

Economics

20 December 2011 | 20 pages

Empirical and Thematic Perspectives

U.S. Household Saving and Deleveraging – What's Next?

- This essay examines the outlook for U.S. household debt deleveraging and saving. Specifically, we first consider some empirical evidence as to what levels of household indebtedness are likely to prove sustainable over the medium term. And second, with this evidence in hand, we assess the impact that balance sheet developments, including the evolution of both household debt and net worth, are likely to have on the trajectory of saving rates going forward.
- Since the onset of the financial crisis in mid-2007, household indebtedness—scaled by disposable income (a key measure of households' capacity to carry debt)—has been on a gradual downward path. The decline in this ratio has been driven primarily by rising nominal disposable income, but absolute debt levels have also been pared, reflecting both paydowns and write-offs by lenders. Notwithstanding these declines, our work suggests that household debt remains well above sustainable levels and, thus, is likely to continue to move down in coming years.
- Our expectation is that this downward adjustment in debt levels will continue to occur gradually and without disruption. This view is supported by two observations: first, household net worth is fairly well-aligned with longer-term averages; and second, debt-service indicators are at historically low levels, as accommodative monetary conditions have allowed many households to refinance debt and lock in low interest rates. These observations suggest that households' overall balance-sheet positions are not overly stressed at present.
- Even so, we recognize that further adverse shocks—most likely associated with an intensification of financial stresses in Europe—could trigger a more abrupt adjustment. U.S. households would be particularly vulnerable in the event of a sharp decline in asset prices, a weakening in the trajectory of disposable income, or a renewed tightening in credit conditions. Indeed, in the event of such developments, the resulting deterioration in U.S. household balance sheets could become an important channel amplifying the shock to the domestic and global economies.
- Finally, we present evidence suggesting that the U.S. household saving rate is likely to move in a range of roughly 4 to 5 percent over the medium term, driven by expected moves in net worth, real interest rates, and labor market conditions. We also find that when debt levels are elevated relative to historical norms, households tend to respond defensively by pushing up the saving rate.

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See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

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U.S. Household Saving and Deleveraging – What’s Next?

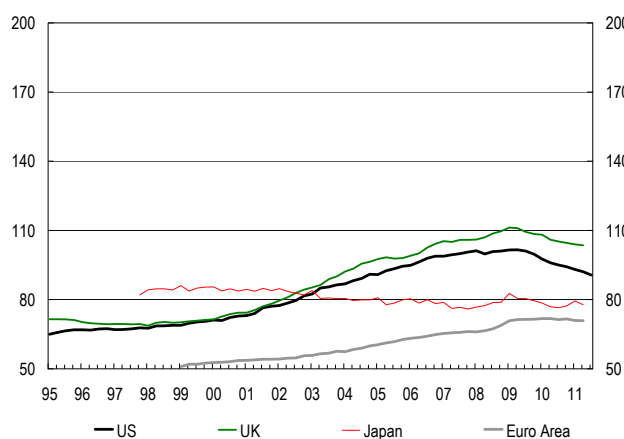
The International Context

An examination of debt burdens across countries calls to mind Tolstoy’s quip that the story of each happy family is essentially similar, but each unhappy family has its own unique saga of woe and sorrow. By this metric, the industrial countries are now very much like a collection of unhappy families, with policymakers in the United States, the euro area, Japan, and the United Kingdom each having their own unique troubles managing current levels of indebtedness.

The challenges that these four economies face with heavy public debt burdens are well documented. In framing this issue, however, it’s important to consider national balance sheets in their broadest possible terms, especially the behavior of private debt. As highlighted by our colleague Michael Saunders in the November edition of *Global Economic Outlook and Strategy*, private indebtedness generally surged in the years before the financial crisis.

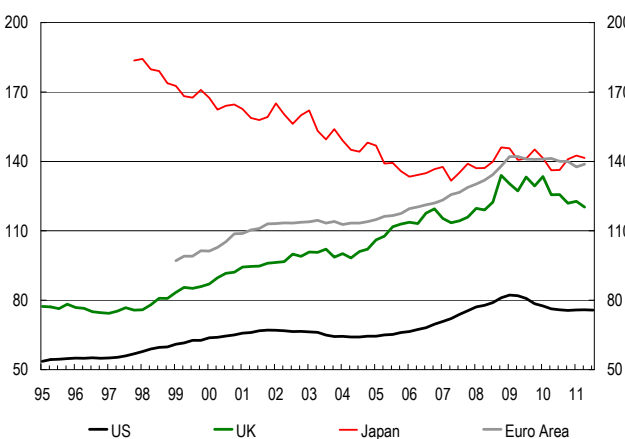
Figures 1 and 2 present some summary evidence on this issue. In the United States, the run-up in private debt in the period before the crisis was particularly sharp in the household sector, where debt jumped from just over 70 percent of GDP in 2000 to 100 percent of GDP in 2007. The rise in corporate indebtedness was somewhat less pronounced (moving up from 65 percent of GDP in 2000 to a peak of just over 80 percent of GDP at the end of the decade), while the level of corporate debt was markedly below that of the other major economies. In contrast, the euro area saw a more moderate increase in consumer debt in the years before the financial crisis, but recorded a much sharper rise in corporate debt.¹ And the U.K. posted sizable increases in both household and corporate debt levels. Notably, however, in the years since the financial crisis erupted, the United States and the United Kingdom have made progress in bringing down private debt levels, while such progress for the euro area is less apparent. Finally, Japan’s experience has been more idiosyncratic, with the behavior of private debt reflecting sustained efforts, particularly by firms, to repair balance sheets following the bursting of the asset bubble in the early 1990s.

Figure 1. Household Debt (Percent of GDP)



Source: Haver Analytics.

Figure 2. Nonfinancial Corporate Debt (Percent of GDP)



¹ Among the individual euro-area countries, household debt to GDP ratios are particularly high (above 90 percent) in Ireland, Netherlands, Portugal, and Spain. Corporate debt to GDP ratios are particularly elevated in Austria, Finland, Ireland, Netherlands, Portugal, and Spain.

From a broader macroeconomic perspective, the bulging debt in the years before the financial crisis was the unsurprising consequence of a confluence of factors: Global interest rates were at historically low levels; capital flows to the advanced economies were abundant; credit conditions and underwriting standards in these economies were generally easy; regulatory approaches were “light touch”; and rising market values of real estate and other assets pushed up the value of collateral.

But with the onset of the global financial crisis in 2007, much of this unwound. Credit conditions tightened, risk premiums spiked, and balance sheets are now in the process of adjusting. Deleveraging and balance sheet repair are occurring on a global scale, with consequent headwinds for economic activity in a broad set of countries.

Notably, the stresses associated with this deleveraging process are no doubt being amplified by the demographic strains associated with population aging in these economies. This is occurring through at least two channels. First, the prospective retirement of the baby-boom generation is translating directly into an imminent surge in claims on public expenditure programs for pensions and health benefits. Second, many workers who are part of this cohort have seen their personal balance sheets deteriorate significantly during the crisis and, as a result, have strong incentives to repair their balance sheets and delever in the years remaining before retirement.²

Taking this global perspective as background, the remainder of our essay focuses on the recent behavior and prospective evolution of U.S. household debt and saving. These are issues that bear importantly on the pace of recovery in the United States and, hence, on the outlook for global recovery more broadly. In addition, as a closely related matter, the household saving rate is a key variable influencing the path of the U.S. current account deficit and the prospects for global rebalancing.

Our work finds that the U.S. household debt to disposable income ratio is currently above levels that are likely to be sustained over the medium to long run. As such, we expect household indebtedness to be on a downward trajectory going forward. That said, recent experience—as well as broader empirical evidence—indicates that this process is likely to be fairly gradual and driven largely by increases in nominal disposable income, rather than by an upward lurch in the saving rate or a sharp drop in absolute debt levels. Although a more abrupt adjustment cannot be ruled out, the fact that household net worth is currently near its 30-year average and very close to levels that prevailed in the mid-1990s before the onset of the equity and housing bubbles provides some confidence that the overall condition of household balance sheets is not overly stressed. In addition, household debt-service ratios are near multi-decade lows. Finally, we present evidence suggesting that the U.S. household saving rate is likely to move in a range of roughly 4 to 5 percent over the medium term, driven by expected moves in net worth, real interest rates, and labor market conditions. We also find that when debt levels are elevated relative to historical norms that households have responded defensively by pushing up the saving rate.

² These incentives could also manifest themselves in a rising labor-force participation rate, as deteriorating financial positions prompt older workers to remain in the labor-force longer than they had previously planned. That said, the United States at least has seen a remarkable drop in the labor-force participation rate since the eruption of the financial crisis.

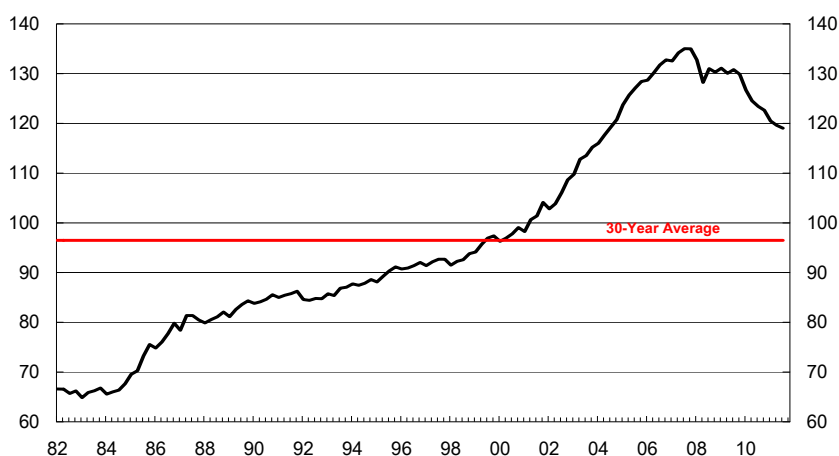
Framing the Deleveraging Hypothesis

To structure our discussion, we put forward two simple—and potentially complementary—hypotheses as to how debt levels might influence household consumption and saving.

- *The net-worth hypothesis.* A simple neoclassical perspective suggests that balance sheet conditions influence consumption and saving mainly through wealth effects associated with the evolution of net worth (i.e., assets minus liabilities). From this perspective, net worth—rather than the level of debt *per se*—is the key driver of household spending and saving decisions. Under this view, it's not so important whether I have \$10 in assets and \$5 dollars in liabilities or \$20 in assets and \$15 dollars in liabilities—what matters most is that in each case I have \$5 of net wealth. This implies that movements in net worth should be the primary channel through which debt and other balance sheet variables influence consumption and saving.
- *The deleveraging hypothesis.* A second view, which is broadly associated with Richard Koo's work documenting Japan's "balance sheet" recession,³ suggests that debt is seen as inherently risky during periods of economic stress.³ During such episodes, households and firms face uncertainties about their future capacity to service debt and, thus, move preemptively to delever. For example, a worker who is worried about the security of his employment may cut consumption and aggressively pay down debt today to fortify his balance sheet in case such fears eventually materialize.

A key empirical point, however, is that at the current stage of the deleveraging cycle it may be difficult to differentiate between these two hypotheses. Under the net-worth hypothesis, households are focused on repairing their balance sheets because they have sustained a negative net wealth shock. But in an environment where asset prices are volatile and interest rates are exceedingly low—the safest approach for rebuilding net worth might very well be hiking saving rates and reducing debt. In contrast, from Richard Koo's perspective, U.S. households are

Figure 3. U.S. Household Debt (Percent of Disposable Personal Income)



Sources: Federal Reserve Board, Haver Analytics, and Citi Investment Research and Analysis.

³ See Richard Koo, *The Holy Grail of Macroeconomics: Lessons from Japan's Great Recession*, John Wiley & Sons, 2008.

aggressively paying down debt because they are inherently afraid of the obligations and risks associated with servicing that debt given high levels of economic uncertainty and consequent anxiety about the path of future incomes.

As such, an important observation is that the neo-classical net-worth hypothesis embeds an important role for debt and deleveraging, as cutting debt is a powerful (and relatively certain) way to reverse a decline in net worth. The key question then becomes whether households are worried only about the level of their debt *relative* to their assets, or whether they tend to see certain levels of indebtedness as inherently risky, particularly during times of stress. The following sections consider some empirical evidence that sheds further light on these issues.

The Recent Evolution of U.S. Household Debt and Net Worth

As shown in **Figure 3**, U.S. household debt relative to disposable income rose rapidly in the decade before the crisis, reaching a peak of 135 percent in mid-2007.^{4,5} In the years since the crisis erupted, debt has fallen back about 15 percentage points but remains more than 20 percentage points above its 30-year average. The decline in this ratio over the past four years reflects three factors: First, households have used their saving to pay down debt. Second, delinquencies on mortgages and consumer debt have in some instances led to charge-offs by lenders. And third, nominal disposable income has grown 10½ percent since mid-2007. Of these factors, the rise in disposable income has been by far the largest contributor. That said, nominal household debt levels are down about \$750 billion from their peaks;⁶ given data limitations, decomposing this decline into pay-downs as opposed to charge-offs is a thorny endeavor, but a watershed paper by Brown, et al. (2010) finds that both developments have been in play.⁷

Figure 4. U.S. Household Saving Rate (Percent of Disposable Personal Income)



Sources: Bureau of Economic Analysis and Haver Analytics.

⁴ In Figure 1, U.S. household debt was scaled by GDP to facilitate comparisons across countries. Throughout the rest of the essay, however, we focus on the ratio of household debt to disposable personal income, which strikes us as a much better metric of households' capacity to service debt.

⁵ Our household debt variable is the total balance sheet liabilities of households and non-profit organizations, drawn from Table B.100 of the flow of funds accounts published by the Federal Reserve Board. We choose this definition of household liabilities because this table provides a consistent rendering of assets, liabilities, and net worth. We use all three of these variables in the empirical work presented in the following two sections.

⁶ The absolute level of household debt kept rising until 2008:Q3, a full year after the peak in the debt to disposable income ratio. Relative to 2007:Q3, the level of household debt is now down about \$350 billion.

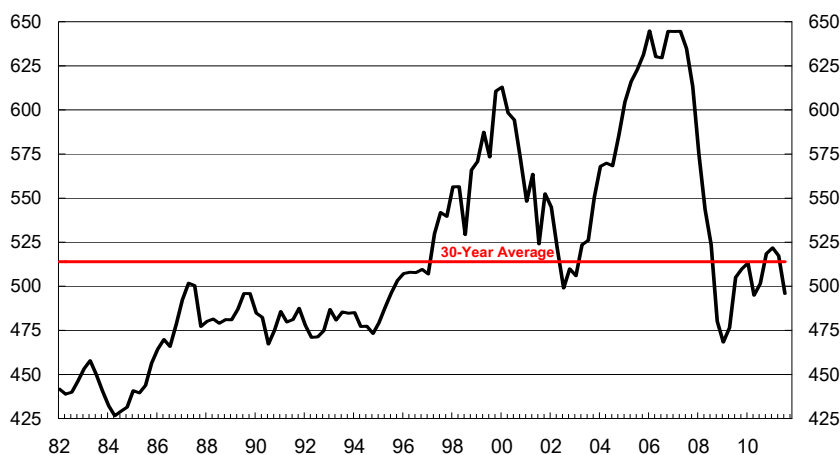
⁷ See M. Brown, A. Haughwout, D. Lee, and W. van der Klaauw, "The Financial Crisis at the Kitchen Table: Trends in Household Debt and Credit," Federal Reserve Bank of New York Staff Reports, December 2010.

Notably, as shown in **Figure 4**, the U.S. household saving rate has cycled over the past couple of years in the neighborhood of 4 to 6 percent of disposable income.⁸ Assuming that the saving rate remains roughly in this range, how long might it take for households to reduce the debt-to-disposable income ratio 20 percentage points, back down to the 30-year average near 100 percent of disposable income? Of course, the answer to this question also depends on a number of other factors, including the pace of disposable income growth, the share of saving that is devoted to paying down debt, and the extent to which continued delinquencies result in further debt forgiveness. Without taking a specific stand on the future evolution of each of these variables, we note that the past four years have seen a 15 percentage point drop in this ratio, an average decline of roughly 3 to 4 percentage points per year. Going forward, it seems reasonable that a pace of decline that is similar—or even a bit more rapid (if nominal income growth picks up)—should be achievable.

This discussion implies that households may very well remain in deleveraging mode for a number of years to come. However, to be clear, the hallmark of such deleveraging is not an ever-rising saving rate but, rather, a flat or slightly declining nominal debt load coupled with ongoing increases in disposable income. In other words, households would continue to clamp down on any further net borrowing and fund their consumption out of disposable income. (We will take up these issues in greater detail below.)

Alternatively, what does the net-worth hypothesis suggest about the trajectory of deleveraging going forward? As shown in **Figure 5**, household net worth was very volatile in the decade preceding the financial crisis—moving up as the equity bubble inflated, down as it popped, and back up with the real estate bubble. Following the onset of the financial crisis, net worth again plunged—but, even so, has hovered in recent years near its 30-year average. The 2011:Q3 reading on net worth dipped below 500 percent of disposable income, but much of this drop reflected a sharp decline in equity prices that has since been partially reversed.

Figure 5. U.S. Household Net Worth (Percent of Disposable Personal Income)



Sources: Federal Reserve Board, Haver Analytics, and Citi Investment Research and Analysis.

⁸ The latest observations on household saving have moved below this range, falling to 3½ to 3¾ percent in the recent monthly data. As we will discuss below, we see such readings as unsustainable and expect the saving rate to move back up to around 4 to 5 percent in coming quarters.

This discussion yields the conclusion that household net worth is now better aligned with its long-term historical average than is debt taken alone and, thus, suggests that overall balance sheet positions may not be particularly stretched. Even so, this observation should not be pushed too far. Over the past fifteen years, the major shifts in net worth have been driven by several remarkable swings in asset prices. Given the significant risks the global economy now faces, it is fair to say that net worth remains vulnerable to sizable downside shocks, and the resulting uncertainties may very well be reinforcing households' incentives to delever.

Empirical Evidence on Household Deleveraging

We turn next to the question of what drives aggregate household debt. Beyond just looking at historical averages, can anything systematic be said about the level of debt that may be sustainable for U.S. households over time? To address this question, we consider a benchmark empirical model that seeks to explain movements in the household debt to disposable income ratio as a function of three variables:

- *Household assets relative to disposable income.* A higher level of assets should allow households to comfortably sustain a higher level of indebtedness.
- *The real interest rate.* Our proxy for this variable is the estimated real yield on the five-year Treasury note, but the results are broadly similar when we use a measure of the ten-year real rate.⁹ Higher real interest rates should prompt households to reduce their debt burdens.
- *The unemployment gap*, i.e., the difference between the actual unemployment rate and the NAIRU estimated by the Congressional Budget Office. This variable controls for cyclical developments and, in particular, for the performance of the labor market. Its sign could go either way: On the one hand, cyclically stressed periods are likely to be characterized by higher levels of indebtedness (suggesting a positive sign). On the other hand, labor market stresses provide incentives for households to increase their saving and pare their debt burdens (suggesting a negative sign).

We consider two versions of this benchmark model. The first includes the contemporaneous values of each of the three variables noted above. As a check on the robustness and dynamic properties of these results, the second version regresses household debt on four lags of each of the three explanatory variables.¹⁰ The model is estimated on a sample running from 1982:Q1 through 2007:Q2. We reserve the period of the financial crisis, from 2007:Q3 through 2011:Q3, to test the equation's out-of-sample performance. Finally, we note by way of disclaimer that this model is entirely empirical in nature—we are not attempting to determine the direction of underlying causality or to describe the deep structure of the economy.

As shown in the first two columns of **Table 1**, the two versions of the model provide remarkably similar assessments of the relationship between the explanatory variables and the level of household debt, and the estimated coefficients are statistically significant at high levels. The results suggest that a 10 percentage point increase in assets relative to disposable income is associated with nearly a 2 percentage point rise in debt. In addition, a 100 basis point increase in the real interest rate tends to reduce debts levels by 3 to 4 percent. Finally, a percentage point rise in the unemployment gap tends to be associated with an increase in debt

⁹ Specifically, our real interest rate series is calculated as the five-year Treasury yield less the five-year expected inflation rate (as reported by the Federal Reserve Bank of Cleveland).

¹⁰ The coefficients on the lags are estimated using a second-order polynomial distributed lag.

burdens of roughly 1½ to 2½ percent, depending on which of the two models is used. With the CBO's estimate of this gap running above 3 percent at present, the cyclical effect on debt burdens is consequential.

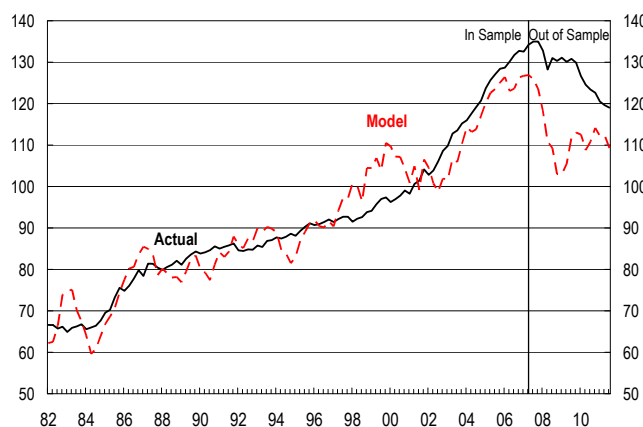
Figure 6 shows the in-sample and out-of-sample performance of the benchmark contemporaneous equation. This chart merits two comments. First, actual debt is currently running about 10 percentage points above the model's prediction. Second, the figure highlights that the level of household debt remained well below that implied by the model through the dot.com equity bubble of the late 1990s and early 2000, suggesting that households looked through much of the surge in share prices. In contrast, however, household indebtedness substantially exceeded the model's expectation during the subsequent housing bubble. This feature of our results suggests that debt may be more sensitive to non-financial wealth (principally housing wealth) than it is to financial wealth.

Table 1. Results for Household Debt

	Benchmark Model		Disaggregated Model	
	Contemporaneous	Lagged	Contemporaneous	Lagged
	(1)	(2)	(3)	(4)
Assets/DI	0.192*	0.188*		
	15.2	12.3		
Financial Assets/DI			0.115*	0.105*
			10.5	10.2
Nonfinancial Assets/DI			0.349*	0.353*
			24.2	26.3
Five-Year Real Interest Rate	-2.964*	-3.870*	-3.181*	-4.227*
	-5.9	-5.9	-10.1	-10.6
Unemployment Gap	1.486*	2.618*	0.190	0.671
	2.3	3.7	0.5	1.6
Number of Observations	102	98	102	98
Adjusted R-squared	0.916	0.910	0.961	0.964

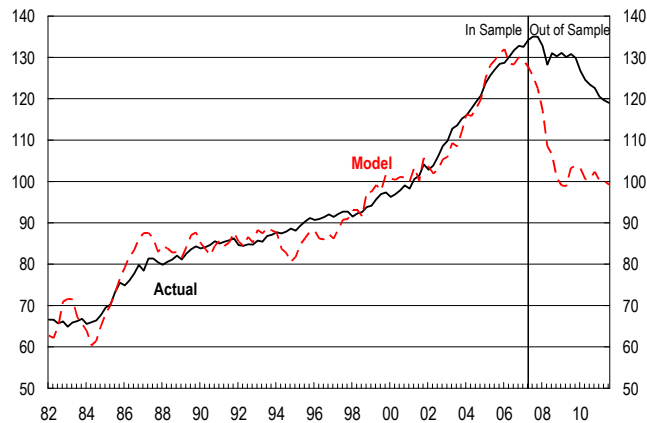
Note: All regressions include an unreported constant; DI is Disposable Personal Income; t-statistic reported underneath coefficient. * Indicates significance at the 5% level. Source: Citi Investment Research and Analysis.

Figure 6. U.S. Household Debt: Actual vs. Benchmark Model*



Note: * Percent of Disposable Personal Income.
Source: Citi Investment Research and Analysis.

Figure 7. U.S. Household Debt: Actual vs. Disaggregated Model*

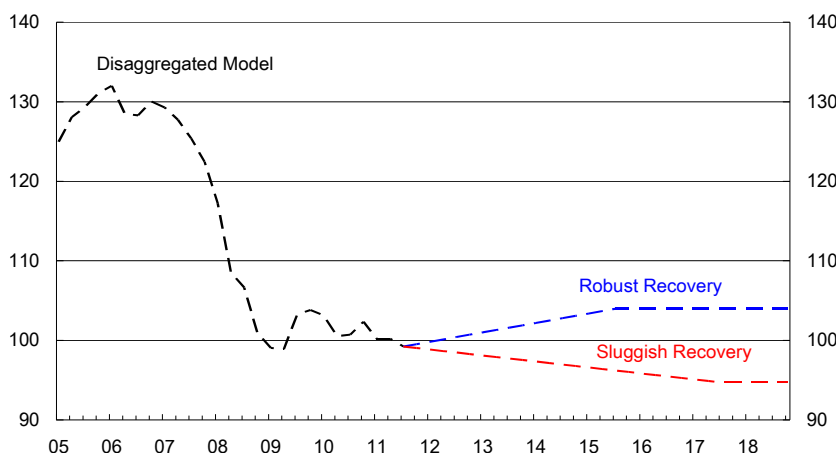


Columns three and four of **Table 1** report the results obtained from an explicit test of this hypothesis. We find that debt levels are indeed significantly more sensitive to housing wealth than to financial wealth.¹¹ **Figure 7** illustrates the performance of the model with the asset variables disaggregated. The in-sample fit is much tighter than with the previous model, particularly during the housing bubble before the financial crisis. Importantly, the model's greater sensitivity to the recent plunge in housing wealth implies a significantly lower target level of household debt than does the other version of the model. Specifically, this version of the model expects debt to now be running at around 100 percent of disposable income, roughly 20 percentage points lower than its actual level and very similar to the 30-year historical average. These results strike us as quite convincing, and we take them as our preferred estimates in the remainder of our empirical work.

We conclude this section with two further exercises. First, as shown in **Figure 8**, we extrapolate our preferred model's solution beyond 2011:Q3 under two scenarios. In the "robust recovery" scenario, we assume that over the next four years, the unemployment gap closes, the real interest rate rises to a historically normal value of around 2½ percent, and the level of assets rebounds to its 15-year average (670 percent of disposable income versus 615 percent at present). Under this scenario, the model projects that debt levels will eventually stabilize at 105 percent of disposable income. In the "sluggish recovery" scenario, we assume that it takes six years to close the unemployment gap and for the real interest to rise back to more normal levels. We also assume that asset values return only to their 30-year average, essentially unchanged from current levels. Under such conditions, the model suggests that household debt will decline to around 95 percent of disposable income. These exercises reinforce our view that debt levels of around 100 percent of disposable income are likely to prevail in the long run and should be sustainable.

As a second exercise, we run several tests examining the following question: In the past when debt levels have deviated from those predicted by the model, how quickly has debt tended to adjust back to the long-run relationship? Our results

Figure 8. U.S. Household Debt: Two Scenarios (Percent of Disposable Personal Income)



Source: Citi Investment Research and Analysis.

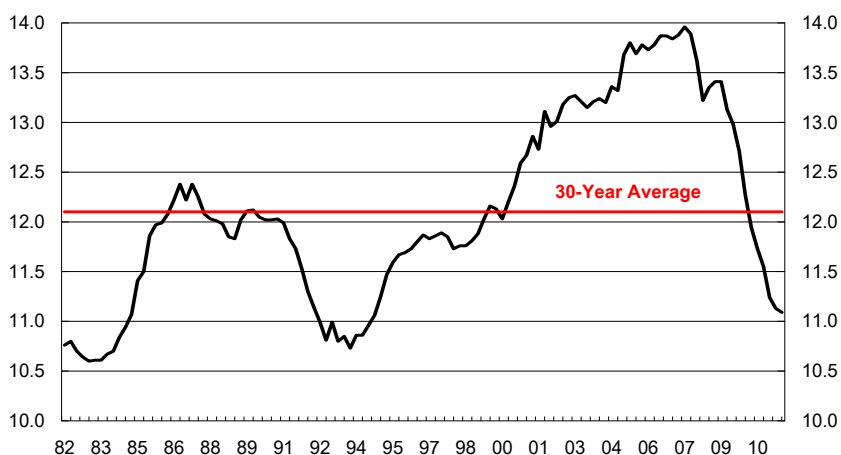
¹¹ One explanation is that purchasing housing typically involves taking on mortgage debt. But it is also possible that this greater sensitivity reflects that housing wealth is held more diffusely in the economy, including by households that would otherwise have limited collateral to facilitate borrowing.

suggest that over the past three decades this adjustment has typically occurred at a gradual rate of 3 to 4 percent per quarter (or roughly 15 percent per year). Thus, with debt levels 20 percentage points above those implied by our preferred model, these estimates indicate a downward correction in the debt ratio at a pace of roughly 3 percentage points of disposable income a year.

Notably, this result is broadly consistent with the rate of household deleveraging we have seen since the financial crisis erupted. As a matter of arithmetic, such deleveraging can comfortably be achieved with nominal debt levels remaining roughly constant, or even rising slightly, assuming that nominal income expands at a rate of 3 to 4 percent annually. Nominal income growth at this pace should be broadly obtainable assuming that inflation runs at 2 percent and that growth proceeds at a similar rate, more or less in line with consensus expectations for the U.S. economy in coming years.

As such, our empirical work suggests that household deleveraging should be a stable process that occurs gradually, likely continuing into the second half of the decade. The following observations add further support to this conclusion. Although net worth has declined sharply since the crisis erupted, it has nonetheless remained near its long-term average, which suggests that overall balance sheet conditions are not particularly dire. In addition, as shown in **Figure 9**, the household debt-service burden is presently light by historical standards. The exceptionally low interest rates that now prevail have reduced the burden associated with servicing high debt levels and allowed creditworthy households to refinance mortgages and otherwise lock in low rates for long horizons. Indeed, while there is scope for legitimate debate about the overall effectiveness of the Federal Reserve's policies, accommodative monetary conditions are providing a powerful tailwind supporting the ongoing process of balance sheet repair.

Figure 9. U.S. Household Debt-Service Ratio (Percent of Disposable Personal Income)



Sources: Federal Reserve Board, Haver Analytics, and Citi Investment Research and Analysis.

That said, the gap between present debt levels and those implied by our models is large by historical standards, and we accordingly cannot rule out the risk of a more abrupt correction. For example, the pace of deleveraging could accelerate markedly in the event of a collapse in asset prices, a sharp contraction in disposable income, or a renewed tightening of credit conditions (which would likely bring with it some combination of higher borrowing rates and reduced credit availability). Given the ongoing stresses in Europe, such risks are not just abstract

possibilities but rather all-too-plausible outcomes that need to be carefully considered, with an eye toward reducing potential vulnerabilities.

Assessing the Implications for Saving

We now turn to an examination of what this analysis means for saving and consumption. Similar in spirit to the previous section, we model the U.S. household saving rate as a function of (1) the household net worth to disposable income ratio (in line with the net-worth hypothesis), (2) the five-year real interest rate, and (3) the unemployment gap.

As shown in the first two columns of **Table 2**, the contemporaneous and lagged versions of the model again yield broadly similar results, suggesting that these variables are trending closely together. Notably, each of the explanatory variables is highly statistically significant and has the anticipated sign. Specifically, a 10 percentage point increase in the net worth to disposable income ratio reduces the saving rate by nearly 20 basis points, consistent with the view that increased wealth tends to reduce the incentives for saving out of flow income. Second, a percentage point decline in the real interest rate reduces the saving rate by a hefty 75 basis points, as the lower rates make saving less attractive. Third, a percentage point increase in the unemployment gap increases saving rates about 30 basis points, apparently reflecting higher precautionary saving in response to increased job vulnerability and greater economic uncertainty.¹²

Table 2. Results for Household Saving Rate

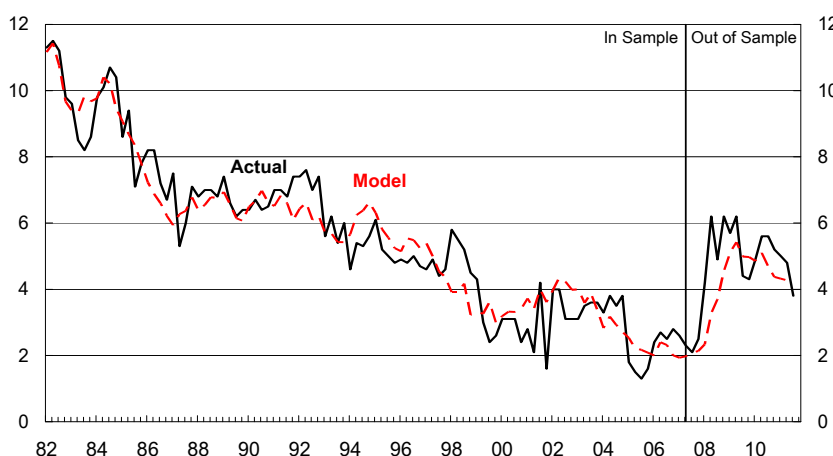
	Benchmark Model		Augmented Model	
	Contemporaneous (1)	Lagged (2)	Contemporaneous (3)	Lagged (4)
Net Worth/DI	-0.018* -11.3	-0.019* -10.1	-0.019* -12.0	-0.015* -8.5
Debt Residual			0.016 1.1	0.040* 2.1
Five-Year Real Interest Rate	0.739* 13.5	0.755* 12.6	0.662* 13.6	0.674* 11.5
Unemployment Gap	0.334* 5.0	0.276* 3.3	0.340* 6.4	0.369* 5.8
Number of Observations	102	98	119	115
Adjusted R-squared	0.903	0.888	0.880	0.860

Note: All regressions include an unreported constant; DI is Disposable Personal Income; t-statistic reported underneath coefficient. * Indicates significance at the 5% level. Source: Citi Investment Research and Analysis.

As shown in **Figure 10**, our benchmark contemporaneous saving regression tracks the evolution of the household saving rate over the past three decades very closely. Notably, this relationship suggests that the drop in the saving rate in the years immediately before the financial crisis was not an aberration but, rather, a continuation of an ongoing relationship that has remained generally intact through the last several decades. Stated differently, the low level of saving before the crisis was not a surprise given the exceptionally high level of household net worth, as well as the relatively low real interest rates and the favorable unemployment gap. There is scope for legitimate debate as to why U.S. households did not look through the rapid increases in asset prices and question whether such increases were sustainable. But households were not alone in their failure on this score.

¹² This effect swamps a competing consideration—namely, households that experience actual bouts of unemployment are typically forced to sharply dis-save, which tends to weigh on aggregate saving.

Figure 10. U.S. Household Saving Rate (Percent of Disposable Personal Income)

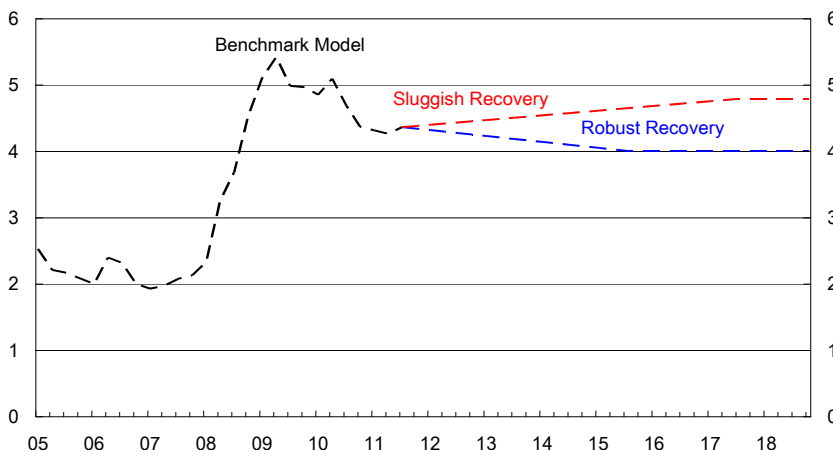


Source: Citi Investment Research and Analysis.

As an equally notable observation, the out-of-sample fit of this equation is also on track, broadly following the evolution of saving through the past four years. However, one important deviation is that the equation calls for a saving rate in 2011:Q3 of nearly 4½ percent—above the 3¾ percent estimate in the preliminary GDP release. As such, we expect the saving rate to adjust upward from its currently reported level. This will hopefully come through positive revisions to Q3 income—initial readings on savings rates have been subject to large upward revisions in recent years. But, if not, consumption will likely grow somewhat more slowly than income through the first part of 2012.

As with debt, we extrapolate our saving model forward under two scenarios. As shown in **Figure 11**, the robust recovery assumes that over the next four years, the unemployment gap closes, the real interest rate returns to 2½ percent, and the net worth ratio moves up to its 15-year average (555 percent of disposable income). In this scenario, the saving rate is expected to glide down from about 4½ percent to

Figure 11. U.S. Household Saving Rate: Two Scenarios (Percent of Disposable Personal Income)



Source: Citi Investment Research and Analysis

roughly 4 percent by the end of 2015. In the sluggish recovery, it again takes six years for the unemployment gap and the real interest rate to normalize, and the level of net worth rises to just over 510 percent (its 30-year average). In this case, the saving rate edges up to a little below 5 percent by the end of 2017. Notably, under these two diverse scenarios for the performance of the economy in coming years, the saving rate remains in a range of roughly 4 to 5 percent, and we see this as a good estimate of where the saving rate is likely to be over the medium term.

The remarkable fit of this empirical model for the saving rate suggests that the net-worth hypothesis, which focuses on household net worth as the key nexus between balance sheet conditions and saving and consumption decisions, is indeed quite powerful. But what about Richard Koo's hypothesis—is there a significant additional kick to saving and deleveraging associated with elevated debt levels?

As a test of Koo's hypothesis, we examine the following question: When debt is above the level predicted by our model, does this tend to generate higher saving in the current or subsequent quarters? To explore this issue, we augment the benchmark saving equation with the residuals from our debt regression estimated in the previous section. For this exercise, we extend the estimation period through 2011:Q3, since Koo's hypothesis focuses on incentives to delever and increase saving during episodes of stress (such as what we have experienced over the past four years).

The results indicate that "excess" debt levels (i.e., levels that are above those predicted by our model) are in fact associated with higher rates of saving above and beyond what is implied by net worth, interest rates, and the unemployment gap. This relationship is particularly strong—and is statistically significant—in the lagged version of the model, which captures the dynamic relationship between indebtedness and saving. Taken together, these results suggest that over the past couple of years, the household saving rate has been pushed up roughly $\frac{1}{2}$ to $\frac{3}{4}$ percentage point by uncomfortably high debt levels and corresponding efforts to consolidate balance sheets. As a further extension of this work, we test to see whether the residuals from our debt regression Granger cause the household saving rate to move. Specifically, do lagged values of the debt residuals help explain current moves in the saving rate? Our results indicate that the debt residuals Granger cause saving at the 5 percent level of significance. In sum, the broad conclusion that emerges from our work is that higher-than-desired debt levels do in fact prompt U.S. households to increase their saving, very much in line with Richard Koo's conjecture.

Some Concluding Thoughts

In this essay, we have presented a battery of empirical evidence describing the recent evolution of U.S. household debt and saving rates, as well as the prospects for these variables going forward. Our basic conclusion is that U.S. households are in the midst of a process of balance sheet repair and deleveraging that is likely to continue into the second half of the decade. We expect that the key features of this process going forward will broadly match what we have seen in recent years. First, levels of debt relative to disposable income will continue to glide down, largely driven by ongoing increases in the denominator. Second, saving rates are likely to remain in the neighborhood of 4 to 5 percent.

As such, the hallmark of this deleveraging process will not be an upward lurch in the saving rate. Rather, households will gradually repair their balance sheets supported by a roughly stable saving rate. The stable saving rate, in turn, implies that

consumption will tend to grow at the same pace as income. This suggests, however, that there will be no additional bounce in consumption that might help fuel a closing of the output gap or a steeper trajectory of recovery. Given the current outlook for the U.S. economy, this suggests real consumption growth of roughly 2 to 2½ percent as far as the eye can see. Of course, a sizable financial shock from Europe or renewed recession in the domestic economy could yet lead to more severe outcomes.

Notes

Notes

Appendix A-1

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