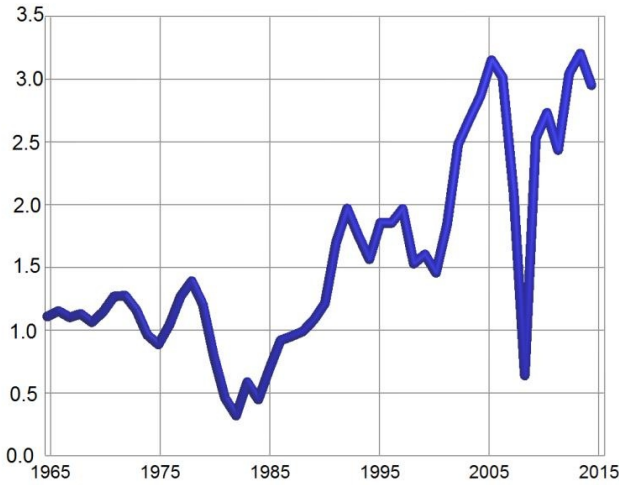


Handout for April 16, 2015

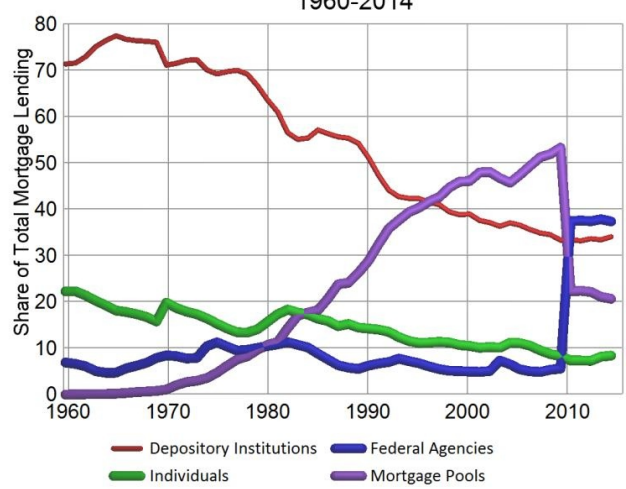
Financial Institutions Profit as % of GDP
 1965-2014



Source: Economic Report of the President 2013, Tables B91 and B1. Updated from bea.gov, Tables 1.1.5 and 6.16D (accessed 4/14/15)

Figure 1

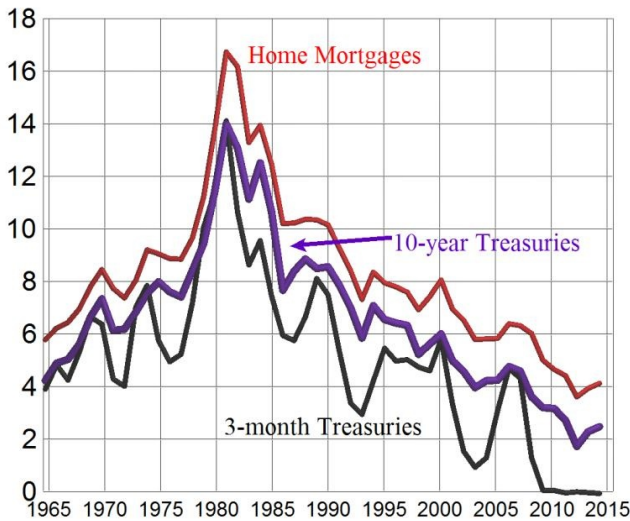
Who Holds Mortgages?
 1960-2014



Source: Federal Reserve Board, Mortgage Debt Outstanding, accessed 4/14/15

Figure 3

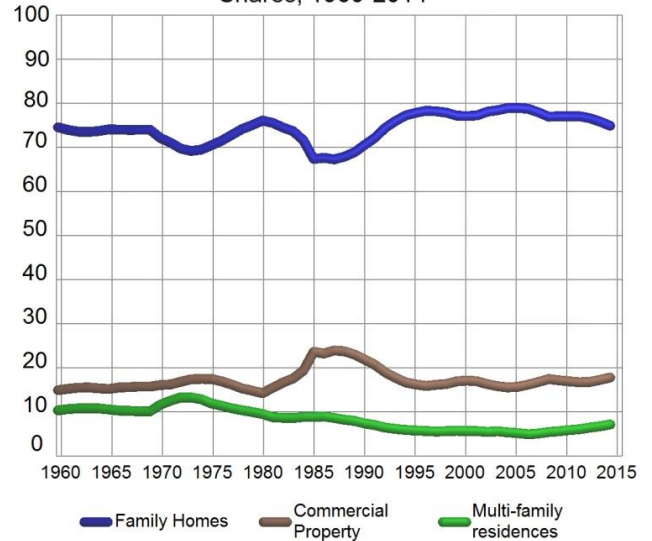
Interest Rates, 1965-2014



Source: FederalReserve.gov, series H.15

Figure 2

Mortgage Debt Outstanding by Property Shares, 1960-2014



Source: Federal Reserve Board, Mortgage Debt Outstanding, accessed 4/14/15

Figure 4

Case Shiller National and Composite Indices SA (Nominal)

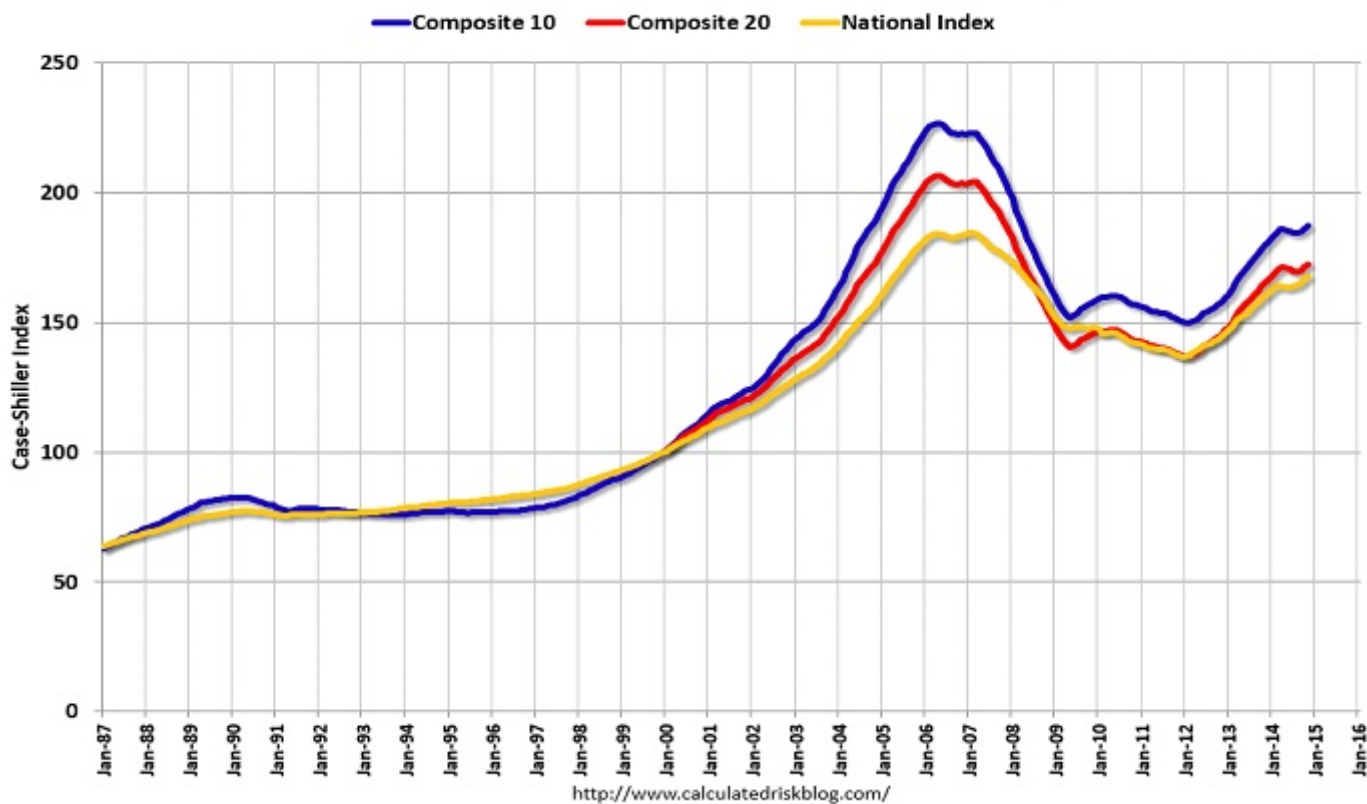


Figure 5

Table 1. Effect of House Prices on Household Borrowing for 1997 Homeowners

	Change in total debt, 2002-2006 (thousands \$)			
Δ Home Value, 2002-06	0.245*** (0.050)	0.271*** (0.056)	0.253*** (0.056)	0.246*** (0.065)
Median home value, 2002	0.020 (0.039)	-0.014 (0.044)	-0.010 (0.037)	-0.076 (0.079)
Controls for credit score, HH income, debt/income, age		✓		
Male (0/1)		✓	✓	✓
Individual dummy variables			✓	✓
Census & Income variables				✓
Observations (n)	13,328	13,199	13,199	12,497

Notes: Unit of observation = groups of 5-9 reasonably homogeneous homeowners. Standard errors clustered at MSA level.
 ***Significant at 1% level. **Significant at 5% level. *Significant at 10% level.

Source: Mian & Sufi, "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis," *AER* 101 (2132-56). Table 3.

Table 2. What Did People Do With Borrowed Money?

	Coefficient on Δ Home Price (HP), 2002-06					
	Probability of Moving	Change in # of mortgages		Credit card balance	Credit card balance / income	
Actual HP growth	0.046 (0.036)		-0.011 (0.021)			
Instrumented HP growth Δ		0.010 (0.076)		-0.109** (0.047)	0.084 (0.143)	0.017 (0.022)
Observations (n)	68	13,196	12,772	12,772	3,233	3,233

Notes: Δ instrumented house price (HP) growth uses MSA housing supply inelasticity as an instrument for house price growth. ***Significant at 1% level. **Significant at 5% level. *Significant at 1% level.

For credit card analysis (n=3,233), sample restricted to those in top quartile of credit card utilization distribution, 1997.

Source: Mian & Sufi, "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis," *AER* 101 (2132-56). Table 6.

Plus I'm attaching <http://www.frbsf.org/publications/economics/letter/2011/el2011-02.html>, Mian & Sufi, FRBSF Economic Letter (January 18, 2011)

Consumers and the Economy, Part II: Household Debt and the Weak U.S. Recovery

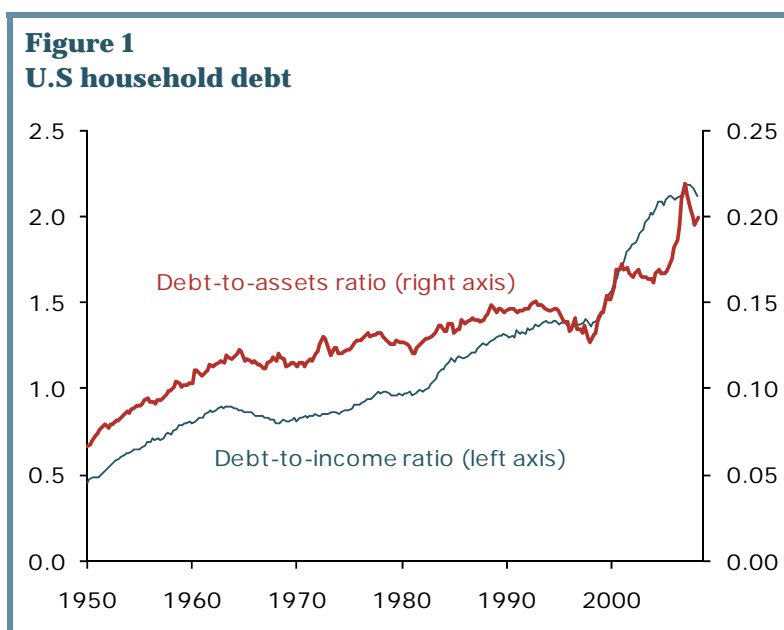
BY ATIF MIAN AND AMIR SUFI

The U.S. economic recovery has been weak, especially in employment growth. A microeconomic analysis of U.S. counties shows that this weakness is closely related to elevated levels of household debt accumulated during the housing boom. Counties where household debt grew moderately from 2002 to 2006 have seen a moderation of employment losses and a robust recovery in durable consumption and residential investment. By contrast, counties that experienced large increases in household debt during the boom have been mired in a severe recessionary environment even after the official end of the recession.

One of the striking features of the U.S. economic downturn that started in 2007 is that it was preceded by the largest increase in household debt in recent history. The thin blue line in Figure 1 plots the ratio of household debt to income for the U.S. economy over time, where income is measured as compensation and wages. After a steady increase from 1950 to 2001, the household debt-to-income ratio skyrocketed from 2001 to 2007 by more than it had in the prior 45 years.

While housing wealth and stock market gains masked the increase in debt from 2001 to 2006, the subsequent collapse of asset prices led to a tremendous increase in the ratio of total debt to total assets in the U.S. household sector, as shown by the thick red line in Figure 1. The ratio of housing-related debt to housing wealth peaked at 65% in 2009, which was 25 percentage points higher than at any time since 1950. The concurrent household default crisis has been catastrophic. Most analysts agree that household defaults sparked the financial crisis of 2007 and 2008. Our research suggests that a high level of household debt was an important factor underlying the recession (Mian and Sufi 2010).

All eyes are now on the economic recovery. By many measures, the nascent recovery is weak, especially in employment. This *Economic Letter* examines the relationship between the weakness of the current economic recovery and the preceding sharp



increase in household leverage ratios. The evidence suggests that high levels of household debt represent an important impediment to growth.

U.S. county patterns

How has the sharp rise in household debt from 2002 to 2007 affected the economic recovery? It is difficult to answer this question using aggregate data alone. Household debt levels are elevated, but many other factors could also be causing weakness. For example, many economists argue that an unwillingness of banks to lend and a lack of business investment are the key impediments to growth.

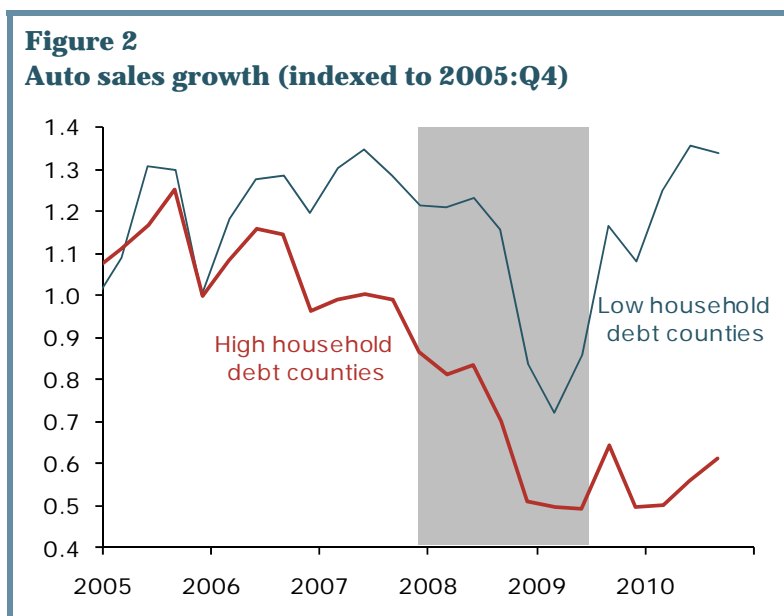
This *Letter* analyzes county-level data on household debt and economic activity during the recovery. U.S. counties experienced very different levels of debt growth during the housing boom. Counties where it is difficult to increase housing supply, such as some in California and Florida, experienced much higher increases in household debt than counties where it is relatively easy to increase housing supply, such as in Texas. By using the variation in household debt growth across U.S. counties from 2002 to 2006, we can examine the effect of high debt on residential investment, durable consumption, and employment during the recovery.

Our analysis looks at the 238 counties that have at least 100,000 residents. We split this sample into deciles based on the increase in the household debt-to-income ratio from 2002 to 2006. We focus on the counties in the highest and lowest decile. Most counties in the top decile are in California and Florida, plus one county each in Massachusetts and Virginia. Counties in the bottom decile are in a number of states, including New York, Pennsylvania, and Texas. The county with the largest increase in the household debt-to-income ratio from 2002 to 2006 was Monterey County, California. The county with the smallest increase was Will County, Illinois. We refer to the top decile counties as high household debt counties and to the bottom decile as low household debt counties.

The economic recovery in high and low household debt counties

In Figures 2 and 3, we plot growth of auto sales and residential investment for high and low household debt counties. The plots are indexed to the fourth quarter of 2005. Figure 2 shows that auto sales began to decline in high household debt counties as early as 2006, long before sales began falling in low household debt counties (Mian and Sufi 2010). Both high and low household debt counties experienced a sharp drop in auto sales during the most severe part of the recession.

Perhaps the most stunning auto sales evidence comes in the recovery. Relative to 2005, auto sales in high household debt counties were 50% lower in every quarter after the end of the recession, except for a brief blip associated with the “cash for clunkers” program. By contrast, low household debt counties experienced a robust recovery of auto sales. In the third



quarter of 2010, low household debt counties had auto sales that were as high as or higher than pre-recession levels.

The pattern in residential investment in Figure 3 is similar. The decline in residential investment in high debt counties began even before the recession began and there has been no recovery. Residential investment in high household debt counties remains 40% to 60% below pre-recession levels. In contrast, low household debt counties have almost completely avoided a decline in residential investment.

The emphasis on residential investment and durable consumption as measured by auto sales is particularly important given evidence

from Leamer (2007). He shows that nine of the last 11 recessions were preceded by drops in residential investment and durable consumption. Furthermore, rebounds in residential investment and durable consumption are among the strongest leading indicators that an economic recovery is imminent. Given Leamer's evidence, Figures 2 and 3 suggest that high household debt areas are likely to remain in a recessionary environment well into the future.

What about employment in high household debt counties? Unfortunately, the county-level focus is not as well suited for examining the effect of household debt on employment patterns. The reason is simple. Production of goods does not necessarily take place in the same geographical area as the consumption of goods. For example, suppose high household debt in Monterey County, California, leads to a reduction in purchases of recreational vehicles. This reduction in RV purchases may lead to more unemployment in

Elkhart County, Indiana, where RVs are produced. If Elkhart County has low household debt, the methodology will fail to connect high household debt in Monterey with higher unemployment in Elkhart.

However, at least part of any county's production caters to local demand. Indeed, Figure 4 shows powerful evidence that employment and household debt patterns are closely linked. Counties with high household debt experienced relatively high employment declines well before the recession began. During the most

Figure 3
Residential investment growth (indexed to 2005:Q4)

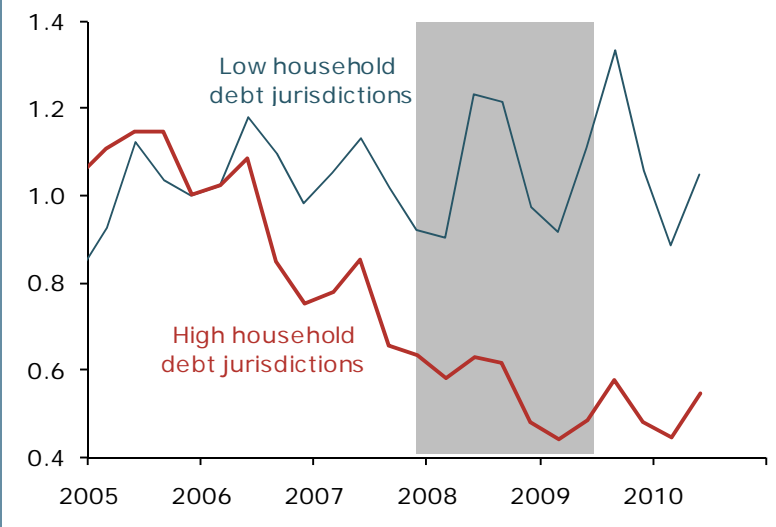
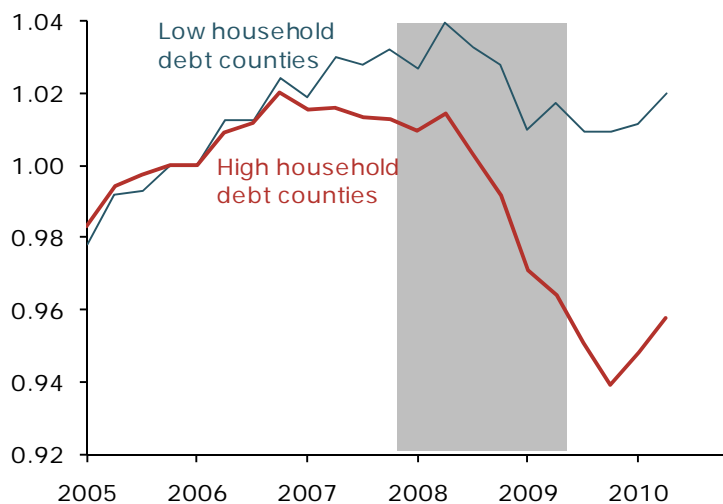


Figure 4
Employment growth (indexed to 2005:Q4)



severe part of the recession, employment losses in high household debt counties were dramatic. Total employment declined by 7% from the second quarter of 2008 to the second quarter of 2009. Furthermore, employment remained at extremely depressed levels in high household debt counties through the second quarter of 2010. By contrast, employment growth in low household debt counties stabilized as early as the second quarter of 2009. Total job losses were much lower. While there is still no evidence of robust recovery in low household debt counties, the employment situation is far less bleak than in high household debt counties.

House prices are an important factor. High household debt counties experienced much larger price declines than low household debt counties during the recession. In fact, previous research demonstrates that the debt-to-income increase from 2002 to 2006 can explain more than 60% of the variation in house price declines across U.S. counties from 2006 to 2009 (Mian and Sufi 2010). It is likely that the large increase in debt burdens had both a direct effect on the economy and an indirect effect due to the subsequent sharp declines in house prices in highly leveraged areas.

Why the weak recovery?

What does the evidence on high and low household debt counties suggest about the reasons for the weak recovery? One explanation commonly offered for the weak recovery is hangover from the financial crisis of the fall of 2008. In this view, for a variety of reasons, banks that were embroiled in the crisis are not lending even to businesses that have strong investment opportunities. But it is hard to imagine that businesses in high debt counties have many good investment opportunities when residential investment and durable consumption remain 40% to 60% below pre-recession levels.

A variant of this argument is that local credit conditions are crucial. But this is also difficult to reconcile with the data. In an earlier work, we showed that the correlation between household debt and economic outcomes is the same in counties where national banks are dominant (Mian and Sufi 2010). In other words, even in counties where banks are less affected by local default and consumption patterns, household debt strongly predicts economic outcomes. This strengthens the argument that household debt, not local credit conditions, is the main impediment to recovery.

Overall, the county evidence strongly suggests that credit demand is weak because of an overleveraged household sector. This view is supported by survey evidence that the main worry of businesses is sales, not financing. The October 2010 National Federation of Independent Business survey (Dunkelberg and Wade 2010) shows that almost no small businesses viewed credit availability as their primary problem. In fact, the NFIB has reported that weak sales were the top problem facing small businesses throughout the recession. Weak consumer demand also helps explain the enormous cash balances currently held by U.S. corporations (see Lahart 2010). These results have important policy implications. If the main problems facing businesses relate to depressed consumer demand due to a household sector weighed down by debt, investment tax subsidies and lower interest rates may have a limited effect on business investment and employment growth.

The evidence is more consistent with the view that problems related to household balance sheets and house prices are the primary culprits of the weak economic recovery. King (1994) provides a detailed discussion of how differences in the marginal propensity to consume between borrowing and lending households can generate an aggregate downturn in an economy with high household leverage. This idea goes back to at least Irving Fisher's debt deflation hypothesis (1933) and has found empirical support in

several studies (Mishkin 1978, King 1994, Olney 1999, Eichengreen and Mitchener 2003, Glick and Lansing 2010, and Mian and Sufi 2010). Our view is that the depth and length of the current recession relative to previous recessions is closely linked to the tremendous rise in household debt that preceded it.

Atif Mian is an associate professor of finance and real estate at the Haas School of Business, University of California, Berkeley, and a visiting scholar at the Federal Reserve Bank of San Francisco.

Amir Sufi is an associate professor of finance at the University of Chicago Booth School of Business.

References

- Dunkelberg, William C., and Holly Wade. 2010. "NFIB Small Business Trends." National Federation of Independent Businesses survey, October. <http://www.nfib.com/Portals/0/PDF/sbet/sbet201010.pdf>
- Eichengreen, Barry, and Kris Mitchener. 2003. "The Great Depression as a Credit Boom Gone Wrong." Bank for International Settlements Working Paper 137, September. <http://www.bis.org/publ/work137.pdf>
- Fisher, Irving. 1933. "The Debt-Deflation Theory of Great Depressions." *Econometrica*, pp. 337–357.
- Glick, Reuven, and Kevin Lansing. 2010. "Global Household Leverage, House Prices, and Consumption." *FRBSF Economic Letter* 2010-01, January 11. <http://www.frbsf.org/publications/economics/letter/2010/el2010-01.html>
- Lahart, Justin. 2010. "Layoffs Ease but Hiring Sluggish." *Wall Street Journal*, Oct. 8.
- Leamer, Edward. 2007. "Housing IS the Business Cycle." NBER Working Paper 13248. <http://www.nber.org/papers/w13428>
- King, Mervyn. 1994. "Debt Deflation: Theory and Evidence." *European Economic Review* 38, pp. 419–445.
- Mian, Atif, and Amir Sufi. 2010. "Household Leverage and the Recession of 2007 to 2009," *IMF Economic Review* 58, pp. 74–117.
- Mishkin, Frederic S. 1978. "The Household Balance Sheet and the Great Depression." *Journal of Economic History* 38, pp. 918–937.
- Olney, Martha. 1999. "Avoiding Default: The Role of Credit in the Consumption Collapse of 1930." *Quarterly Journal of Economics* 114, pp. 319–335.

Recent issues of *FRBSF Economic Letter* are available at
<http://www.frbsf.org/publications/economics/letter/>

2011-01	Consumers and the Economy, Part I: Household Credit and Personal Saving http://www.frbsf.org/publications/economics/letter/2011/el2011-01.html	Glick / Lansing
2010-38	Risky Mortgages and Mortgage Default Premiums http://www.frbsf.org/publications/economics/letter/2010/el2010-38.html	Krainer / LeRoy
2010-37	Mortgage-Backed Securities: How Important Is "Skin in the Game"? http://www.frbsf.org/publications/economics/letter/2010/el2010-37.html	James
