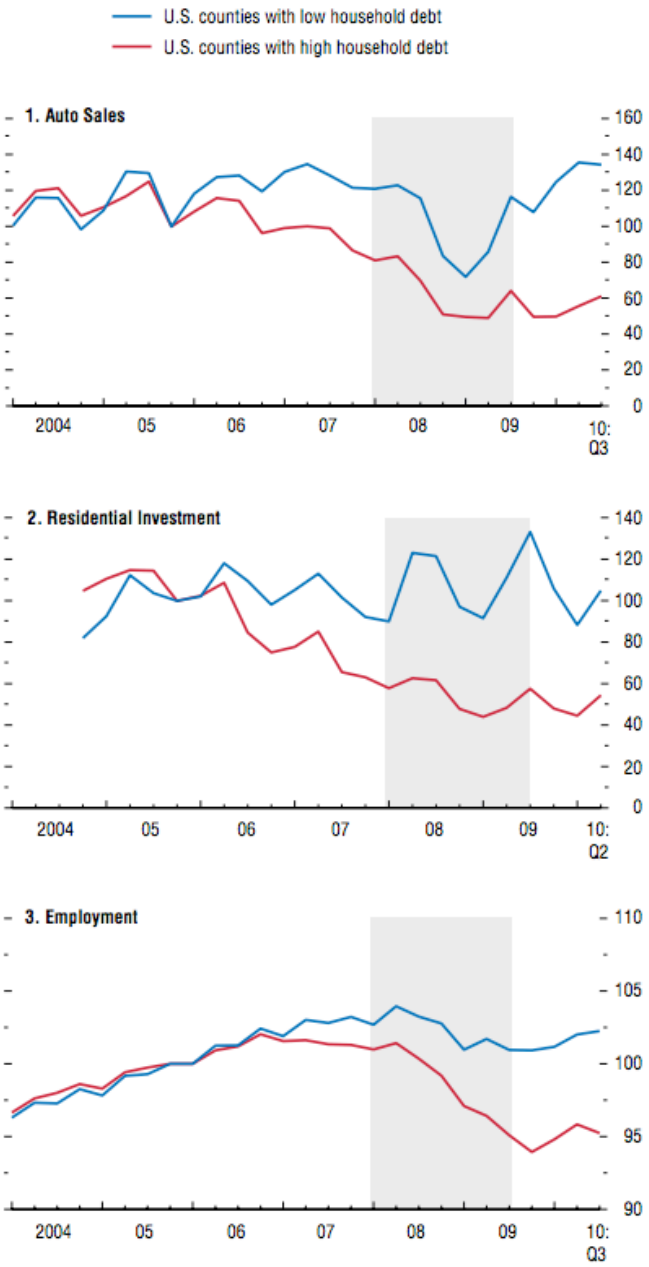
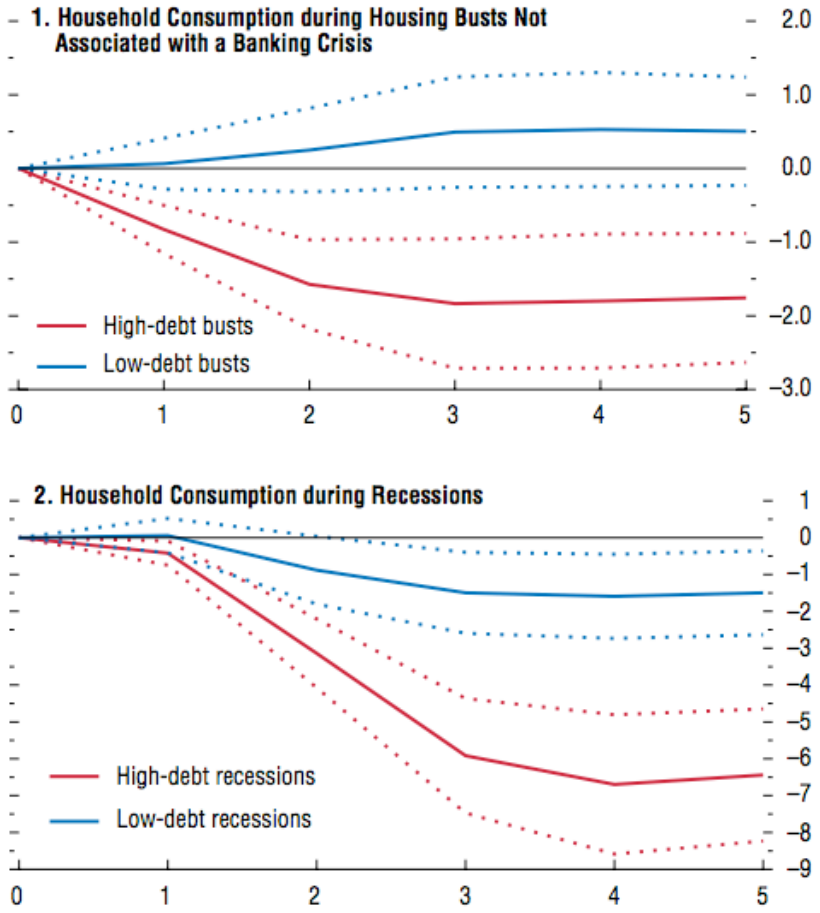


Figure 5:

(Source: IMF World Economic Outlook, April 2012)



The regression analysis they carry out finds that housing busts with "larger household debt tend to be followed by more severe and longer-lasting declines in household consumption." Five years later, the drop in real household consumption is 4.3 percent lower in the high-debt group, while it is only 0.4 percent lower for the low-debt group. This is statistically significant at the 1 percent level, and it survives a variety of tests.

These results are also reproduced from their study in Figure 5. These results hold with or without a financial crisis, showing that a common belief that economic slumps are more severe after a financial crisis is misinformed, and instead a severe household debt issue drives the poor economic growth (and can, by itself, trigger financial crises).

With these studies in mind, it is worthwhile to examine two specific issues related to the financial system and how they interact with the balance-sheet recession.

How Does the Current Financial System Impact This Problem?

How does our mortgage servicing system interact with a balance-sheet recession? In the housing market, what are the current incentives lenders and borrowers face when dealing with mortgages that are going bad?

Between 1985 and 2007, the asset-backed securities (ABS) market grew from $1 billion in new issues to $997 billion. Third-party mortgage servicers run this ABS market on behalf of the debt owners.[10]

As law professors Adam Levitin and Tara Twomey argue in their 2011 paper "Mortgage Servicing":

> "[S]ervicers do not have a meaningful stake in the loan's performance; their compensation is not keyed to the return to investors. Second, the servicing industry's combination of two distinct business lines – transaction processing and default management — encourage servicers

> to underinvest in default management capabilities, leaving them with limited ability to mitigate losses. Servicers' monetary indifference to the performance of a loan only exacerbates this situation...
>
> Servicers' incentives in managing individual loans do not track investors' interests. This creates three interrelated problems. First, servicers are incentivized to pad the costs of handling defaulted loans at the expense of investors and borrowers. Second, servicers are not incentivized to maximize the net present value of a loan, but are instead incentivized to drag out defaults until the point that the cost of advances exceeds the servicer's default income. In other words, servicers are incentivized to keep defaulted homeowners in a fee sweatbox rather than moving to immediately foreclose on the loan. Third, servicers are incentivized to favor modifications that reduce interest rates rather than reduce principal, even if that raises the likelihood of redefault."

Mortgage servicers are incentivized to collect fees (such as late fees and foreclosure fees), and thus they are also incentivized to keep a borrower in default instead of trying to make him or her current on the mortgage. Since the servicer's monthly servicing fee is computed as a percent of the outstanding balance, servicers benefit from any and all delays in reducing principal and suffer a permanent loss of income when they agree to a principal reduction. Loan modifications that increase principal by capitalizing arrears and fees boost this income. According to "State Foreclosure Prevention Working Group: Analysis of Mortgage Servicing Performance," 70 percent of mortgage modifications fall into this category of increasing principals by capitalizing arrears and fees. This structure gives servicers a huge incentive to do make-work modifications for struggling homeowners. These may include interest rate adjustments with a high redefault rate and principal forbearance, because even though the monthly payment might be a bit lower, the principal is the same and the servicing fee is calculated based on that (before the interest payment to bondholders).

Empirical research backs this up. In "Market-Based Loss Mitigation Practices for Troubled Mortgages Following the Financial Crisis" by Agarwal, Amromin, Ben-David, Chomsisengphet, and Evanoff, the authors find this conflict of interest in the modification of securitized loans. The likelihood of a modification of a securitized loan is 70 percent lower relative to a loan held in a portfolio.

Servicers also incorporate two business lines: transaction processing, or running the payments from the household to the bondholder, and default management, which involves trying to work out mortgages that have gone delinquent. These are two very different lines of business. Transaction processing is usually run as a very thin model, with minimal staff and increasing returns to scale. However, default management, which is what is now needed from servicers, is time and labor intensive – it is functionally similar to underwriting completely new mortgages. Agarwai et al find that resources aren't deployed sufficiently enough to fully staff the default management portion of the business: "The staggering amount of delinquent loans that see no action from lenders/investors is consistent both with the idea of an industry overwhelmed by the wave of problem mortgages and with the difficulty in overcoming the severe asymmetries of information that inhibit active loss mitigation."

There are also conflicts when a mortgage servicer works for an institution with an exposure to a second, junior lien (or mortgage). The difference in the modification rate when a second lien is involved is on the order of 11-13 percent, significantly higher than when there is no second mortgage.

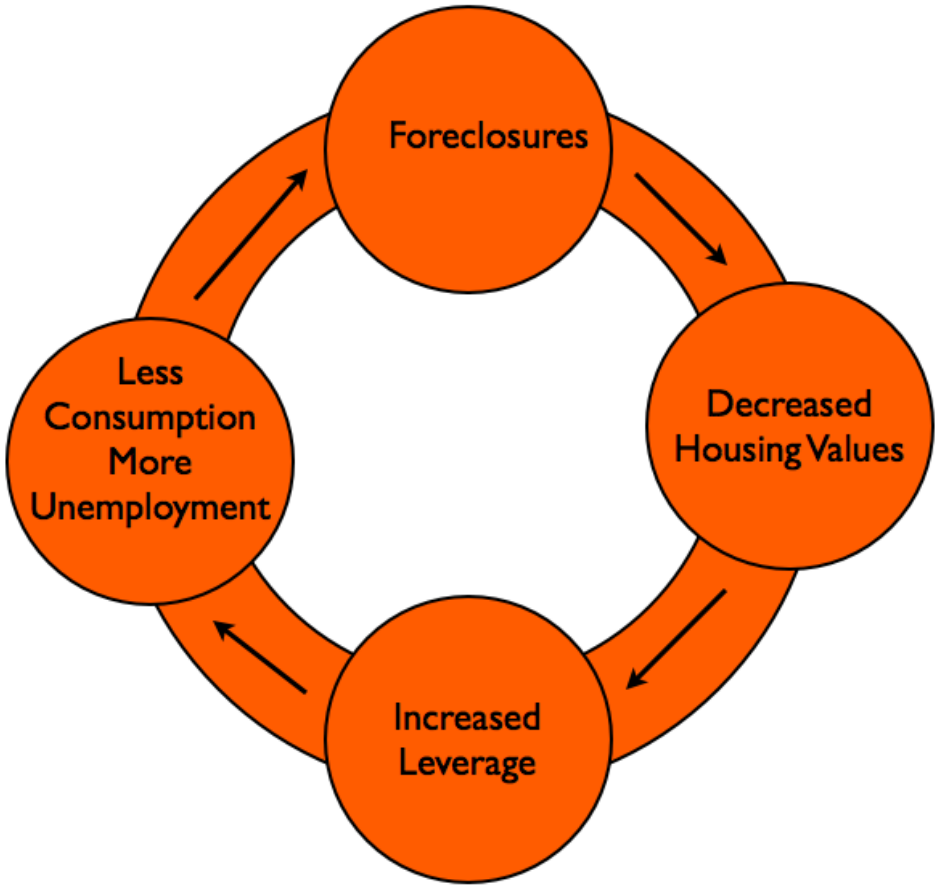
Notice the way that the theory of the balance-sheet recession interacts with the conflicts of interest inherent in the servicing model. The conflicts embedded in the servicing structure encourage increasing principal during a mortgage workout, even if it means the homeowner is more likely to default. It also provides significant incentives to completely avoid reducing mortgage principle, even if it means a higher chance of redefault. This increases the leverage ratio for the household. According to the theory of balance-sheet recessions, this in turn decreases consumption further, which drags down the economic recovery.

If Debt is the Problem, Why Don't Foreclosures Help the Economy?

If bad debts are holding back the economy, it might seem logical that periods of high defaults and foreclosures would alleviate the problem. Though many homeowners could legally be held responsible for outstanding loan balances after a foreclosure, in practice many homeowners who default do not have subsequent actions against them. Meanwhile, there have been millions of foreclosures since the housing crisis began, with some estimates saying that up to 10 million households could still default.[11]

There are many economic models that can explain the negative impact of the forced sale of durable goods in a depressed economy. An owner doesn't want to have to

Figure 5:



sell an asset in a depressed market because there aren't many buyers and the "fire sale" effect brings down the value of all other assets. When an economy is depressed, a fire sale of housing can trigger decreased prices for other homeowners.[12]

In the balance-sheet world, this has a similar effect as the paradox of thrift described above. According to economic estimates, foreclosures reduce the price of neighboring properties by 1 percent, and the effect of a wave of foreclosures can be much higher, even approaching 30 percent.[13] These neighboring homeowners now have decreased housing values, which increase their leverage ratios. As we see from the studies mentioned above, an increase in leverage ratios decreases consumption, employment, and wages through the balance-sheet effect. A new wave of unemployment, decreased wages, and leverage makes foreclosures more likely, which creates a vicious cycle, as displayed in Figure 5.

The IMF staff notes, "distress sales are the main driving force behind the recent declines in house prices—in fact, excluding distress sales, house prices had stopped falling" and "there is a risk of house price undershooting."[14]

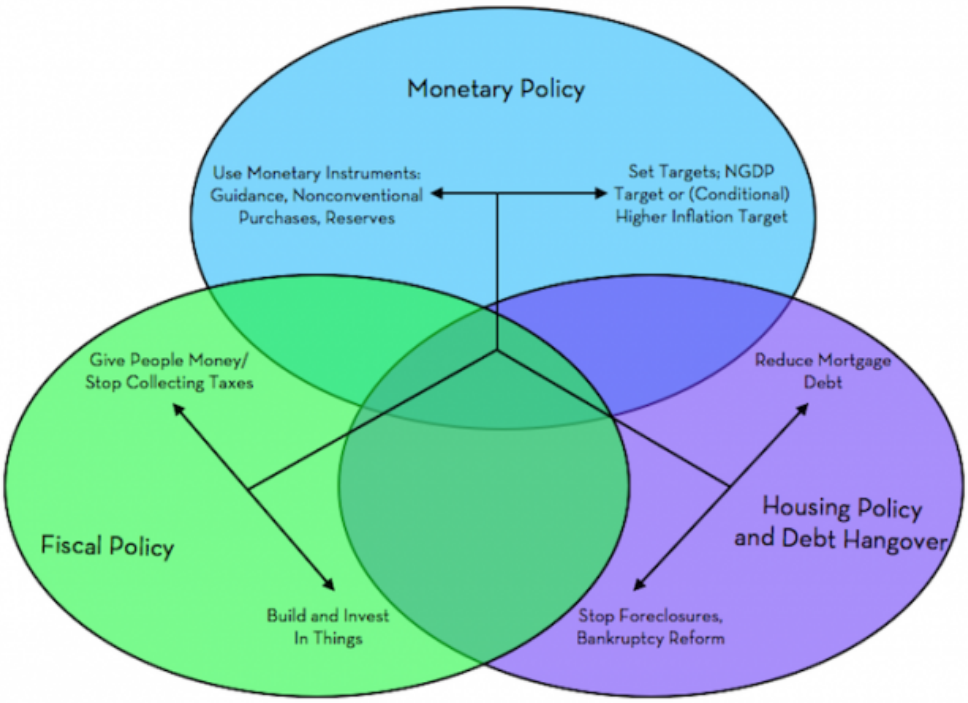
This plays out empirically. Mian, Sufi, and Trebbi's paper, "Foreclosures, House Prices, and the Real Economy," finds estimates that "suggest that foreclosures were responsible for 15% to 30% of the decline in residential investment from 2007 to 2009 and 20% to 40% of the decline in auto sales over the same period."[15]

They also find that "our estimates suggest that foreclosures lead to more abrupt declines in these outcomes than would be observed in the absence of foreclosures, and these declines are likely to be more painful in the midst of a severe recession."

There are also substantial costs to communities associated with foreclosure. According to the Urban Institute's "The Impacts of Foreclosure on Families and Communities," a foreclosure can cost a municipality between $430 and $34,199, a major impact when municipality budgets are strained by the recession. And the GAO found, in its report "Vacant Properties," that crime increases in neighborhoods with mass foreclosures.

As homes are abandoned, critical tipping points are reached where it is difficult to stem the loss of population and resources.

Demand-Based Solutions.



Conclusion and Notes on Policy

What are high-level policy responses appropriate to a balance-sheet recession? There are three general areas from which stimulus can come in order to boost aggregate demand. The first is fiscal policy, the second is monetary policy, and the third is mortgage debt policy.

By boosting the deficit to ensure that household income is supported, the government is capable of making sure incomes don't collapse in the middle of a recession. Income collapse makes the balance-sheet effect much more severe than it would otherwise be. Policies in this category include giving people more money to boost demand through reducing taxes or increasing income support (food stamps, unemployment insurance, etc.). It also includes investing in productive public goods, investment that employs people and also builds out the productive capacity of the country. Anything from infrastructure spending to rebuilding schools falls in this category.

One crucial driver of the balance-sheet recession is that deleveraging is so severe that conventional monetary policy is unable to stabilize the economy, as interest rates are hitting the zero lower bound. However, there are a wide variety of unconventional monetary policy techniques available at the Federal Reserve to induce more growth. In general, these polices split into the Federal Reserve making more purchases versus the Federal Reserve setting expectations. The Federal Reserve has done the former when purchasing assets through quantitative easing, and it has done the latter when explaining that it will keep interest rates low into 2014. It could be more aggressive.

The third area of stimulus is housing and mortgage relief policy. By reducing household debt, the deleveraging process will be moved along more quickly. And by mitigating the massive amount of foreclosures that are occurring, the externalities associated with foreclosures won't wreak havoc on the balance sheets of neighboring homes.

Government support for household debt restructuring is crucial in this project. There are a range of options available to prevent the fire sale of housing and encourage mass writedowns in and out of the courts in the public sector as well as the private sector. The costs to taxpayers associated with government purchases will be mitigated by increased economy activity, and the costs of using courts or other mandatory mediations will be minimal. During the Great Depression, the United States had huge success with the Home Owners' Loan Corporation (HOLC). In the aftermath of Iceland's recent crash, a foreclosure moratorium was declared and a comprehensive system to reduce debt was put into place.[16]

It is useful to think of each of these areas of stimulus as three forces holding up the economy. If any one of them weakens – through austerity at the state or federal level, tighter money, or an increase in debt and foreclosures – the others need to do more work in order to keep the economy steady. It is also important to remember that under a balance-sheet recession view of the economy, the pool of bad mortgages is not fixed; austerity, tightening money, and continued foreclosures and increases in bad mortgage debt will grow the pile, while stimulus and mortgage writedowns will shrink it.

Endnotes

1 – 2011. Financial Crisis Inquiry Report (New York, New York: PublicAffairs).

2 – CoreLogic gives the lower range of the estimates, while Zillow gives the high end. The differences appear to be calculation of second and other junior mortgages. See: Whelan, Robbie. "Negative Equity More Widespread Than Previously Thought,

Report Says." Developments. The Wall Street Journal. 24 May 2012.

3 – All numbers from Current Population Survey, Bureau of Labor Statistics. Discouraged workers calculated using U-5 unemployment, which includes discouraged and marginally-attached to the labor force workers. U.S. Bureau of Labor Statistics. 2011. Current Population Survey. May (Washington).

4 – For structural issues with the workforce, see: Kocherlakota, Narayana. 2010. "Inside the FOMC." Marquette, Michigan. Aug. 17. For policy uncertainty, see: Greenspan, Alan. 2011. "Activism." International Finance, Vol. 14 No. 1. pp. 165-82. For a historical relationship between financial crises and prolonged economic slumps, see: Reinhart, Carmen M., and Kenneth Rogoff. 2009. "This Time Is Different: Eight Centuries of Financial Folly." Princeton University Press (Princeton).

5 – See: Faberman, R. Jason. 2012. "Is There a Skills Mismatch in the Labor Market?" Chicago Fed Letter. Federal Reserve Bank of Chicago. For mobility see: Konczal, Michael, April 11th, 2011. "Housing Lock is not a Major Part of this Crisis." Rortybomb blog.

6 – For more on the question of a wealth effect in housing at the national level, see: Calomiris, Charles, Stanley D. Longhofer and William Miles. 2009. "The (Mythical?) Housing Wealth Effect." NBER Working Paper No. 15075 (Cambridge, Massachusetts: National Bureau of Economic Research).

7 – For a book length treatment of the balance-sheet recession as it has related to Japan and the current recession, see: Koo, Richard C. 2009. "The Holy Grail of Macroeconomics: Lessons from Japans Great Recession." University of California. For an economic model that generates the theoretical case for a balance-sheet recession see: Eggertsson, Gauti and Paul Krugman. 2011. "Debt, Deleveraging, and the liquidity trap: A Fisher-Minsky-Koo approach." (New York).

8 – See: Mian, Atif, and Amir Sufi. 2011. "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis." American Economic Review, Vol. 101 No. 5. pp. 2132–56.

9 - 2011. Financial Crisis Inquiry Report. pp 214. (New York, New York: PublicAffairs).

10 – See: Rosner, Joshua. 2010. "Securitization: Taming the Wild West." Make Markets Be Markets. Roosevelt Institute.

11 – See: Nocera, Joe. November 4th, 2011. "To Fix Housing, See the Data." New York Times.

12 – For several models of fire-sales in a depressed market, see: Shleifer, Andrei, and Robert Vishny, 1992, "Liquidation Value and Debt Capacity: A Market Equilibrium Approach." Journal of Finance, Vol. 42. pp. 1343-1365. Mayer, Christopher. 1995. "A Model of Negotiated Sales Applied to Real Estate Auctions." Journal of Urban Economics. Vol. 38 No. 1. pp. 1-22. Krishnamurthy, Arvind. 2010. "Amplification Mechanisms in Liquidity Crises." American Economic Journal: Macroeconomics, Vol. 2 No. 3. pp. 1–30.

13 - Campbell, John Y., Stefano Giglio, and Parag Pathak. 2011. "Forced Sales and House Prices." American Economic Review, Vol. 101 No. 5. pp. 2108–31.

14 – International Monetary Fund (IMF). 2011. United States: Staff Report for the 2011 Article IV Consultation, Country Report No. 11/201 (Washington).

15 – Mian, Atif, Amir Sufi and Francesco Trebbi. 2012. "Foreclosures, house prices, and the real economy." May 25. See also: Mian, Atif, Amir Sufi and Francesco Trebbi. "Foreclosures, house prices, and the real economy." Vox. Feb. 10.

16 – See IMF, World Economic Outlook, Chapter 3: Dealing with Household Debt, for more on case studies of countries dealing with household debt after a crisis.