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PRIDE GOES BEFORE A FALL:
FEDERAL RESERVE POLICY AND ASSET MARKETS

Carmen M. Reinhart
Vincent Reinhart

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ABSTRACT

Considerable debate rages about whether Federal Reserve policy was too lax in the early part of the 2000s, thereby fueling the home-price bubble that was the proximate cause of the global financial crisis. We present evidence that the view that modest alterations to monetary policy have vast consequences is inconsistent with theory and not supported by evidence. We take a close look at the responses of asset markets to changes in the short-term policy interest rate since the founding of the Fed in 1914. Changes in the federal funds rate have no systematic effect on either long-term interest rates or housing prices over nearly a century. Indeed, since the mid-1990s the policy rate had a negative relationship with long-term interest rates. This is consistent with a global view of capital markets where massive cross-border flows shape the availability of domestic credit and asset prices. The evidence casts doubts on arguments that a moderately different monetary policy path might have mattered.

Carmen M. Reinhart
Peterson Institute for International Economics
1750 Massachusetts Avenue, NW
Washington, DC 20036-1903
and NBER
creinhart@piie.com

Vincent Reinhart
American Enterprise Institute
1150 Seventeenth Street, N.W.
Washington, DC 20036
vincent.reinhart@aei.org

The Federal Reserve's conduct of monetary policy casts a spell over market participants, commentators, and academics. The pages of financial newspapers parse subtle differences among the comments of Fed officials and delve deeply into potentially multiple meanings of official statements. Academic discussions argue that the path of the policy rate may (as in Taylor, 2009) or may not (as in Bernanke, 2010, and Greenspan, 2010) have fueled a home-price bubble in the United States.

The view that modest alterations to monetary policy have vast consequences for national economies would seem to be inconsistent with theory and evidence. Most modern economic models (represented authoritatively by Woodford, 2005) offer limited scope for policy surprises. The basic logic is that spending depends on decisions capitalized over the longer term, and small perturbations in the level of the short-term interest rate do not matter much to those values. More fundamentally, the prominence accorded to authorities controlling nominal magnitudes seems to undervalue the resilience of market economies, which are supposed to be efficient in grinding out appropriate relative prices so as to employ resources efficiently. In other words, if central bankers are crucial to moderating the operations of capitalist economies, then capitalist economies may have serious drawbacks.

We will argue that this fascination with the Fed is also at odds with the evidence by taking a close look at the responses of asset markets to changes in the short-term interest rate since the founding of the Fed in 1914. In fact, there are apparent effects on either long-term interest rates or housing prices. We will also show that the policy rate more recently had no systematic relationship with long-term interest rates. A global view of capital markets casts doubt on those arguing that a different policy path might have crucially mattered.

The conclusion is similarly wary of outsized expectations of monetary policy makers and explains why pride goes before a fall.

Saying that modest changes in monetary policy would not matter much does not imply that monetary policy makers are irrelevant. They can do great ill by losing the story line and forgetting their role in providing a stable backdrop of price stability. Small mistakes also cumulate. Easy monetary policy from 2002 to 2006, as well as a lack of sensitivity to the dangers posed by the build-up of credit, contributed to the over-valuation of financial assets and the subsequent crisis. Predictability in monetary policy encouraged short-termism in financial markets. But were we able to walk back the path that the world took, changes to supervision and regulation would most likely loom larger still in shaping economic outcomes in the 2000s.

The limits of monetary policy in theory

Two properties of most macroeconomic models are especially relevant to the conduct of monetary policy. First, spending and pricing decisions are assumed to be based on long-term assessments of real income and real rates of return. Second, changes in monetary policy can only change real interest rates temporarily. Ultimately, the forces of productivity and thrift determine them, not changes in nominal magnitudes on the central bank balance sheet.¹

Combining the two propositions implies that the Federal Reserve's interest rate policy, as long as it stays within the narrow range of experience, would not be expected to have a significant or long-lasting imprint on markets or activity.

John Taylor (2009), among others, demurs in that view. In particular, the Federal Reserve is held to have systematically run policy too loose from around 2002 to 2006, which encouraged the housing boom and the related financial market excesses. However, the

¹ Obviously, this is a source of debate among economists. We follow the textbook presentation along the lines of Woodford (2005). Akerlof and Shiller (2009) provide a stark counterpoint.

deviations from Taylor's preferred policy were modest. Such sensitivity of outcomes to those misses is hard to square with the propositions that the Fed can only keep the short real rate low for a limited time and that it is long-term values that matter.

An example can make the point clearer. Finance theory posits that a capital asset is valued as the present value of expected future income. Such assets include homes, long-term government and corporate debt instruments, and durable goods, but stock prices are the simplest to model (as explained in Shiller, 1989). With equities, the income comes in the form of dividends, and the discount factor is the real short-term interest rate plus a risk premium. As shown in the memo items of Table 1, from 1914 to 2006, the real one-year risk free rate (using the one-year Treasury rate less the year-ahead percent change in consumer prices as the proxy) averaged about 1-1/4 percent, equities gave a return in excess of that of about 7-1/8 percent, and real dividends expanded 1-1/8 percent per annum. Calculating the present value of equities at those historical averages is straightforward.

The entries of Table 1 assess how those present values change if the real interest rate were one percentage point higher than its long-term average. As the shaded area in the bottom row attests, a permanent increase in real rates has a powerful effect on capitalized values, ranging from hits of 13 percent (if the equity premium matched its average) to 78 percent (if the equity premium were zero). It is results such as this that creates the perception that the Fed has a powerful lever on the economy.

But the prior from theory is that the Fed's ability to raise *real* interest rates is fleeting, at best. Hence, the upper rows of the table are more relevant. Those entries provide the effects on

Table 1
Effect of a one-percentage point increase in the real short-term interest rate on the present discounted value of all future dividends

Years for which the real short-term interest rate is held one percentage point higher:	Change in present value, percent		
	Equity premium is assumed to be:		
	<i>average</i> <i>1914-2006</i>	<i>one-half</i> <i>the average</i>	<i>zero</i>
1	-0.9	-0.9	-1.0
2	-1.8	-1.9	-1.9
3	-2.6	-2.7	-2.9
4	-3.3	-3.6	-3.8
5	-4.0	-4.4	-4.8
10	-6.8	-8.0	-9.3
forever	-13.3	-25.1	-78.4

Memo: Average from 1914 to 2006, percent

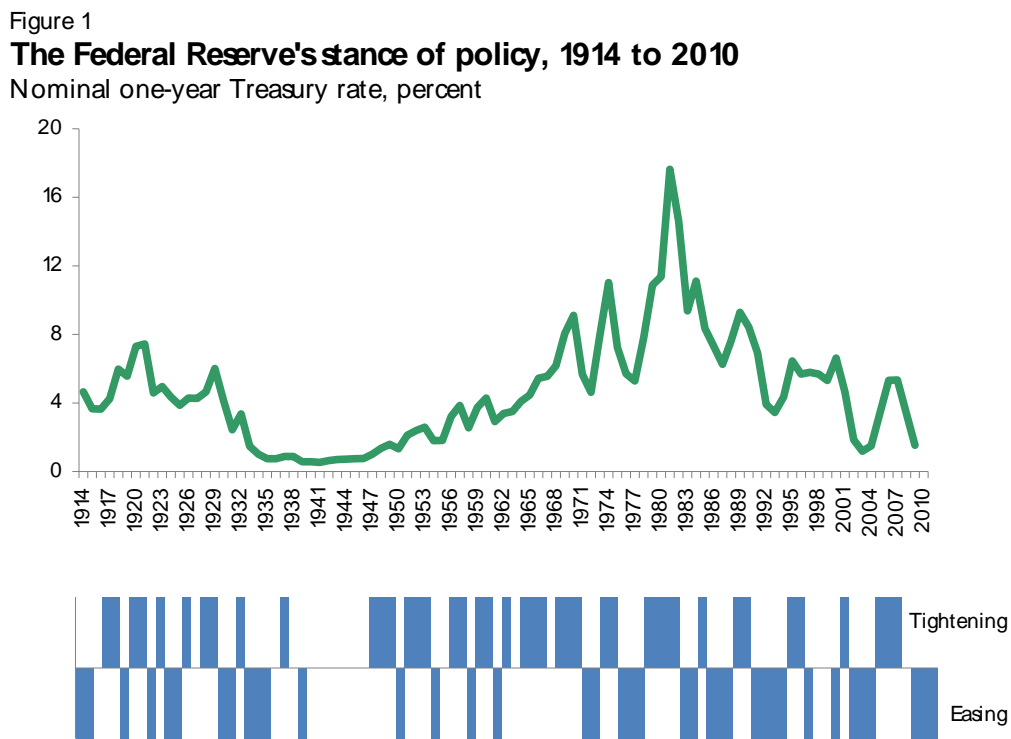
Real short-term interest rate	1.27
Real growth of dividends	1.85
Dividend/price ratio	4.46
Equity premium (short-term real return on equity less the real short-term interest rate)	7.11

Source: Shiller (1989 and 2005) and authors' calculations.

present values if the real interest rate is kept higher by one percentage point for the time (in years) given in the row stub. As is evident, tighter policy that succeeded in raising real rates for as long as three years would knock from 1 to 3 percent from the capital value of assets. To view this as a source of policy leverage that could materially and exclusively changed events of the past few years is to assume implicitly that the economy is not well anchored by real phenomena.

The limits of monetary policy in practice

If the Federal Reserve served a critical role in stabilizing the economy, then presumably it should leave a systematic imprint in financial markets. The data from Shiller (1989 and 2005) provides a helpful resource for testing this proposition, giving long time series on Treasury yields, equity and house prices, and consumer prices. The green line in the upper panel of Figure 1 plots annual observations on the one-year Treasury rate over the existence of the Federal Reserve, from 1914 to 2010, from the Shiller dataset.



We coded these observations, with year-on-year increases of more than $\frac{1}{4}$ percentage point representing a tightening, decreases of more than $\frac{1}{4}$ percentage point representing an easing, and variations in the $\frac{1}{2}$ percentage point range bracketing zero representing no change. The bars in the lower part of Figure 1 show the results, with 1 and -1 corresponding, respectively, tightening and easing of monetary policy. This simple rule accords surprisingly

well with narrative information of policy decisions. For instance, the dating from Federal Reserve correspondence of the tightening cycle from 1988 to 1992 in Reinhart and Simin (1997) matches the rule-based characterization. There are about an equal number of easing and tightening episodes (20 of the former and 21 of the latter), which also about split up equally the years of the Fed's existence. In about one-fifth of the years, the policy stance did not differ materially from the year before.²

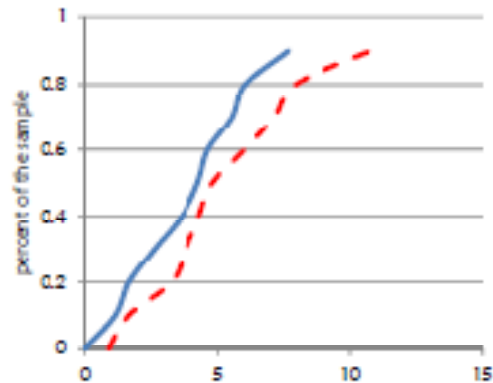
The five panels of Figure 2 show the cumulative frequency distributions over the tightening and easing policy stances for nominal short- and long-term yields and the one-year realized nominal returns on long-term Treasuries, the S&P 500 Composite equity index, and home prices.³ As is evident and reassuring to the policy identification strategy, the tightening regimes (the blue solid line) are associated with a higher short-term rate than the easing regimes (the red dashed line). But there are no significant differences in the outcomes for long-term Treasuries and home prices. Equity markets do produce outsized returns in *tightening* episodes. We may be observing the policy reaction function of monetary policy restraint in a booming share market, not a changed inducement to hold equities for different policy rates.

² An alternative identification scheme is to code unchanged years as a continuation of the prior stance. Nothing that follows would change had we adopted that rule.

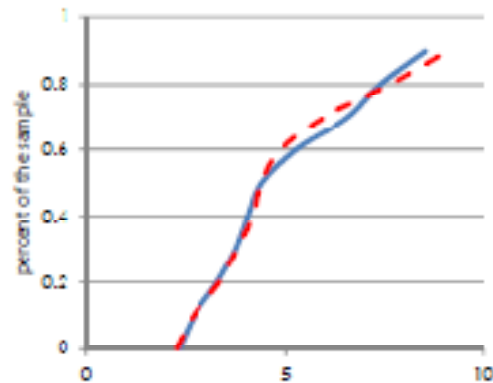
³ Redoing the figure for real returns produces identical results.

Figure 2
The market response to the Federal Reserve's stance of policy, 1914 to 2010

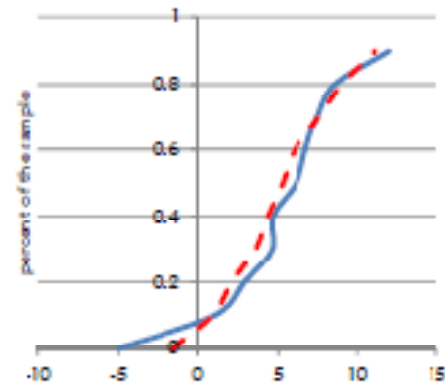
Nominal one-year Treasury rate, percent



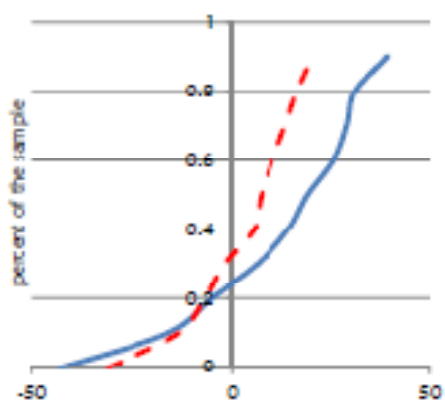
Nominal long-term Treasury yield, percent



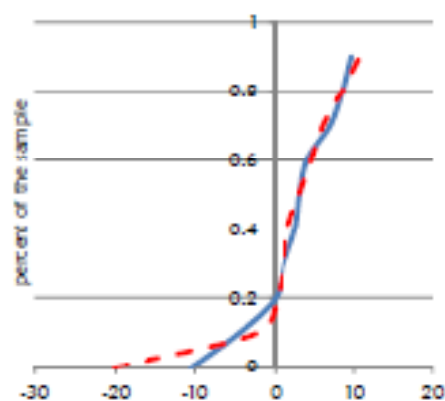
Nominal short-term return on long-term Treasuries, percent



Nominal return on equities, percent



Nominal capital gains on houses, percent



— Tightening episodes
 - - - Easing episodes

Source: updates of Robert Shiller, *Market Volatility* (MIT Press), 1989 and *Irrational Exuberance* (Princeton University Press), 2005.

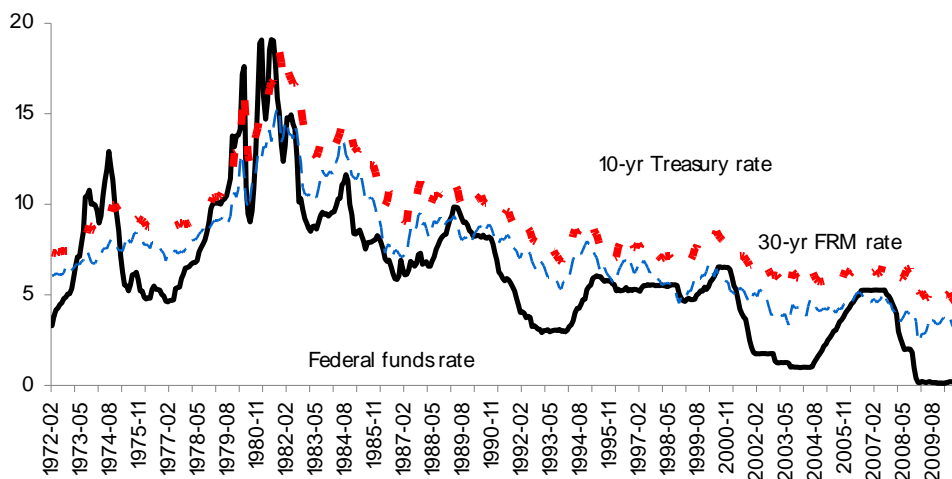
Asserting that monetary policy restraint would be associated with a notable constriction of asset prices is evidently inconsistent with the Fed's history. Of course, there are many problems associated with categorizing outcomes. Keeping in mind the "post hoc, propter hoc" argument made famous by Tobin (1970), the results are silent as to causation. Additionally, a policy instrument guided optimally to offset the effects of random and exogenous shocks of the goal variable will not be correlated with the goal variable. But the variables shown in Figure 2 are part of the transmission mechanism and intermediate to the goal of monetary policy. That is, they are part of channels through which policy affects the goal and apparently almost all systematically unrelated to the stance of policy.

The forgotten open economy

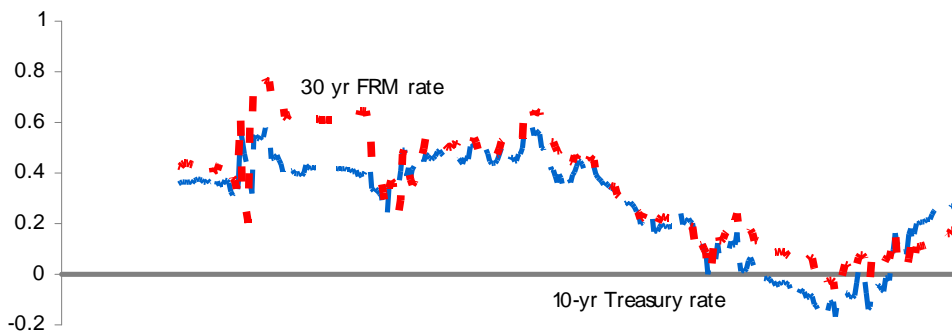
The lack of association between the stance of policy and key financial market outcomes is not an artifact of our near-century-long comparison. Consider the upper panel of Figure 3, which plots monthly observations of the overnight federal funds rate, the ten-year Treasury yield, and the rate on thirty-year fixed-rate mortgages from 1972, around the collapse of the Bretton Woods exchange rate system, onward. For the first quarter-century of the sample, interest rates moved closely together.

The two lines in the bottom panel plot the simple correlation of the changes in the ten-year Treasury yield and the mortgage rate with changes in the federal funds rate over a five-year moving window. As is evident, these correlations were typically close to one-half. In the latter parts of the 1990s, something happened and these correlations dropped off sharply. Indeed, for the whole of the period when it is asserted that the Fed kept financial conditions too accommodative, the policy rate and the most important market yield were negatively related (also see Greenspan, 2010, for a related analysis).

Figure 3
Selected interest rates, percent



Correlation with monthly changes in the funds rate over five-year moving periods



Source: Federal Reserve, H.15 statistical release, authors' calculations

There are many potential explanations for this lack of association and the limited scope for the Fed to have sharply altered the course of the past few years. The most plausible one to us is that analysts often focus too intently on the domestic economy. Probably the most dramatic set of events for emerging market economies in the late 1990s was the Asian financial crises of 1997 to 1998. The crises were cathartic for authorities in that region, who apparently as a result put a very high premium on assuring a reliable export market by managing their U.S. dollar exchange rates and building up foreign exchange reserves.

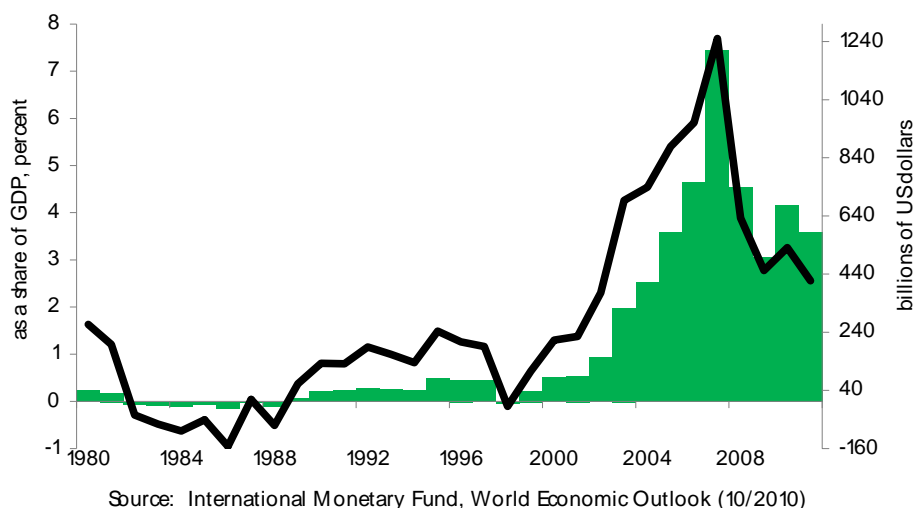
The result was a sharp pickup in reserve accumulation, shown for emerging market and developing economies in Figure 4. The bars provide the dollar amounts of annual additions to reserves, which peaked at \$1-1/4 trillion in 2007. As shown by the line, authorities in these economies were willing to direct the equivalent of around 4 to 7-1/2 percent of their nominal incomes to reserve accumulation. Indeed, as the housing bubble inflated from 2002 to 2006, these economies accumulated \$2-1/4 trillion of reserves or an average of 4-1/2 percent of their GDP. Statistics from the International Monetary Fund indicate that about two-thirds of those purchases were directed to U.S. dollar obligation.⁴

This willing funding by foreign official accounts altered the composition of finance and kept the level of long-term interest rates in the United States low. First, as for the compositional effect, foreign official entities loaded up on U.S. government securities, leaving private demands unmet. Into this void, financial engineers constructed AAA-rated dollar exposure by using housing collateral to create mortgage-backed securities and collateralized-mortgage obligations. The top tiers of those payment flows were rated by the rating agencies as triple-AAA, meeting the need, particularly, of foreign banks that were desirous of those securities' special treatment under the Basel II capital rules.

⁴ See the report, the Currency Composition of Official Foreign Exchange Reserves at <http://www.imf.org/external/np/sta/cofer/eng/index.htm>.

Figure 4

Reserve accumulation of emerging market and developing economies



This posed a problem for the investment banks that put in motion the process of financial engineering. Underwriting these complicated securities to meet the demand of foreigners for AAA-rated credit left them with bits and pieces of securities on the cutting-room floor. This unwanted residue of their own underwritings represented highly leveraged bets on the U.S. housing market that proved difficult to remove from their balance sheets.

The second main consequence of these global savings was to keep U.S. long-term interest rates lower than they would have been otherwise. Any analyst pointing to Federal Reserve policy as augmenting the housing boom must first address how the Federal Reserve might have had the leverage to do so. In the event, the simple correlation from 2002 to 2006 between its policy instrument and the rate that matters for housing activity was negative and statistically insignificant from zero. Perhaps this reduced-form coefficient represented a concatenation of partials effects that in their deep structure allowed the Fed some leeway. But perhaps not, or perhaps not in a manner than would have yielded predictable results.

Conclusion

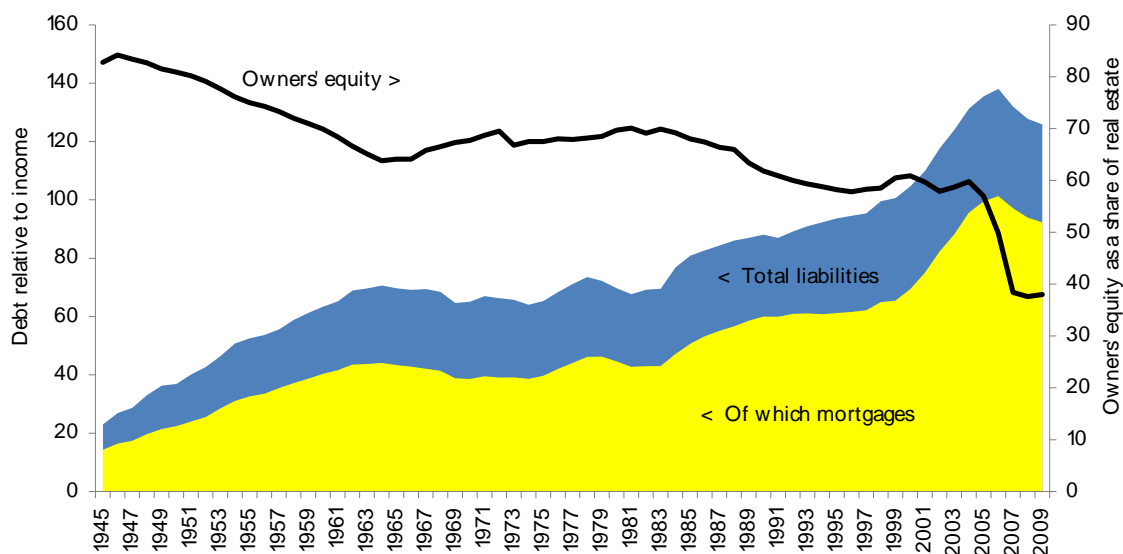
In an open economy, the central bank has less scope to influence the path of globally traded financial assets. Thus, the lack of association between the stance of policy and the longer-term rates that matter for spending—either broadly stated over the past century or narrowly focused on the past decade—should not come as a surprise. This does not, however, absolve the Fed from all responsibility.

The free flow of international capital irons out yield differentials across world markets by facilitating the exchange of financial obligations. Thus, signals from the market about domestic imbalances are not in prices but rather in quantities. And there were signals. In particular, the benign mortgage rate environment of the 2000s was associated with a marked scaling up of household liabilities. As shown in Figure 5, the total liabilities of the U.S. household sector rose about 25 percentage points of nominal income from 2002 to 2006, virtually all of which was accounted for by mortgages.

The leverage of households was rationalized at the time by the strong equity component of balance sheets—the housing equity component. The more than 20 percentage point decline in owners' equity (the solid line) commencing in 2005 showed the fragility of those underpinnings. As we demonstrated in Reinhart and Reinhart (2010), a distinct leverage cycle similar recurred in the fifteen most severe financial crises of the past century.⁵

⁵ Geanakoplos (2010) makes a forceful argument for recognizing the importance of the leverage cycle.

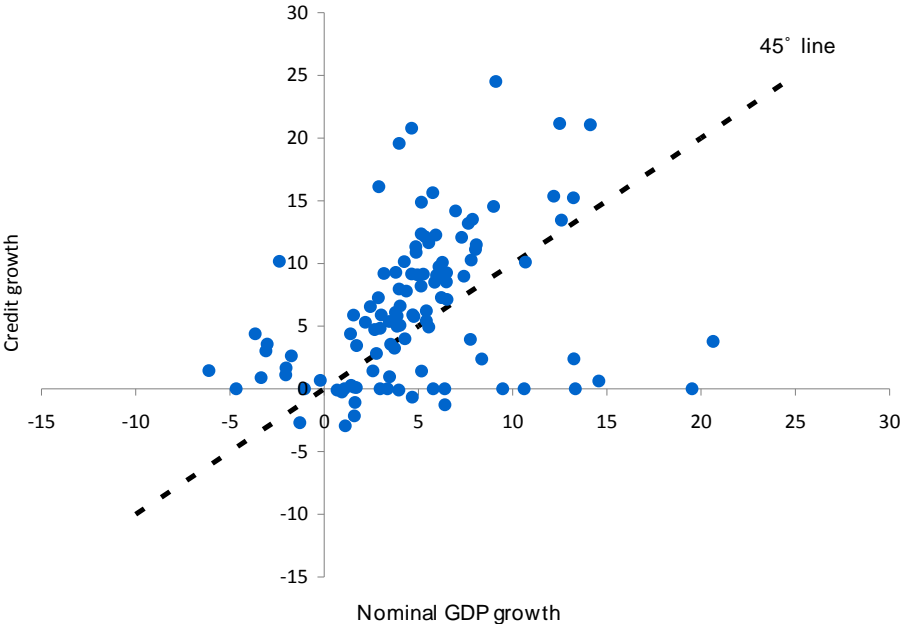
Figure 5
U.S household sector balance sheet, percent



The United States, by the way, was not alone. Figure 6 plots the annual pairs of the growth of domestic credit and nominal GDP for 11 advanced economies from 2000 to 2009. About three-quarters of the observations lie above the 45 degree line, implying sustained and widespread reliance on leverage. This suggests another avenue that has been unexplored by those criticizing Fed policy. Many other economies had systemic banking crises and fell into recession. Some of them had their own currency and an independent monetary policy (Iceland and the United Kingdom), and some did not have their own currency and a monetary policy dictated by a foreign capital (Ireland and Spain). How could Fed decisions been so central to all those shared dislocations? Moreover, none of the major economies that exhibit a “fear of floating” as in the Calvo and Reinhart (2002) and have to keep their domestic monetary policies aligned with the Fed had systemic banking crises. Why did the problems attendant to easy monetary policy, asserted to be central to our imbalances, stop at our borders?

The historical record does not provide a platform to support an outsized role for the Federal Reserve in avoiding the financial crisis. But as financial market prices tend to overshoot, so too do reputations. The fall in the Fed’s standing in the past few years owes importantly to a correction of its build-up in the years before. In part, putting the Fed pride of place in explaining the Great Moderation left its reputation vulnerable when the economy left its sweet spot. After all, pride does go before a fall.

Figure 6
Growth of domestic credit relative to nominal income
Annually across 11 economies from 2000 to 2009, percent



Source: <http://www.principalglobalindicators.org/>

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