

**Out of Many, One?  
Household Debt, Redistribution and Monetary Policy during the  
Economic Slump\***

Amir Sufi  
University of Chicago Booth School of Business and NBER

Andrew Crockett Memorial Lecture  
June 2015

Abstract

During normal times, monetary policy affects the real economy primarily through *redistribution channels* that require an appreciation of differences across households. High income and low income individuals respond very differently to monetary policy shocks, as do savers and borrowers. Monetary policy has been especially weak in advanced economies over the past 7 years because the redistribution channels of monetary policy have been severely hampered. Standard representative agent-based macroeconomic models miss this key insight, and have therefore been an insufficient guide to policy decisions. A framework that recognizes the importance of redistribution channels of monetary policy can guide central bankers on what policies are most likely to be effective. The same policy may have different effects on the real economy depending on the distribution of debt capacity across individuals.

\* I thank Adrien Auclert, Stephen Cecchetti, Neale Mahoney, Atif Mian, Hyun Shin, Johannes Stroebel, and Robert Vishny for helpful comments.

The economic performance of advanced economies since 2007 has been dismal. Figure 1 shows real GDP for the Euro area, Japan, the United Kingdom, and the United States against trend growth in the decade prior to 2007. All four economies have deviated dramatically from their previous performance, resulting in a considerable loss of income worldwide. While there have been some recent glimmers of hope, there is little to suggest enough economic strength to return back to trend.

Few economists in 2006 foresaw the stagnant economic performance of advanced economies from 2007 to 2015. Most economic forecasters have consistently expressed too much optimism over the past 6 years. Economists today find themselves on the defensive, which reminds me of what Keynes said in 1930: “if economists could manage to get themselves thought of as humble, competent people, on a level with dentists, that would be splendid!”

And that is how I will approach the lecture today: hopefully I will prove competent enough to offer some insight into what explains our continued economic malaise, but humble enough to avoid causing as much pain as a root canal!

The economic slump presents a number of challenging issues for macroeconomists, and a productive discussion has begun. In this lecture, I want to focus on two of the themes emerging from the broader discussion—themes that I believe are of utmost importance to central bankers.

First, there has been an attack on the standard representative agent dynamic-stochastic-general equilibrium model that is the workhorse for monetary policy formulation and analysis. Christopher Carroll put it least delicately when he wrote: “during the crisis, the dominant class of models, representative agent DSGE models, either had nothing useful to say about the policy questions that needed answers, or provided answers sharply at variance with both common sense and empirical evidence.”<sup>1</sup>

Second, there is consensus building among economists that monetary policy is not as effective as the profession believed prior to the Great Recession. Leading central bankers no longer express confidence that aggressive monetary policy can cure all ills; instead, there is now admission that “monetary policy is not a panacea,” as former Chairman of the Federal Reserve Board of Governors Ben Bernanke said in a speech in 2012. Charles Goodhart of the London School of Economics summed up the sentiment felt by many monetary economists:

“Had you asked, say back in 2005, what would be the effect of a central bank increasing the reserve base of its banking system by a factor of 10 times, most respondents would have predicted massive expansion of bank credit, of the money stock, of nominal gross domestic product and of inflation. Yet none of this has happened ...”<sup>2</sup>

The central point of my lecture today is that these two themes are directly linked: monetary policy has been weaker than expected because economists have relied too heavily on representative-agent based modeling to understand how monetary policy works. *E pluribus*

---

<sup>1</sup> Carroll, Christopher, 2012. “Implications of Wealth Heterogeneity for Macroeconomics,” Working Paper.

<sup>2</sup> Goodhart, Charles, 2014. “Why Monetary Policy Has Been Comparatively Ineffective,” *Morgan Stanley Research Global Macro Analyst*, April 2.

*unum*—out of many, one—is great for the seal of the United States, but it is insufficient when modeling monetary policy.

During normal times, monetary policy affects the real economy primarily through *redistribution channels* that require an appreciation of heterogeneity across households. High income and low income individuals respond very differently to monetary policy shocks, as do savers and borrowers. Monetary policy has been especially weak over the past 7 years because the redistribution channels of monetary policy have been severely weakened.

In 2012, a Wall Street Journal story examined the situation of Chris Hordan, a small business owner “who emerged from the financial crisis financially unscathed.” As the article put it:

“with a good income and pristine credit, he has refinanced the \$417,000 mortgage on his home in Hermosa Beach, California three times in 17 months, shaving his monthly payments by \$390 ... But Mr. Hordan doesn’t need the money to buy things ... ‘if you don’t need the money, you can get it all day long,’ he said. ‘Thank you, Ben Bernanke.’”<sup>3</sup>

A number of recent empirical and theoretical studies have confirmed the macroeconomic importance of this simple anecdote. I will use this opportunity to highlight the exciting new research, much of which is hot off the presses. A consistent message emerges: Monetary policy over the past 7 years has been ineffective because it has channeled interest savings and additional credit to exactly the households that are least likely to change their spending in response. The households that would normally spend most aggressively out of monetary policy shocks are heavily indebted or have seen their credit scores plummet, rendering them either unwilling or unable to boost spending. Monetary easing over the past 7 years has been fighting an uphill battle of trying to induce households with the lowest consumption sensitivity to boost spending.

I have specific policy recommendations toward the end of my lecture. But my broad goal is to encourage monetary policy-makers to rethink the standard New Keynesian representative-agent model used to formulate and evaluate policy. Central banks around the world are engaging in unprecedented acrobatic measures, and it is imperative for policy-makers undertaking such actions to understand *why* such aggressive easing has not boosted economic activity significantly. Advances in both theoretical and empirical research suggest that models used by central banks should incorporate differences across households and recognize the importance of redistribution channels of monetary policy. A core lesson of these models is that the exact same policy may have very different real effects depending on the distribution of debt capacity across individuals in the economy.

## **How Does Monetary Policy Work?**

### *Empirical Evidence*

---

<sup>3</sup> *Wall Street Journal*, 2012. “Fed Wrestles with How Best to Bridge the U.S. Credit Divided,” June 19, 2012. See also *Economist*, 2012. “The Broken Transmission Mechanism,” October 3<sup>rd</sup>, 2012.

Analysis of monetary policy often begins with a model, and then finds data to help understand whether the model is useful. I believe this is the wrong approach, for the same reason Sherlock Holmes criticized this method in *A Scandal in Bohemia*: “It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories instead of theories to suit facts.” Data availability has exploded over the past 20 years, and we have excellent empirical research fleshing out exactly how households respond to monetary policy shocks. Let’s investigate the facts, and then explore what theoretical framework best matches those facts.

One of the central lessons from the empirical research is that there is substantial heterogeneity across households in their consumption response to monetary policy shocks. Let’s start with the most direct channel through which monetary policy functions: changes in interest rates. Two recent analyses use variation in the use of adjustable rate mortgages across households in the United States.<sup>4</sup> Both look at mortgages with an initial fixed interest rate originated in the mid-2000s, which then subsequently turn into adjustable rate mortgages. When the rate floats, households with these mortgages see a significant drop in interest payments due to extremely low interest rates in the Great Recession and afterward. The two studies are careful microeconomic studies that assess the *causal impact* of a rate reduction on spending, which is an important economic parameter in the transmission of monetary policy to the real economy.

Both studies show a similar result: for the same decline in interest payments, households with high mortgage debt burdens consume more. For example, Di Maggio, et al (2014) show that in response to the same interest savings, “high loan-to-value borrowers spend more than twice as much on durable goods as low loan-to-value households.”

The same pattern is found over a longer time period in the United Kingdom: as Cloyne, Ferreira, and Surico (2015) put it: “in response to an unanticipated change in interest rates, households with mortgage debt adjust their expenditure significantly, especially on durable goods, renters react to a lesser extent, and outright home-owners do not react at all.” They conclude based on this finding that “heterogeneity in housing debt positions plays an important role in the transmission of monetary policy.”<sup>5</sup>

Another channel through which monetary policy attempts to boost consumption is through increasing credit availability to households. A recent study by Agarwal, Chomsisengphet, Mahoney, and Stroebel (2015) estimates the marginal propensity to spend out of an exogenous increase in credit card limits, and the results are striking. For households with a FICO score below 660 (subprime), the marginal propensity to spend out of a dollar increase in the credit limits is more than \$0.50, and this effect is realized almost immediately. In contrast, borrowers with the highest FICO scores are almost completely unresponsive.<sup>6</sup> Figure 2 uses the Agarwal, et al (2015) data to show the marginal increase in total borrowing for each additional dollar of

---

<sup>4</sup> Keys, Benjamin, Tomasz Piskorski, Amit Seru, and Vincent Yao, 2014. “Mortgage rates, Household Balance Sheets, and the Real Economy,” Working Paper. And DiMaggio, Marco, Amir Kermani, and Rodney Ramcharan, 2014, “Monetary Policy Pass-Through: Household Consumption and Voluntary Deleveraging,” Working Paper.

<sup>5</sup> Cloyne, James, Clodomiro Ferreira, and Paolo Surico, 2015. “Monetary Policy When Households Have Debt: New Evidence on the Transmission Mechanism,” Working Paper.

<sup>6</sup> Agarwal, Sumit, Souphala Chomsisengphet, Neale Mahoney, and Johannes Stroebel, 2015. “Do Banks Pass through Credit Expansions? The Marginal Profitability of Consumer Lending During the Great Recession,” Working Paper.

credit limit, plotted separately for borrowers across the credit score distribution, and for different horizons after the account was opened.<sup>7</sup>

Perhaps the most important effect of monetary policy on credit availability happens through the housing market. For example, Aladangady (2015) argues that monetary policy easing boosts house prices, which in turn fuels home-equity based borrowing.<sup>8</sup> My own research with Atif Mian shows substantial heterogeneity across households in the marginal propensity to borrow and spend out of housing wealth. We find that households in the lowest quartile of the income distribution boost borrowing by \$0.25 for every dollar of house price appreciation, whereas households in the top 10% of the distribution are completely unresponsive.<sup>9</sup>

Figure 3 shows the marginal propensity to borrow out of a dollar increase in home equity across the credit score distribution in the left panel, and the marginal propensity to spend on a new vehicle across the income distribution in the right panel. We argue that the aggregate effect of house prices on consumption during the 2002 to 2006 housing boom in the United States was driven completely by borrowing against home equity by the bottom 75% of the income or credit score distribution. In other words, the “housing wealth effect” should more aptly be called a “housing borrowing effect,” and the effect is nonexistent for households at the top of the income distribution.

### *Theoretical Framework*

The standard representative-agent New Keynesian DSGE model employed for monetary policy formulation does not incorporate the large variation across households in the marginal propensity to consume. Instead, the only channel of monetary policy transmission to consumption in the standard model is inter-temporal substitution by the representative agent, and that response is governed by the elasticity of inter-temporal substitution. Let’s call this channel the *substitution channel*.

So how should we incorporate differences in the marginal propensity to consume across households into a theoretical framework of monetary policy transmission? Luckily, we now have a benchmark model in the thesis work of Adrien Auclert, a former MIT Ph.D. student who is joining the faculty at Stanford. In his study, he explores what he calls the “redistribution” role of monetary policy.<sup>10</sup> He builds a general equilibrium model with heterogeneity across households, and he argues that variation in marginal propensities to consume is crucial for understanding the elasticity of aggregate consumption with respect to monetary policy shocks.

More specifically, Auclert argues that monetary policy shocks can boost aggregate consumption through two channels beyond the substitution channel. First, there is the *interest rate exposure channel* which depends crucially on the *covariance across the population of interest rate*

---

<sup>7</sup> See also Gross, David and Nicholas Souleles, 2002, “Do Liquidity Constraints and Interest Rates Matter for Consumer Behavior? Evidence from Credit Card Data,” *Quarterly Journal of Economics*, 149-185. They find that the marginal propensity to consume out of a higher credit card limit is significantly larger for those close to the limit.

<sup>8</sup> Aladangady, Aditya, 2015 “Homeowner Balance Sheets and Monetary Policy,” Working Paper.

<sup>9</sup> Mian, Atif and Amir Sufi, 2014, “House Price Gains and U.S. Household Spending from 2002 to 2006,” Working paper.

<sup>10</sup> Auclert, Adrien, 2015. “Monetary Policy and the Redistribution Channel,” Working Paper.

*exposure and the marginal propensity to consume.* For example, suppose borrowers in the economy with adjustable rate mortgages have a much higher marginal propensity to consume than the savers that provide those mortgages through the financial system. In such a setting, a decline in interest rates will have an effect on aggregate consumption that is much larger than the substitution channel alone. The reason is straightforward: borrowers boost spending for every dollar of interest savings by more than the savers cut spending out of the dollar lost in interest income.

The second channel is the *Fisher channel*, which depends on the *covariance across the population in net nominal liabilities and the marginal propensity to consume*. This channel is more standard in the literature sparked by the seminal debt-deflation argument of Fisher (1933). Inflation benefits debtors. If monetary policy is able to generate inflation, and if indebted households have a larger marginal propensity to consume than other households, then the reduction in real debt burdens resulting from inflation generates a wealth effect that boosts overall aggregate consumption.<sup>11</sup>

I would add a third channel through which monetary policy affects consumption in a model with heterogeneous households: the *credit extension channel*. Monetary policy is more likely to have an effect on aggregate consumption if it *increases the willingness of the financial sector to channel savings from low marginal propensity to consume savers to high marginal propensity to consume borrowers*. This credit extension channel is quite broad, and includes the effect of monetary policy on the risk premium or on collateral value such as housing used for borrowing.

These three channels demonstrate an important theoretical insight: *distributional impact matters*. The effectiveness of monetary policy relies on more than just lower interest rates and higher asset prices. Instead, these effects must reach individuals with a high marginal propensity to consume. The representative agent model misses this key insight.

I refer to these channels—the interest rate exposure channel, the Fisher channel, and the credit extension channel—as the redistribution channels of monetary policy. Before the Great Recession, these channels were powerful mechanisms through which monetary policy affected the real economy. The microeconomic evidence on the large variation in marginal propensities to consume supports this view.

We also have macroeconomic evidence. For example, Calza, Monacelli, and Stracca (2013) use data from 1980 to 2008 across 19 advanced economies and find that countries with a higher share of adjustable-rate mortgages see a stronger effect of monetary policy shocks on residential investment and consumption.<sup>12</sup> Similar evidence is in Aladangady (2015). He shows that monetary policy shocks have a stronger effect on consumption in U.S. regions where housing supply is relatively inelastic. The mechanism is the credit extension channel mentioned above: house prices increase in inelastic areas, which facilitates additional borrowing and spending by

---

<sup>11</sup> For a quantitative assessment of this channel from before the Great Recession, see Matthias Doepke and Martin Schneider, 2006, “Inflation and the Redistribution of Nominal Wealth,” *Journal of Political Economy* 114: 2069-1097.

<sup>12</sup> Alessandro Calza, Tommaso Monacelli, and Livio Stracca, “Housing Finance and Monetary Policy,” *Journal of European Economic Association* 11: 101-122.

high marginal propensity to consume households. Gertler and Karadi (2014) use a VAR analysis in the United States and conclude that the primary channel through which monetary policy affects real economic activity is a reduction in credit costs, and in particular a reduction in credit spreads.<sup>13</sup> This risk premium effect is also consistent with the credit extension channel mentioned above, and is absent in the standard New Keynesian model.<sup>14</sup>

### **Why Has Monetary Policy Been so Weak?**

Monetary policy from 2008 to 2015 has been weak because the redistribution channels of monetary policy transmission have been severely weakened in the aftermath of the Great Recession. They have been weakened for several reasons.

- First, monetary authorities have been either unable or unwilling to generate significant inflation. The *Fisher channel* is therefore inoperative.
- Second, in many countries and especially in the United States, *the interest rate exposure channel* has been severely weakened because of the inability of large swaths of the population to refinance debt into lower market rates.
- Third, the credit extension channel requires that households with a high marginal propensity to consume have significant unused debt capacity. Such households have suffered major balance sheet problems over the past 7 years. As a result, lenders are unwilling to supply credit to these households even though their own cost of financing has been reduced considerably. And some households that normally spend aggressively out of credit extension have become more conservative and are paying down debt. The *credit extension channel* has been extraordinarily weak.

I want to focus on three areas that exemplify the problems with monetary policy mentioned above: the housing market in the United States, recent evidence on credit cards, and weak consumer lending in the Euro area.

#### *Housing Market in the United States*

The failure of the housing market to boost the U.S. economy serves as one of the strongest examples that the redistribution channels of monetary policy are weakened. We know from research discussed above that the elasticity of spending with respect to interest savings is largest for households with high debt burdens—especially high mortgage loan to home value ratios. However, it is precisely these households that have had the most difficulty refinancing fixed rate mortgages into lower interest rates.

---

<sup>13</sup> Mark Gertler and Peter Karadi, 2013. “Monetary Policy Surprises, Credit Costs, and Economic Activity,” Working Paper.

<sup>14</sup> Steve Cecchetti makes a related but slightly different point: the transmission of monetary policy is different across countries because of differences in financial and legal structure. Cecchetti, Steve, 1999. “Legal Structure, Financial Structure, and the Monetary Policy Transmission Mechanism,” *Economic Policy Review* of the Federal Reserve Bank of New York, Vol. 5, No. 2, July, 9-28.

Figure 4 splits zip codes in the United States into the top and bottom quartile based on the fraction of homeowners that are “underwater” on their mortgages: that is, their mortgage balance is larger than the value of the home. It then plots the share of outstanding mortgages that are refinanced into lower rates by year from 2005 to 2012. Zip codes with few underwater homeowners see refinancing rates after 2008 that are two to three times as high as zip codes with many underwater homeowners. As of March 2012, 70 percent of borrowers with a thirty-year fixed rate mortgage were paying an interest rate of 5 percent or more, despite the fact that market rates were only 3.8 percent.<sup>15</sup>

Given elevated debt burdens and frictions in the refinancing process, monetary policy faces severe impediments in delivering lower rates to exactly the homeowners that would boost spending the most. Recent research by Beraja, Fuster, Hurst, and Vavra (2015) confirms that the inability of heavily indebted homeowners to refinance into lower interest rates has depressed spending.<sup>16</sup>

But it’s not just the interest exposure channel. Borrowers today are either unwilling or unable to use housing collateral to finance consumption as they did from 2002 to 2006. The left panel of Figure 5 shows that house price growth from 2011 to 2013 in the United States was remarkably similar to house price growth from 2004 to 2006: between 15 to 20 percent. Many economic forecasters argued that rising U.S. house prices would fuel stronger growth in 2013 and 2014.

These forecasts proved incorrect because forecasters failed to appreciate the importance of differences across households. The households that spent most aggressively out of rising home equity from 2004 to 2006 either lost their home to foreclosure during the housing crisis, or are too indebted today to use their home as collateral for consumption. As the middle and right panel of Figure 5 show, rising house prices from 2011 to 2013 had a much weaker effect on cash-out refinancing volume and residential investment relative to similar house price growth from 2004 to 2006. The weakness of residential investment in the United States despite strong house price growth has been a main contributing factor to the extraordinarily weak U.S. recovery. The muted response of the real economy to rising house prices was easily predictable if one appreciated the importance of household heterogeneity.<sup>17</sup>

The ability of monetary policy to boost real economic activity hinges on the debt capacity of high marginal propensity to consume households. The housing market illustrates this painful lesson. Interestingly, we can also see this lesson in the one area of consumer spending in the United States that has performed well over the past five years: autos. Auto purchases have been a bright spot in the U.S. economic recovery. In nominal terms, new auto purchases are almost 15% above their 2006 level, whereas other durable goods remain 5% below their 2006 level. These patterns are shown in Figure 6.

---

<sup>15</sup> See Alan Boyce, Glenn Hubbard, Chris Mayer, and James Witkin, “Stream-lined Refinancings for Up to 13 Million Borrowers,” draft policy proposal, 2013.

<sup>16</sup> Martin Beraja, Erik Hurst, Andreas Fuster, and Joseph Vavra, 2015, “Regional heterogeneity and monetary policy,” Hutchins Center Working Paper 13.

<sup>17</sup> See for example my lecture, “Will Housing Save the U.S. Economy?” in April 2013 in which I said: “My bottom line is that we need to temper our optimism on what a housing recovery can do for the U.S. economy.”

[http://faculty.chicagobooth.edu/amir.sufi/research/Sufi\\_bootheconomicoutlook\\_20130423.pdf](http://faculty.chicagobooth.edu/amir.sufi/research/Sufi_bootheconomicoutlook_20130423.pdf)

Why have auto sales done so well, while purchases of other durables so poorly? The answer is debt capacity. Lenders learned in the Great Recession that autos have higher collateral value than they previously believed, and lenders are able to repossess a car much more easily than a home. A report by Equifax compared mortgages to auto loans, and came to the following conclusions: “Since the housing bust, foreclosure timelines have stretched to more than 1000 days in some states ... In auto lending, by contrast, the lender may determine that the debt is uncollectable and repossess the vehicle in as little as 60 days following nonpayment ... While cars are a depreciating asset, consumers are nonetheless maintaining their personal vehicles longer than ever ... that translates to stronger, more accurate and predictable collateral for auto loans, a direct contrast from the often speculative value of houses during the run-up to the financial crisis.”<sup>18</sup>

For lenders, paraphrasing the mysterious voice that Kevin Costner hears in *The Field of Dreams*: “if you have good collateral, they will lend.” Of course, the debt capacity of autos is tiny compared to the potential debt capacity of real estate. As a result, strong growth in auto loans cannot boost aggregate consumption sufficiently.

#### *New Evidence from Credit Cards*

A common strategy by central banks to boost economic activity during a downturn is lowering the cost of capital for financial intermediaries in an attempt to boost lending. The targeted longer-term refinancing operations (TLTROs) by the European Central Bank is a prime example. We know from research cited above that credit extension via credit cards to low credit score households would boost spending considerably. So why have lower interest rates and cheaper financing for intermediaries not translated into more borrowing and spending by low credit score households?

Recent research by Agarwal, et al (2015) explains why. Their key insight is that banks respond to lower financing costs by extending credit to exactly the households that are least likely to spend. More technically, a credit card company’s marginal propensity to lend (MPL) out of cheaper financing is largest for *high credit score* individuals, who are the same individuals that have the lowest marginal propensity to consume (MPC) out of credit availability.

They use excellent panel data on 160 million credit cards from 2008 to 2013; the quality of the data allows them estimate both the MPC out of additional credit by borrowers and the MPL out of cheaper funding costs by lenders. Figure 7 replicates their result showing the MPC and MPL across the credit score distribution. From 2008 to 2013, banks had the lowest MPL to exactly the households that have the highest MPC. Stimulatory policy that reduces the costs of financing for banks is less effective because the resulting loans do not go to those that spend.

As the authors note, failure to account for the differences across households in the marginal propensity to lend and borrow leads to faulty conclusions on policy effects: “Suppose the effect of a decrease in the cost of funds was naively calculated as the product of the average MPL and

---

<sup>18</sup> Amy Cutts and Dennis Carlson, 2015. “Subprime Auto Loans: A Second Chance at Economic Opportunity,” *Equifax Economic Trends Commentary*, February 17.

average MPB in the population ... we estimate that such a calculation would overstate the true effect of a decrease in the cost of funds on total borrowing after 12 months by between 132% and 166%.” Ignoring differences across households by using average responses massively overstated the ability of monetary policy to boost spending through additional lending during the Great Recession.

### *Drought in Consumer Lending in the Euro Area*

Up to this point, I have focused mostly on empirical studies conducted in the United States. This reflects the fact that research using microeconomic data has advanced more quickly there than in the rest of the world. However, a growing body of research out of central banks in other countries demonstrates the importance of household debt and distributional issues. For example, Philip Bunn and May Rostom study microdata from the United Kingdom and show that “high levels of household debt have been associated with deeper downturns,” and that cuts in spending associated with debt were a drag on consumption during recent recession.<sup>19</sup> Andersen, Duus, and Jensen use micro data from Denmark and show “a strong negative correlation between pre-crisis leverage and the change in non-housing consumption during the crisis.”<sup>20</sup> The microeconomic data support the argument that elevated debt levels have depressed borrowing and spending in Europe.

The macroeconomic evidence also supports this view. As the most recent ECB financial stability review put it: “On average, bank lending to euro area households has remained subdued, mirroring sluggish dynamics of household income, high levels of unemployment and housing market weakness in some countries.” Even extraordinary monetary stimulus has had a limited effect on lending to households. Figure 8 shows total consumer debt in the Euro area, which has been falling every year since 2010.

The frictions outlined here also explain why the targeted long-term refinancing operations (TLTROs) initiated by the ECB in June 2014 have had only moderate success. While there are certainly intermediaries facing financing problems, the main restriction on lending in Europe is not an excessively high cost of capital for banks. Instead, economic prospects simply have not justified more lending, and pushing down the cost of capital for banks will not change this fact. Households that would normally want to borrow to spend have suffered weak balance sheets, and firms have too few good opportunities. Many of the policy actions presume that positive net present value projects abound in plentiful supply in Europe, if only we could get banks to fund them. My view is there have been too few positive net present value projects given the current economic circumstances. And there is very little the monetary authority can do to encourage lending to heavily indebted households.

There is some recent evidence of an uptick in borrowing by households and small businesses. I believe this reflects more the fundamental condition of households and small businesses rather

---

<sup>19</sup> Philip Bunn and May Rostom, 2014, “Household debt and spending,” *Bank of England Quarterly Bulletin* Q3: 304-315.

<sup>20</sup> Asger Lau Andersen, Charlotte Duus, Thais Laerkholm Jensen, 2014, “Household debt and consumption during the financial crisis: Evidence from Danish micro data,” *Danmarks NationalBank Working Papers* 2014-89.

than a lower cost of capital for banks. Lending will rebound when balance sheets are repaired and economic conditions improve, and it appears these processes may finally be upon us.

### *Contrast with Zero Lower Bound*

In my view, the main friction facing monetary policy is that the redistribution channels normally at work have been broken. Representative-agent models propose an alternative explanation for weak monetary policy: the zero lower bound on nominal interest rates. I agree that the zero lower bound on nominal interest rates is an important factor in explaining weak monetary policy. In fact, even economic models with household debt where redistribution channels play an important role rely on the zero lower bound to explain severe economic contractions.<sup>21</sup>

But I believe many economists overplay the zero lower bound card. Short-term Treasury bill interest rates have been at the zero lower bound in the United States since November 2008. However, from November 2008 to May 2013, interest rates on 30-year fixed rate mortgages fell from 6% to 3.3%, a stunning 270 basis points. Figure 9 shows these patterns. The 30-year fixed rate mortgage is far more important for household borrowing decisions than the 3-month T-bill rate. While one could argue that the 30-year mortgage rate would have fallen even further in the absence of the zero lower bound on nominal interest rates, one cannot argue that the most relevant interest rates for households have been stuck at a high level since 2008. *They have fallen dramatically*, and yet the economic slump illustrated in Figure 1 continues.

The redistribution view of monetary policy explains economic weakness despite falling mortgage interest rates quite easily. Lower mortgage interest rates only translate into a boost in spending if they reduce interest payments or enable additional borrowing by households with a high marginal propensity to consume. I have already outlined the reasons above why this has not happened.

Put another way, imagine a counter-factual mortgage market in the United States in which high marginal propensity to consume households with mortgages all had their interest rates immediately re-set to 3.5% in 2009. Or alternatively, imagine that households with low credit scores were able to borrow as easily as they did during the housing boom at prevailing rates of 3.5%. My contention is that either counter-factual world would have seen a huge boost in aggregate spending. The zero lower bound matters, but frictions clogging the redistribution channel of monetary policy are more important.

### **What Are the Policy Lessons?**

The most obvious policy lesson from the framework I have outlined here is more aggressive restructuring of household debt burdens. Atif Mian and I have made this case forcefully elsewhere, including an extensive discussion of moral hazard and the danger of imposing losses

---

<sup>21</sup> See Eggertsson, Gauti and Paul Krugman, 2012, “Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach,” *Quarterly Journal of Economics* 1469-1513; Guerrieri, Veronica and Guido Lorenzoni, 2015, “Credit Crises, Precautionary Savings, and the Liquidity Trap,” Working Paper; and Korinek, Anton, and Alp Simsek, 2015 “Liquidity Trap and Excessive Leverage,” Working paper.

on a weakened banking sector.<sup>22</sup> As I have written, I believe that failure to more aggressively tackle household debt was one of the biggest policy mistakes of the Great Recession.

However, I believe it is more fruitful to focus on other policy issues today. I appreciate the fact that debt restructuring on a wide scale is politically explosive and largely outside the purview of central bankers. Further, the benefits of household debt restructuring today are likely significantly lower than they were five years ago. Making matters even more difficult, a private debt problem in Europe has been transformed into a public debt problem, leading to a wider set of issues that are far too complicated for this lecture. For all of these reasons, let me discuss other policy recommendations.

### *Lessons for Monetary Policy*

Monetary stimulus has had limited effect on the real economy over the past 7 years because redistribution channels of monetary policy are broken. But what does this mean for optimal monetary policy stance? In a reduced form New Keynesian model, my argument implies a much steeper IS curve. Given a steeper IS curve, a natural conclusion is that monetary policy should simply push harder to affect the real economy.

This is what former Federal Reserve Governor Jeremy Stein calls the “Tylenol dilemma.” A patient is rushed into an emergency room after a terrible car accident, suffering many broken bones and other ailments. You as a doctor have available only Tylenol to treat the patient. How much should you give? As Professor Stein has pointed out, it surely depends on the side effects of Tylenol!

The analogy helps un-package the heated debate on monetary policy when the transmission mechanism is weak. In particular, many have argued that extraordinary monetary policy efforts such as aggressive quantitative easing have distorted asset prices and raised financial stability concerns—potentially nasty side effects of an extreme dosage. But others counter that taking away the drug from the patient leads to unnecessary suffering: How can we withdraw the medication when the patient is still in serious pain?

The debate is difficult to resolve in part because the effects of monetary easing and tightening have asymmetric effects once differences in household spending propensities are taken into account. In the model of Auclert (2015), an increase in interest rates depresses consumption by more than a reduction in the interest rate boosts consumption. As he says, “This asymmetry in the effects of monetary policy comes from the differential response of borrowers at their credit limit to rises and falls in income: while these borrowers save an important fraction of the gains they get from low interest rates, they adjust spending one for one with every dollar increase in the payments they have to make when interest rates rise.”

This is what I call the *monetary policy asymmetry predicament*: keeping interest rates extraordinarily low may not boost consumption significantly, but increasing interest rates is

---

<sup>22</sup> See in particular Chapter 11 of our book *House of Debt: How They (and You) Caused the Great Recession and How We Can Prevent It from Happening Again*, University of Chicago Press, 2014.

likely to have a significant negative effect on household spending. The Auclert model highlights a problem everyone here knows: Central bankers are in a tight spot!

Researchers at the Resolution Foundation in the United Kingdom have estimated the potential negative effects of tightening monetary policy.<sup>23</sup> They find that “even a relatively benign unwinding of today’s emergency interest rate position ... has the potential to roughly double the number of households facing some form of repayment problem by 2018.” In particular, in response to a two percentage point increase in borrowing costs, 44% of households would be forced to take some form of action such as cutting spending. As the authors point out, it is the uneven distribution of debt burdens that is crucial to understand why a rapid rise in interest rates is perilous.

Given the asymmetry predicament, I tend to agree with continuing to administer the pain reliever. While the side effects are no doubt worrisome, I weigh more heavily the tangible pain the patient will experience if monetary policy is tightened too abruptly. For example, we know in the United States many heavily indebted individuals have adjustable rate mortgages. There is little doubt that a tightening of monetary policy will reduce spending by such individuals. This is a tangible harm associated with tightening. I come from a finance background and wholeheartedly agree that central bank actions are having a worrisome effect on asset prices and financial stability, but the harm associated with this effect is less tangible than the harm associated with raising rates prematurely.

At the same time, the framework I have outlined in this lecture suggests few gains from programs that are designed to boost lending by further lowering the cost of capital of banks. I think monetary policy makers need to move away from the argument that banks are not lending because they face a high cost of capital. This may be true of some banks, but I do not believe that a difficult financing environment is a major impediment to bank lending. Excessive household debt and weak economic prospects explain weak bank lending, not troubled banks.

### *Regulation and Institutional Design*

The ability of monetary policy to boost economic activity will be severely diminished when there is limited debt capacity of households with a high marginal propensity to consume. This is a key lesson emerging from research on the redistribution channels of monetary policy. Central bankers should worry about this problem because severe economic contractions often occur after rapid increases in household debt, something Atif Mian, Emil Verner, and I have shown in new research we released last week.<sup>24</sup>

More specifically, we use data for 30 countries from 1960 to 2012, and run panel regressions forecasting GDP growth. We show that a rise in the household debt to GDP ratio in a country from four years ago to last year forecasts lower growth over the next three years. This forecasting power is unique to household debt; neither non-financial firm debt nor net foreign debt forecasts GDP growth. This builds on my earlier research with Atif Mian showing that

---

<sup>23</sup> See Whittaker, Matthew and Katie Blacklock, 2014, “Hangover Cure: Dealing with the household debt overhang as interest rates rise,” *Resolution Foundation Report*, July.

<sup>24</sup> Mian, Atif, Amir Sufi, and Emil Verner, 2015, Household Debt and Global Growth, Working Paper

cross-sectional variation in the rise in household debt across different parts of the United States from 2002 to 2006 predicts which areas of the country suffered the worse during the Great Recession. Research by Jorda, Schularick, and Taylor concludes that recessions associated with higher household debt burdens tend to be the most severe.<sup>25</sup> Economists at the Bank of International Settlements have long appreciated the role of debt in generating macroeconomic instability.<sup>26</sup>

One must always use caution when forecasting out-of-sample. But I believe we have enough evidence at this point to warrant closer monitoring and potential limits on household debt during booms. In particular, regulators should understand that a large increase in the household debt to GDP ratio over a three to five year period is associated with a reduction in GDP growth over the next three years. Further, elevated household debt cripples monetary policy when it is most needed to help boost growth.

Theoretical research also justifies potential limits on household debt.<sup>27</sup> The reasoning in these models is based on an “aggregate demand externality”: debtors borrow during the boom more than a social planner would want them to borrow because borrowers do not internalize the effect of their pullback in spending on others in case of a bust. As Korinek and Simsek (2014) argue, “The competitive equilibrium is constrained inefficient. Welfare can be improved by ex-ante macro-prudential policies such as debt limits and mandatory insurance requirements.”

The United Kingdom has heeded this warning and implemented restrictions on the amount of high debt-to-income mortgages originated by banks. I believe this is a smart strategy, and one that should be studied and potentially implemented in other countries experiencing a sharp increase in household debt burdens.

Fortunately, while the world economy faces a number of challenges, exploding household debt is not a major issue today in most countries. The variable that best forecasts a decline in GDP growth in Mian, Sufi, and Verner (2015) is the change in the household debt to GDP ratio from four years ago to last year. The average of this variable in 2007 across the 30 countries in our sample was 7.5 percentage points. The three countries with the largest increase as of 2007 were Ireland (33.5), Spain (20.5), and Greece (18.5), all of which subsequently had very bad downturns. The dramatic rise in global household debt forecasted the severe global recession quite well.

In 2013, the latest data we have available, the average increase in the household debt to GDP ratio across the 30 countries in the sample is only 0.7 percentage points, which reflects the fact that many countries have seen a decline in household debt. The three countries with the largest

---

<sup>25</sup> Oscar Jorda, Moritz Schularick, and Alan M. Taylor, 2014, “The Great Mortgaging: Housing Finance, Crises, and Business Cycles,” Working Paper.

<sup>26</sup> See for example, William White, 2009, “Modern Macroeconomics is on the Wrong Track,” *Finance & Development* December: 15-18; Claudio Borio and William White, 2004, “Whither Monetary and Financial Stability? The Implications of Evolving Policy Regimes,” *BIS Working Paper #147*; Jaime Caruana and Benjamin Cohen, 2014, “Five questions and six answers about macroprudential policy,” *Banque de France Financial Stability Review #18*, April

<sup>27</sup> Korinek and Simsek (2014); Emmanuel Farhi and Ivan Werning, 2015, “A Theory of Macroprudential Policies in the Presence of Nominal Rigidities,” Working Paper, 2015.

increases are Thailand (12.4), Singapore (12.2), and Greece (6.6), although the latter is driven by falling GDP rather than a sharp rise in household debt. South Korea and Hong Kong are fifth and sixth on the list as of 2013, raising some concern on trends in East Asia. But overall, household debt is not growing rapidly at the global level. It is worth considering macro-prudential regulation of household debt burdens as a policy tool, although it may not be needed in most countries at this time.

While macro-prudential limits on household debt are advisable when household debt burdens are growing, the longer term solution requires a direct attack on the use of debt as a financial contract. As we argue in our book, the key problem with debt is its inflexibility when the economy collapses. Losses are shared unequally, with high marginal propensity to consume debtors experiencing the largest losses. The reduction in consumer spending by debtors overwhelms the economy, and monetary policy is poorly positioned to clean up afterward.

The long-run solution must be institutional changes that stop encouraging the use of inflexible debt, and instead promote more contingent contracting. The most ambitious proposal we make in our book is to have household debt that is indexed to measures of economic activity such as house prices or GDP growth. Our *shared responsibility mortgage* would see the principal balance fall automatically if a local house price index falls. Lenders in turn would capture some of the capital gain if a homeowner sells when the market is strong. Calculations in our book suggest that the cost of financing would not increase substantially if lenders were promised just 5% of the capital gain at sale. The core idea is to make the mortgage more equity-like, and less debt-like.

Automatic triggers in contracts would more equally distribute losses across the population, and would help preserve debt capacity better than our current system. Someone has to lose when asset prices and the economy collapse. But it matters how those losses are distributed. More equity-like financing for banks and households would help cushion the real economy when disaster strikes.

An interesting related idea is the *ratchet mortgage* by Bert Ely and Andrew Kalotay. It is essentially a one-way adjustable rate mortgage where the interest rate paid by the borrower is tied to a long-term government bond rate such as the 10-year Treasury bond. The key characteristic is that interest rates only adjust *downward*: if the reset formula yields a higher interest rate than the current rate paid by the borrower, then the current rate prevails. The initial interest rate on a ratchet mortgage would be higher than a fully floating adjustable rate mortgage, and slightly higher than most fixed rate mortgages. Given the aggregate benefits to stronger monetary policy pass-through during an economic downturn, the government should play an active role in encouraging its use. At the very least, the government should cease promoting mortgages that have the terrible property of being difficult to refinance when interest rates fall.

Both of these ideas rest on the assumption that a key function of the financial sector is to promote better risk sharing. In particular, I believe policy efforts should encourage the use of financial products that reduce the wealth losses of high marginal propensity to consume individuals during economic downturns. It is more efficient from a macroeconomic perspective to have low marginal propensity to consume individuals bear more aggregate risk – and they

should be properly compensated for bearing such risk. Governments throughout the advanced world promote financial arrangements that do the exact opposite: for example providing a tax deduction for interest payments on inflexible debt financing. We need to re-think what the financial sector is supposed to do. And one of the ancillary benefits would be more effective monetary policy when it is needed most.

## **Conclusion**

In conclusion, I want to express the honor I feel for being invited to give the Andrew Crockett Memorial lecture. I used the invitation as an opportunity to read more carefully Andrew Crockett's work, and I was incredibly impressed with his ability to extract practical real-world lessons from more abstract intellectual ideas.

While much of his writing focused on the goal of preserving stability in the financial sector, he had a deep appreciation for issues surrounding debt burdens in general. In a paper written in 1997, he noted:

“One could, indeed, go further and regard the financial position of firms and households more generally as a potential source of systemic concern. This would be in the tradition of the 'debt-deflation' literature of the 1930s. A number of writers have pointed to the possibility that an excessive build-up of corporate and household sector debt during a period of economic expansion carries the danger of exacerbating recessionary tendencies when the downswing in a cycle comes around. This is because a weakening of economic activity both increases the difficulties economic agents face in servicing their outstanding debt, and reduces their net worth, making it harder for them to engage in further borrowing. There can be little doubt that excessive debt levels have a potential role to play in transmitting the effects of financial instability to the real economy ...”<sup>28</sup>

I agree wholeheartedly. Thank you.

---

<sup>28</sup> Andrew Crockett, 1997, “The Theory and Practice of Financial Stability,” *Essays in International Finance*, 223, April.

Figure 1  
Real GDP Relative to Pre-Recession Trend

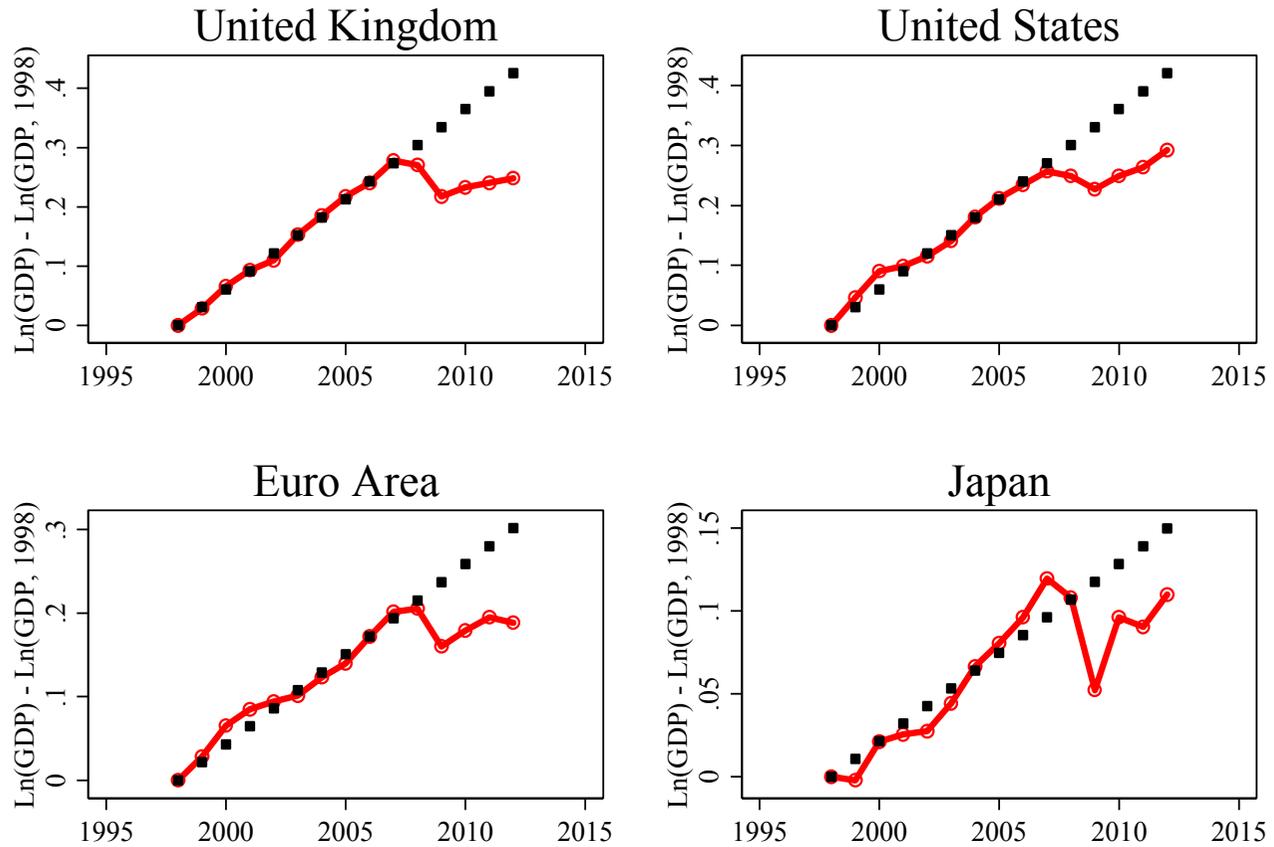
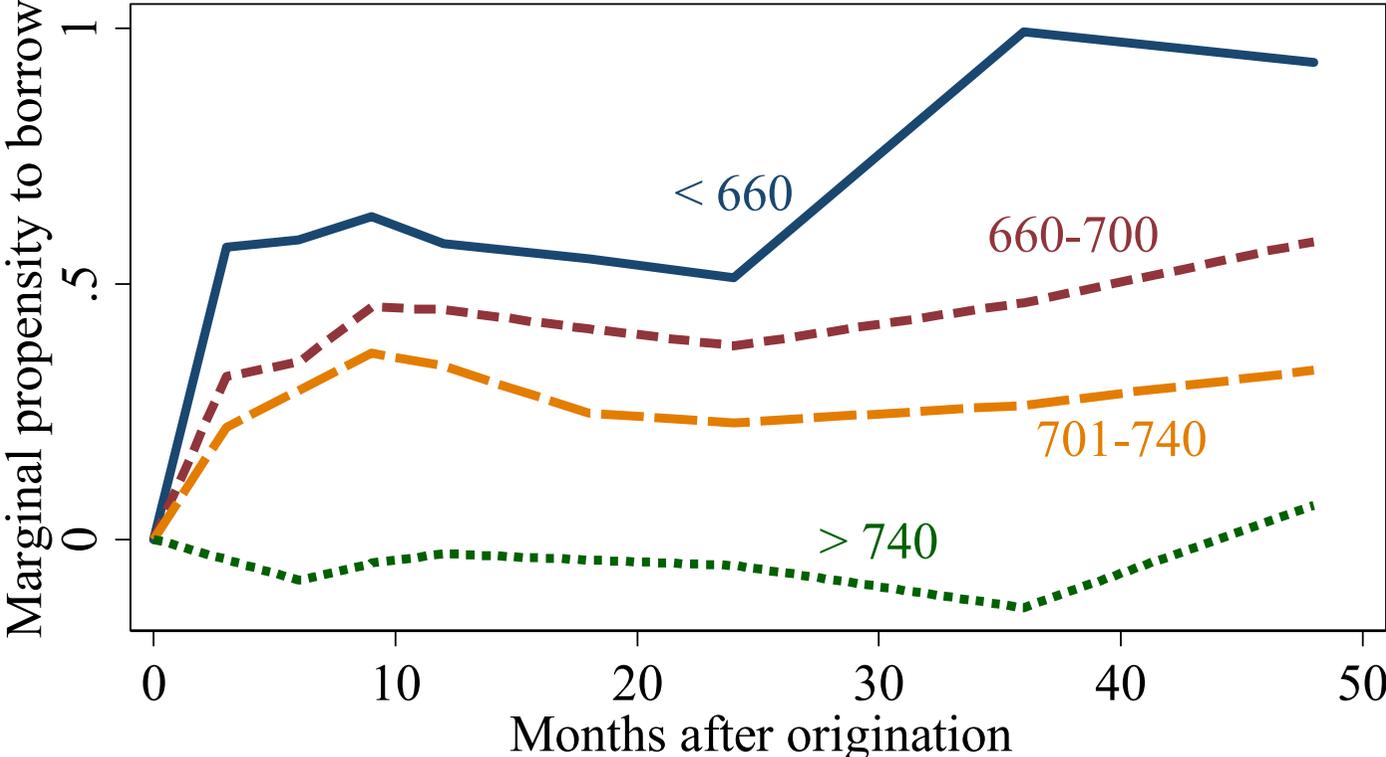
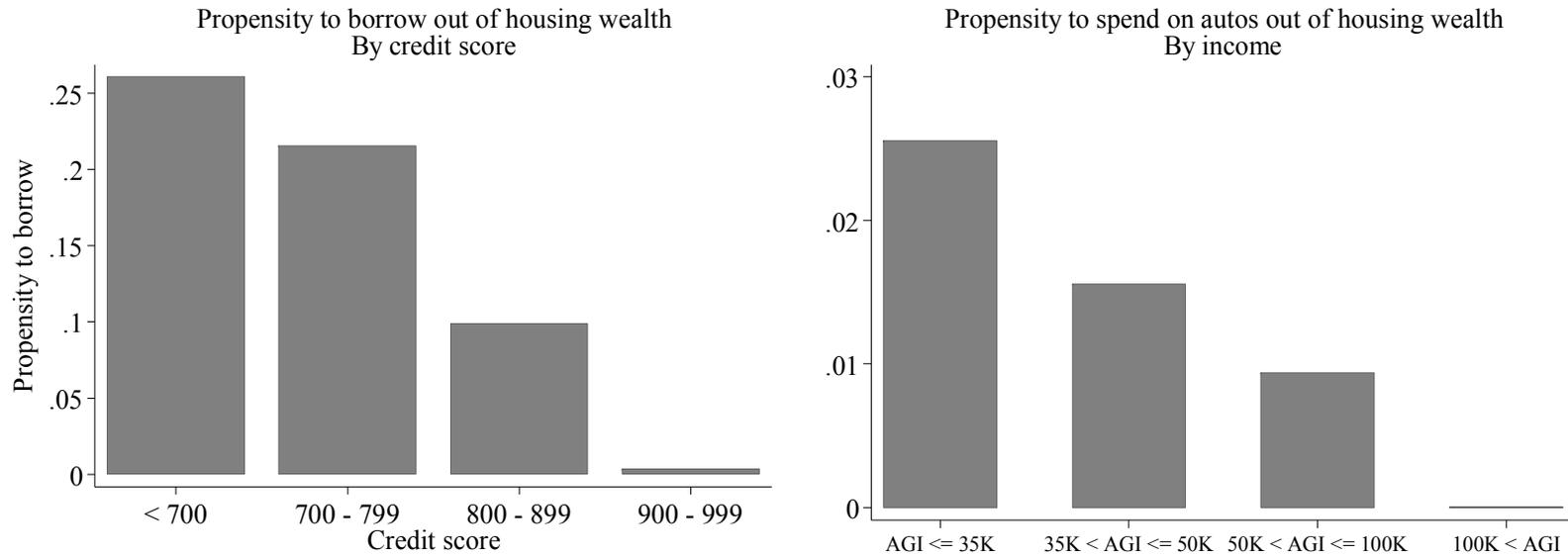


Figure 2  
Marginal Propensity to Borrow out of CC Limit  
By Credit Score



Note: This chart is directly from Agarwal, Chomsisengphet, Mahoney, and Stroebel (2015).

Figure 3  
Marginal Propensity to Borrow and Spend out of Housing Wealth



Note: This chart is directly from Mian and Sufi (2014).

Figure 4  
Underwater Homeowners Less Likely to Refinance Mortgage

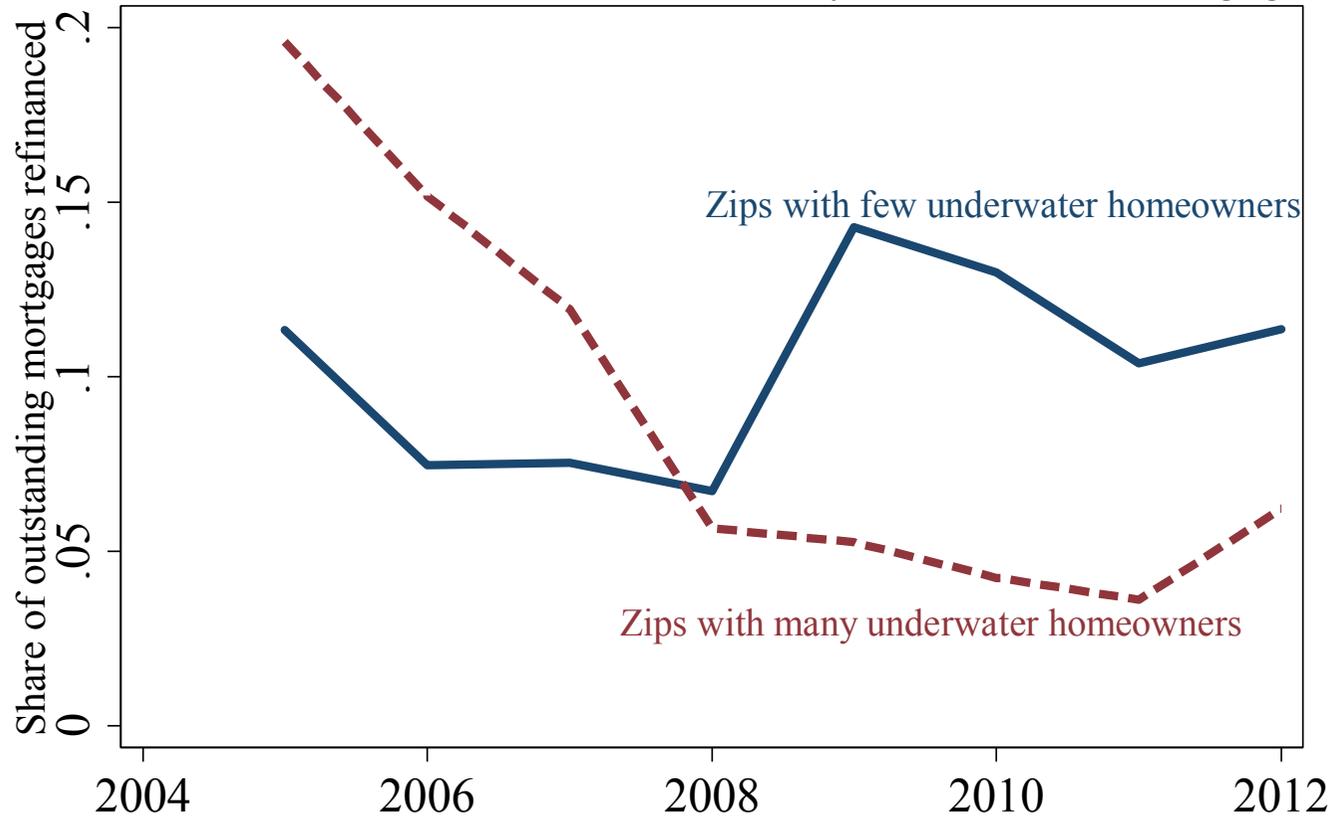


Figure 5  
Recent House Price Growth Has Not Fueled Economy in United States

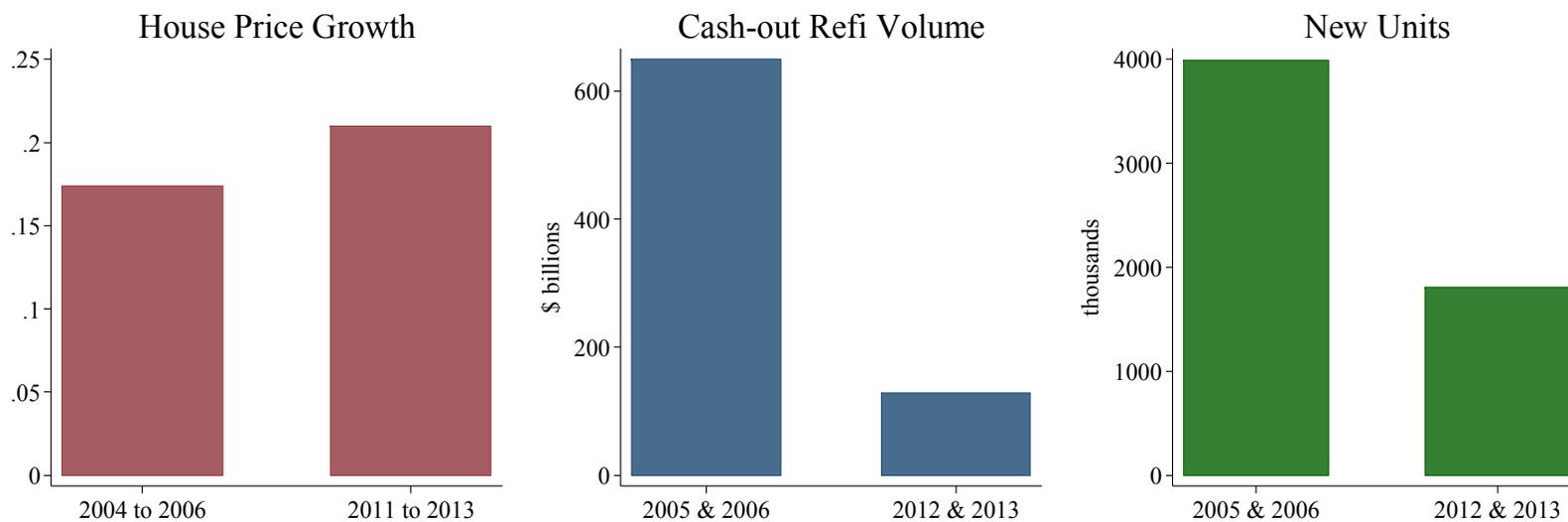


Figure 6  
Purchases of Autos and Other Durables in United States

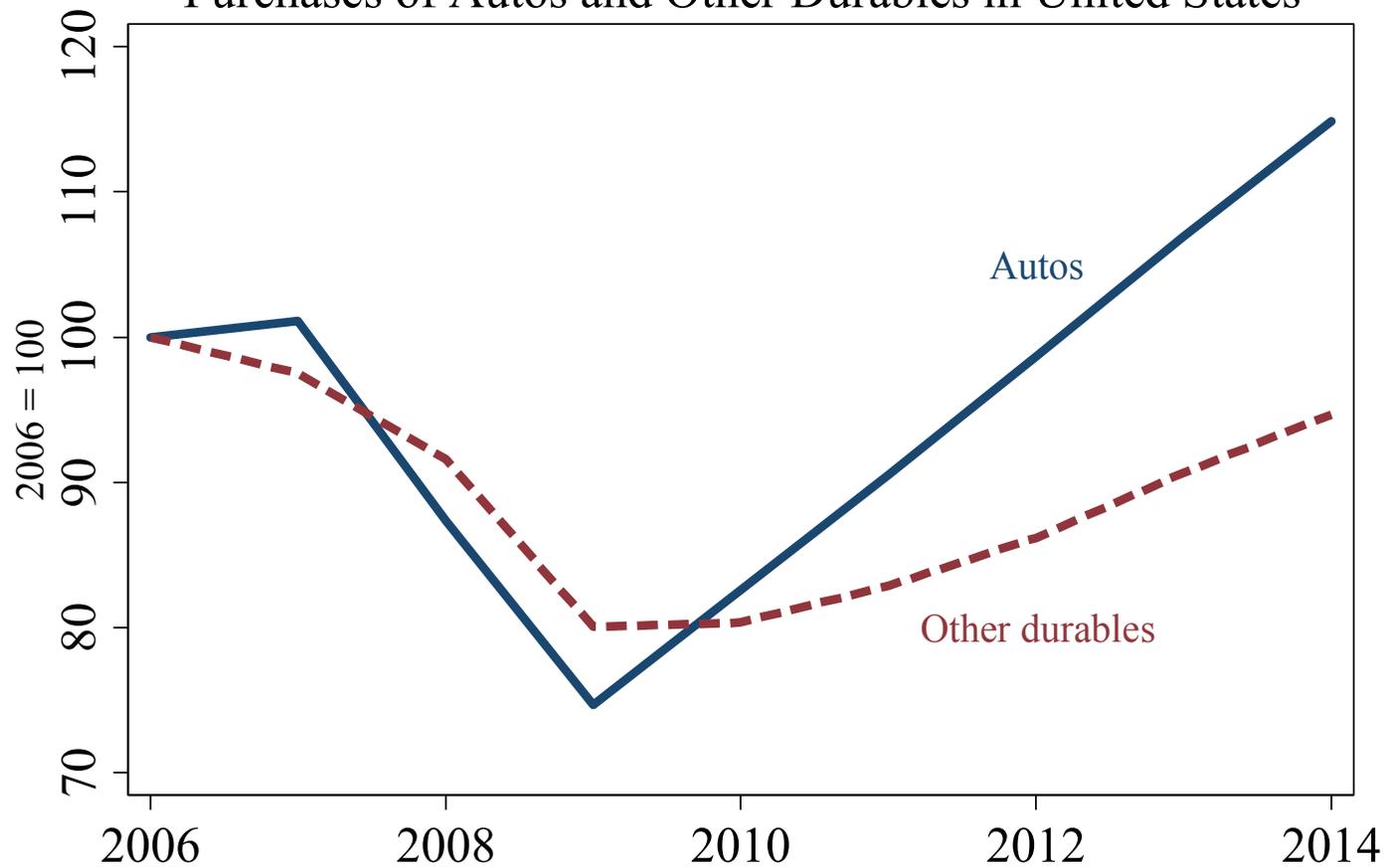
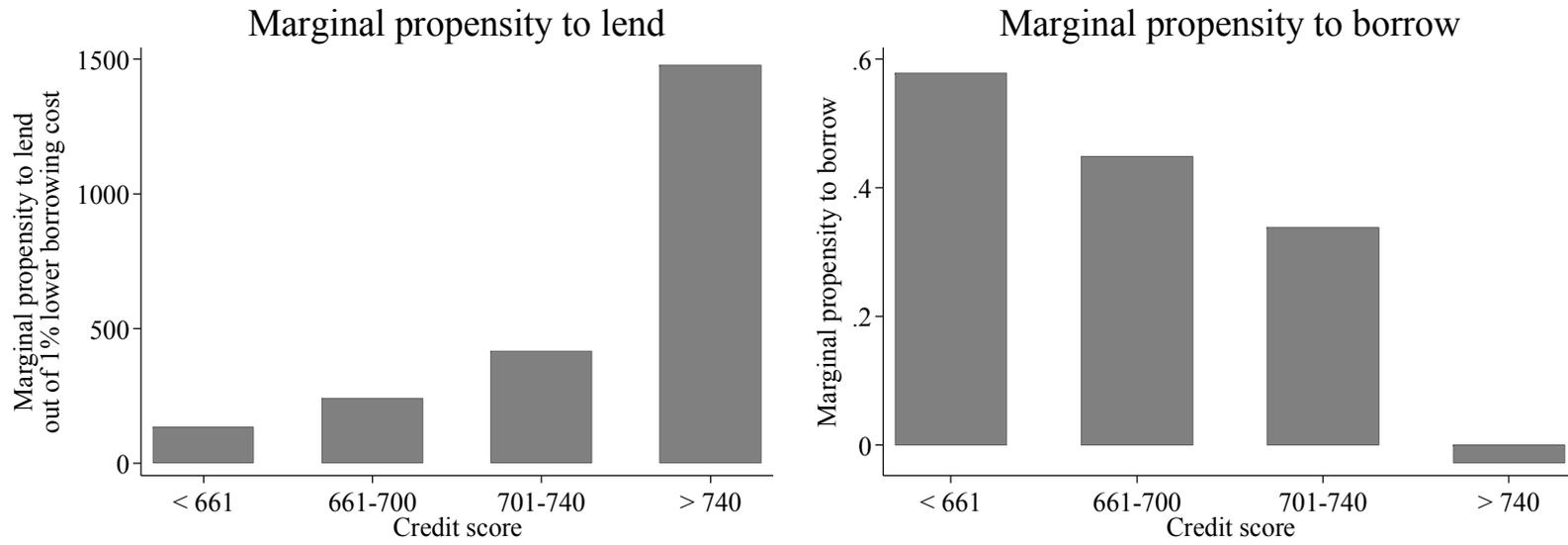


Figure 7  
Credit Card Companies Lend to People Who Do Not Spend



Note: This chart is directly from Agarwal, Chomsisengphet, Mahoney, and Stroebel (2015).

Figure 8  
Outstanding Consumer Debt in Europe

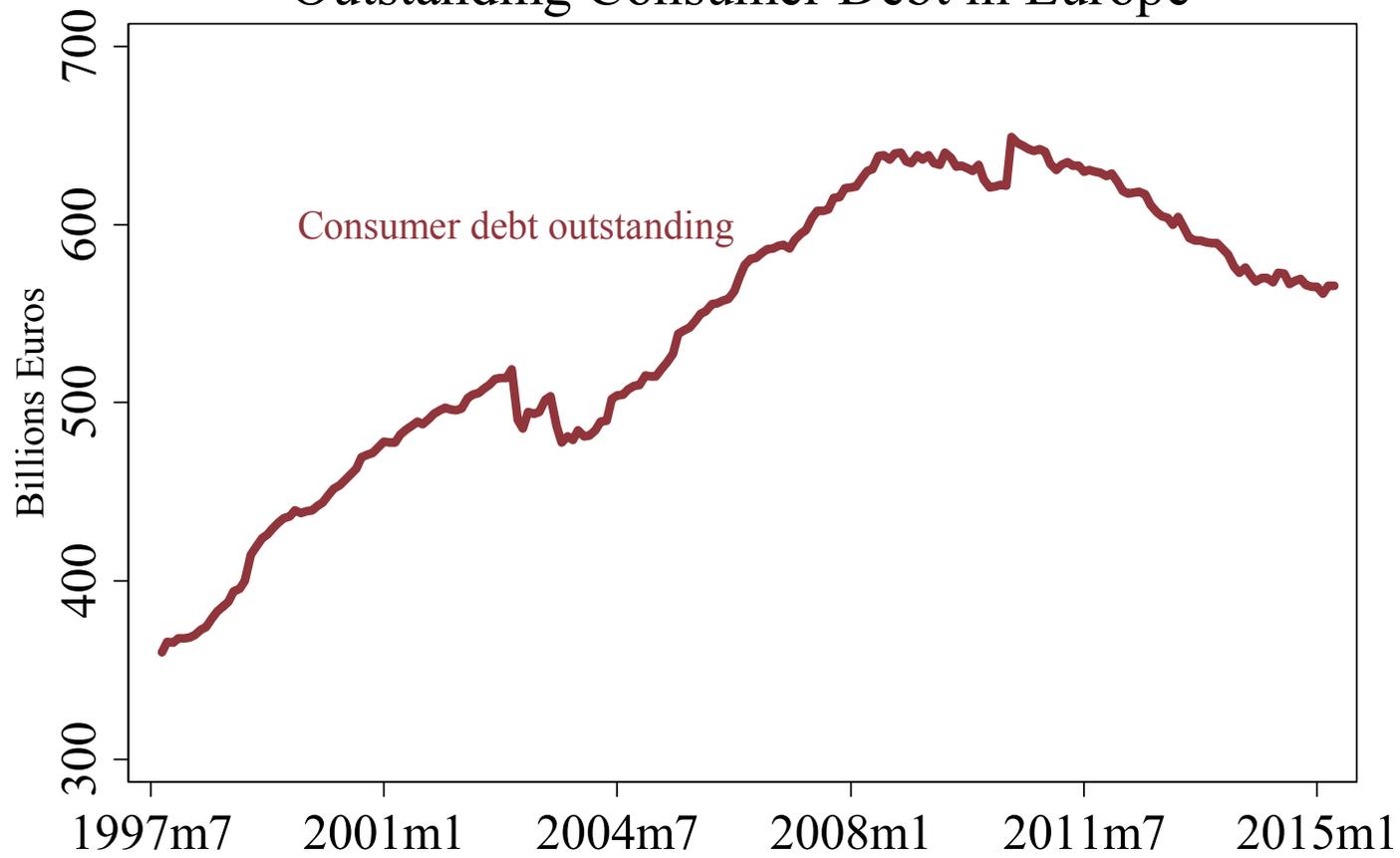


Figure 9  
Is Zero Lower Bound a Constraint on Mortgage Rates?

