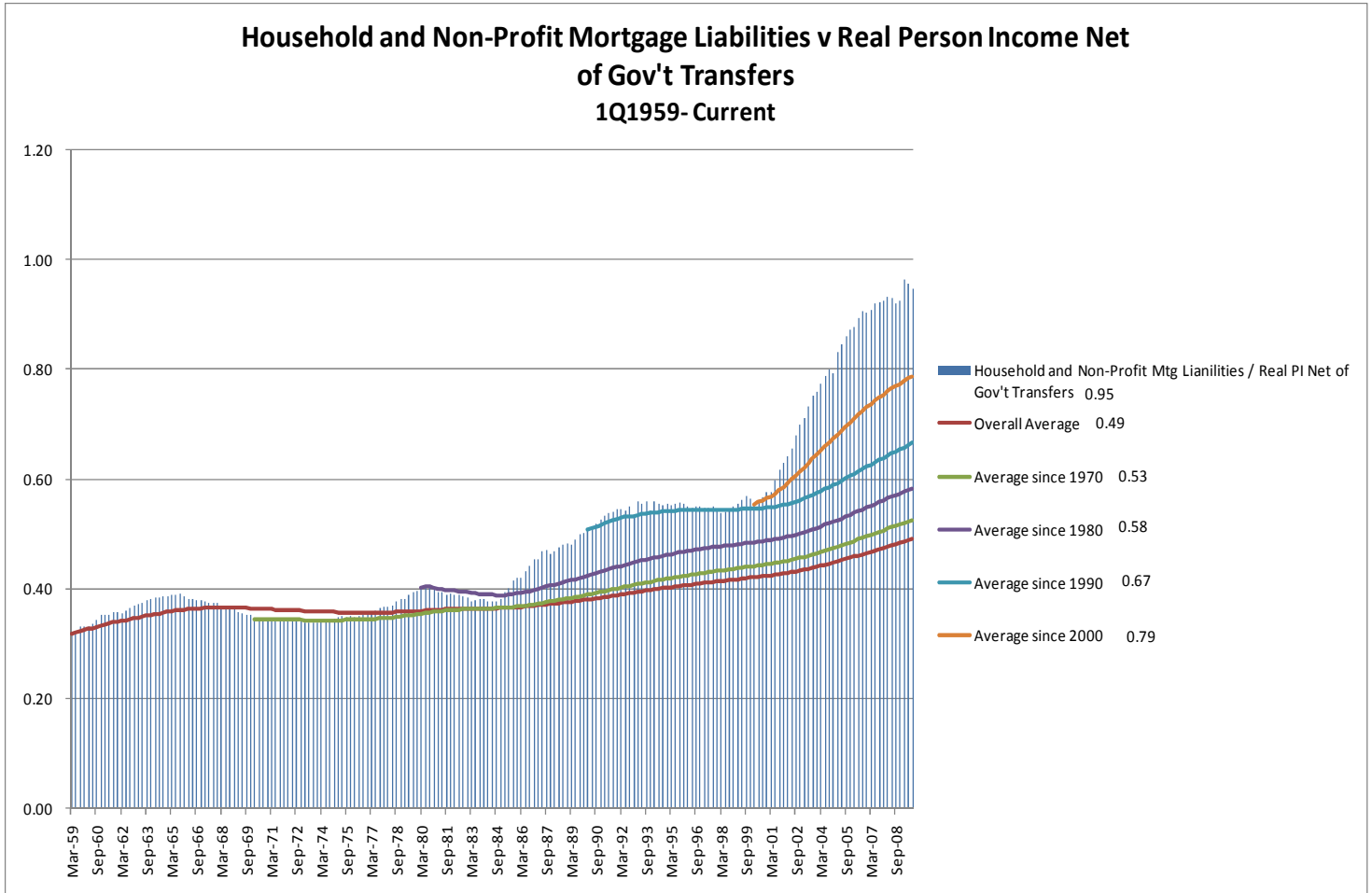


Much has been written about the residential mortgage market and the problems it has caused and has yet to cause. The following analysis focuses on this issue from the perspective of the ratio of outstanding mortgage debt versus real personal income. Mortgage debt is represented by the Household and Non-Profit Mortgage Liabilities from the Federal Reserve's flow of funds report; personal income is represented by real personal income net of government transfers from the Bureau of Economic Analysis.

Households displayed discipline with mortgage 'leverage' until the late 1970's, with the ratio remaining below 0.40. With the beginning of financial liberalization in the 1980's, in terms of the rise of complex financial products being created by Wall Street, households took on progressively more leverage with the ratio reaching 0.50. Fast forward to today, with less household frugality and ever-more financial complexity, and the ratio sits at 0.95. Particularly troubling is the explosion in the ratio since 2001.



The main questions that one posits after looking at this time series are twofold: 1. Is the rise in the ratio sustainable? 2. If not, how will the ratio correct? Given the current dynamics of employment and changes in bank credit, I believe that the answer to question 1 is definitely "No". The obvious answer to question 2 is either mortgage debt declines or real personal income increases.

The table below shows the required reduction in household mortgage liabilities required to return the ratio to various observed average values through history. It also shows the attendant change in the Federal Housing Finance Agency All-Transactions Home Price Index (not seasonally adjusted), as determined by historical regression analysis. This table certainly puts the scope of the problem in perspective.

<i>If the Ratio were to Normalize With Flat Income</i>						
	HH Mortgage Liabilities (\$B)	Real Personal Income Net of Gov't Transfers (\$B)	Ratio	Nominal Debt Reduction Required	% Debt Reduction Required	Implied Home Price Index Change
Current	\$10,323.5	\$10,919.9	0.95	\$0.0	0.0%	(3.3%)
Avg from 2000	\$8,126.7		0.79	(\$2,196.8)	(21.3%)	(22.3%)
Avg from 1990	\$6,868.5		0.67	(\$3,455.0)	(33.5%)	(33.2%)
Avg from 1980	\$6,023.9		0.58	(\$4,299.7)	(41.6%)	(40.6%)
Avg from 1970	\$5,427.6		0.53	(\$4,896.0)	(47.4%)	(45.7%)
Overall Avg	\$5,067.6		0.49	(\$5,255.9)	(50.9%)	(48.8%)

What if the adjustment comes from an increase in real personal incomes? The table below shows the requisite increases, assuming no change in household mortgage liabilities. Again, this table puts the scope of the problem in perspective.

<i>If Ratio were to Normalize with Flat Debt</i>						
	HH Mortgage Liabilities (\$B)	Real Personal Income Net of Gov't Transfers (\$B)	Ratio	Real Personal Income Increase Required	% Real Personal Income Increase Required	Implied Home Price Index Change
Current	\$10,323.5	\$10,919.9	0.95	\$0.0	0.0%	(3.3%)
Avg from 2000		\$13,871.7	0.79	\$2,951.8	27.0%	(3.3%)
Avg from 1990		\$16,412.9	0.67	\$5,493.0	50.3%	(3.3%)
Avg from 1980		\$18,714.2	0.58	\$7,794.3	71.4%	(3.3%)
Avg from 1970		\$20,770.3	0.53	\$9,850.4	90.2%	(3.3%)
Overall Avg		\$22,245.6	0.49	\$11,325.7	103.7%	(3.3%)

Realistically, it is common knowledge that neither household mortgage liabilities nor real personal income will remain constant. The following table reflects different growth scenarios in each factor, using the actual observed average growth rates for the indicated time periods. Also, included are an optimistic scenario, a pessimistic scenario, and a user-defined scenario. The optimistic and pessimistic scenarios are a combination of the maximum and minimum observed growth rates in the data set.

<i>Ratio Scenario Analysis</i>						
	HH Mortgage Liabilities (\$B)	Real Personal Income Net of Gov't Transfers (\$B)	% Growth HH Mortgage Liabilities	% Y/Y Growth Real Personal Income	Ratio	Implied Home Price Index Change
Current	\$10,323.5	\$10,919.9	(1.8%)	(4.3%)	0.95	
Avg from Dec 2008	\$10,196.2	\$10,549.4	(1.2%)	(3.4%)	0.97	(4.4%)
Avg from 2000	\$11,321.2	\$11,347.5	9.7%	3.9%	1.00	5.3%
Avg from 1990	\$11,181.6	\$11,439.1	8.3%	4.8%	0.98	4.1%
Avg from 1980	\$11,270.5	\$11,569.0	9.2%	5.9%	0.97	4.9%
Avg from 1970	\$11,322.8	\$11,683.1	9.7%	7.0%	0.97	5.4%
Overall Avg	\$11,289.9	\$11,686.7	9.4%	7.0%	0.97	5.1%
Maximum			18.1%	13.8%		
Minimum			(1.8%)	(4.5%)		
User Input			(3.0%)	(4.3%)		
Optimistic (declining ratio)	\$10,140.3	\$12,427.1			0.82	(4.9%)
Pessimistic (rising ratio)	\$12,195.2	\$10,433.6			1.17	12.9%
User Input	\$10,013.8	\$10,450.3			0.96	(6.0%)

This analysis also has second and third-order effects. Changes in household net worth can easily be modeled, with the greatest sensitivity to changes in home prices. The table below reflects changes to household net worth under the same scenarios as in the above tables. The changes in equity values, fixed-income values and, net worth are actual observations over the indicated time periods. The optimistic and pessimistic scenarios are a combination of the maximum and minimum observed changes in the equity and fixed-income data set.

<i>Net Worth Effect</i>				
%Change HH Net Worth		YoY% S&P	YoY% 10y (-)	%Change HPI
(17.1)	Avg from Dec 2008	(28.9)	19.4	(4.4)
(20.4)	Avg from 2000	(2.1)	5.0	(22.3)
(26.0)	Avg from 1990	7.0	3.7	(33.2)
(31.6)	Avg from 1980	9.1	2.2	(40.6)
(37.1)	Avg from 1970	7.4	0.7	(45.7)
(40.1)	Overall Avg	7.2	(0.5)	(48.8)
21.7	Optimistic (declining ratio)	52.9	41.0	(4.9)
(6.4)	Pessimistic (rising ratio)	(41.4)	(42.0)	12.9
(9.1)	User Input	(10.0)	0.0	(6.0)

The final step in this analysis is calculating the effect on Personal Consumption Expenditures. Based on the fact that PCE accounts for 70% of the US economy, this is the most important piece of analysis. PCE can easily be modeled, with changes in household net worth having the 2nd greatest sensitivity behind changes in consumer credit. The changes in consumer credit, real personal income and, net worth are actual observations over the indicated time periods. The optimistic and pessimistic scenarios are a combination of the maximum and minimum observed changes in the data set.

<i>Consumption Effect</i>				
	%Change HH Net Worth	%Change Real Personal Income	%Change Consumer Credit	% Change PCE
Avg from Dec 2008	(17.1)	(3.4)	(1.3)	(1.6)
Avg from 2000	(20.4)	3.9	5.6	(0.4)
Avg from 1990	(26.0)	4.8	6.2	(0.9)
Avg from 1980	(31.6)	5.9	7.1	(1.4)
Avg from 1970	(37.1)	7.0	8.0	(1.8)
Overall Avg	(40.1)	7.0	8.2	(2.2)
Optimistic (declining ratio)	21.7	13.8	(3.5)	4.3
Pessimistic (rising ratio)	(6.4)	(4.5)	19.3	2.9
User Input	(9.1)	(4.3)	(10.0)	(2.1)

Conclusions that I draw from this analysis:

1. The scope of the problem from household mortgage liabilities is enormous.
2. The Federal Reserve's and administration's policies will merely slow down the necessary adjustment. They do not have the necessary resources to "fix" the problem.
3. The implied decline in consumption and, therefore, GDP growth that will result from the "normalization" of the household mortgage liability/real personal income ratio will be large and long-lasting.
4. Asset markets will correct, yet again, to reflect this process.

