

## PERSPECTIVES

## The Possible Misdiagnosis of a Crisis

Richard Roll

*Most explanations of the 2007–08 financial crisis—including excessive leverage, subprime mortgages, exotic derivatives, reckless risk taking, and easy money that spawned a housing bubble—are inconsistent with elementary principles of finance. The author explains the inconsistencies and suggests an alternative diagnosis that is fully compatible with rationality.*

The illness underlying the 2007–08 financial crisis might have been misdiagnosed, as is strongly suggested by some elementary principles of finance and development economics. Moreover, there is an explanation for the crisis that is fully consistent with rational beliefs and well-functioning markets. If this explanation is true, public policy prescriptions should be reexamined because there is a danger that the attempted cure is worse than the disease.

Various diagnoses have been proposed by others. They include, but are not limited to, the following:

- The subprime mortgage meltdown
- Too much leverage in financial institutions
- Inadequate regulation
- Excessive use of complex derivatives
- Excessive risk taking induced by agency conflicts
- A housing bubble induced by lax mortgage underwriting standards
- Easy money (i.e., low interest rates that triggered a housing bubble)

The last of these diagnoses, easy money leading to a housing bubble, can be examined empirically by tracing the evolution of interest rates during the run-up in real estate values from the early 2000s to mid-2007. *Nominal* interest rates were indeed quite low by historical standards during this period, but the relevant discount rates for housing values are *real* interest rates. **Figure 1** shows the evolution of real interest rates as measured by yields of Treasury Inflation-Protected Securities (TIPS) during this period. They were not low by

historical standards and actually increased concurrently with real estate prices over the alleged period of bubble expansion. For example, the yield on five-year TIPS rose from around 1 percent to 2.5 percent during this period.

Moreover, as the housing bubble began bursting in the middle of 2007, TIPS yields began a precipitous *decline* and continued to decline throughout the bursting period (see **Figure 2**). The five-year TIPS yield, probably the most relevant for mortgages, fell by more than 200 bps over this period and ended at roughly 0.5 percent a year.

During both the “bubble” expansion and its collapse, real interest rates moved in the same direction as housing prices rather than in the opposite direction. As a consequence, a competent clinician should be wary of the diagnosis that interest rates were an underlying cause of the crisis insofar as they led to a housing bubble.

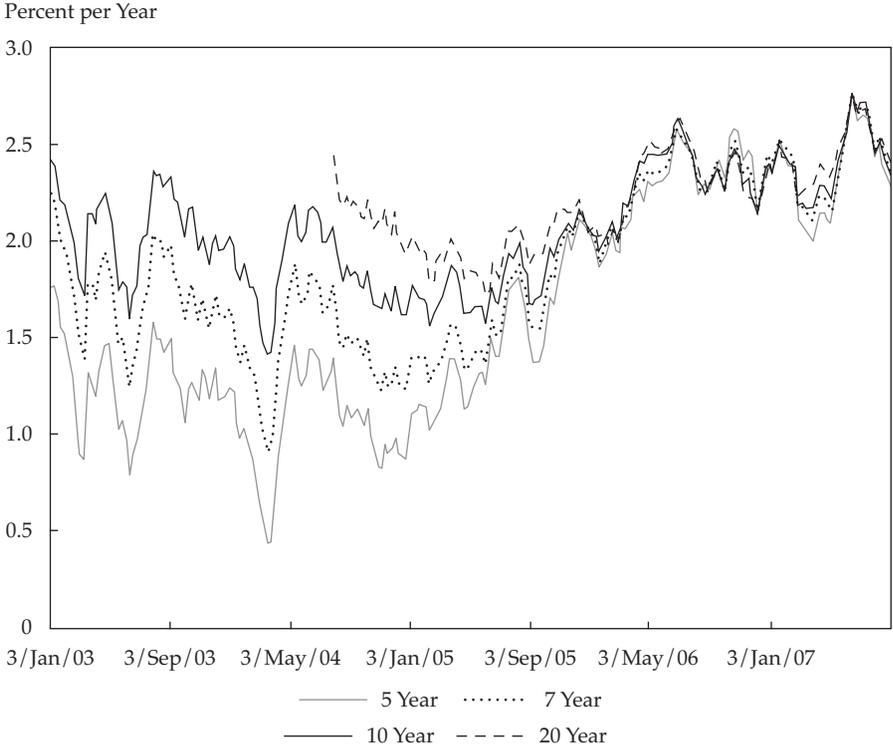
The other aforementioned diagnoses seem less susceptible to empirical examination because they are mainly related to “excessive” or “inadequate” degrees of known phenomena. Their plausibility, however, can be judged with the help of some elementary principles of finance and economic development. The following are four such principles that will be useful in this task:

1. The total value of all debt is zero.
2. The total value of all derivative contracts is zero.
3. Financial markets are forward looking.
4. A country’s prosperity is positively related to the extent of economic liberalization.

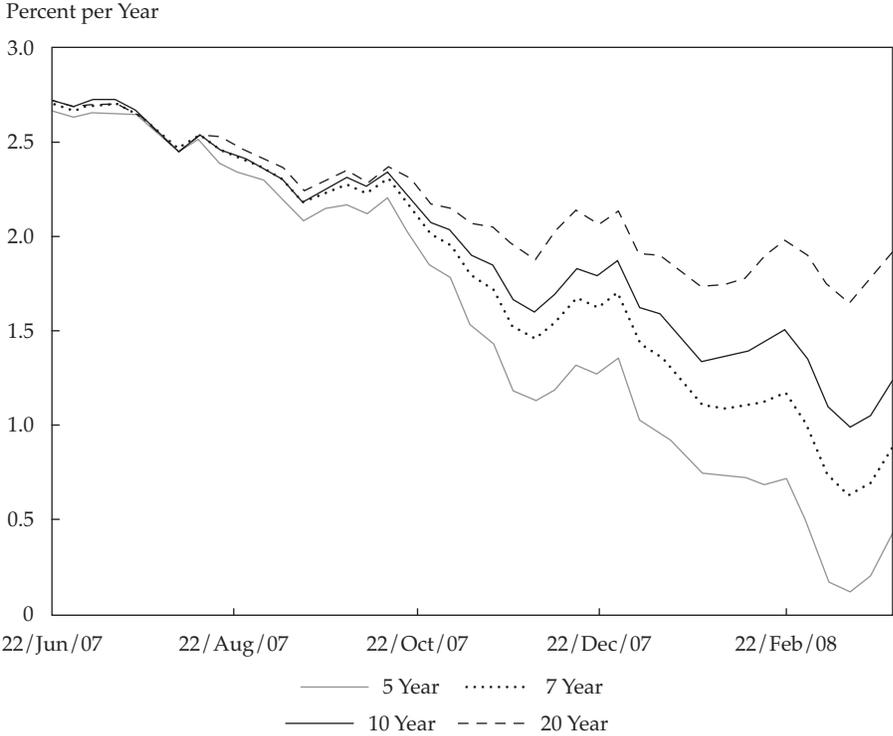
By economic liberalization, I mean an increase in the fraction of GDP spent by the private sector relative to the fraction spent by the public sector.

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**Figure 1. TIPS Yields, January 2003–August 2007**



**Figure 2. TIPS Yields during the Bursting “Bubble,” June 2007–March 2008**



## Can a Wealth Transfer Cause a Market Crash?

Suppose Warren Buffett gave Bill Gates \$20 billion. What is the net change in aggregated (total) wealth? Would markets crash as a result? Would total human capital be worth less? Would real estate values fall or rise (except in Omaha, Nebraska, relative to Seattle)? Would there be any direct impact on existing stocks of productive machinery, goodwill, or any other real asset? No, there would be little, if any, change in total wealth, output, or any other indicator of real economic activity as a result of a simple wealth transfer. This fact has important implications for the role of debt in economic crises.

## Principles 1 and 2: Debt and Derivatives Are in Zero Net Supply

Globally, there is a lender for every borrower and a seller for every buyer of a derivative contract. A liability on the balance sheet of some entity, whether it is a person, a business, or a government, is matched exactly by an asset on the balance sheet of some other entity or entities. The same is true for derivatives, including all forms of futures, options, and swaps.

If we add up all individual balance sheets, liabilities cancel out their corresponding assets, which leaves only real assets on the amassed balance sheet for the entire global economy. These real assets include machinery, equipment, intangibles (e.g., goodwill), land, buildings, and human capital. Total real wealth does *not* include any debt at all, either as an asset or a liability, nor does it include any derivative contract. Consequently, any change in the value of outstanding debt or of derivative contracts has no *direct* impact on total real wealth. Every default is simply a wealth transfer from lender to borrower.

This is true of all “credit” events, including delinquencies in mortgages, insolvencies in banks, and bankruptcies. Similarly, every derivative event, such as an option exercise or a default on a swap, is simply a wealth transfer and has no effect on the combined balance sheet of the two parties to the contract.

## Subprime Mortgages

Some recent examples of these principles pertain to subprime mortgages. Their defaults are often spotlighted as a primary triggering event in the recent crisis, although many have expressed doubt that they are large enough to have been fully responsible.

Consider the following two events: (1) A borrower defaults on a \$300,000 subprime mortgage, and the recovery value of the foreclosed property is \$200,000; (2) the lender makes a \$100,000 cash gift to the same subprime borrower. In either event, the lender’s wealth decreases by \$100,000 and the borrower’s wealth increases by \$100,000. In other words, a subprime default and a subsequent foreclosure have the same impact on both parties as a direct cash gift from lender to borrower. (This example abstracts from taxes and transaction costs, which are wealth transfers to third parties.)

Although a subprime default has no direct impact on real wealth but is merely a wealth transfer, there are associated tertiary events. The lender’s wealth reduction, induced by a transfer to the borrower, might trigger defaults on debt liabilities that the lender has with others; these defaults would entail further wealth transfers from entities that were not participants in the original subprime mortgage contract.

Whoever ends up with the final bill, the final reduction in *individual* real wealth, there is still no direct impact on the total wealth of everyone. Some are less wealthy, and others, particularly the original subprime borrower, have an increase in net worth, but there is no collective change for all entities.

There must have been, however, a triggering cause of the subprime default, probably a reduction in the real value of the underlying real estate collateral. We will consider the possible cause of that reduction in a subsequent section. This fall in real estate value *does* reduce collective real wealth. But the subprime default itself does not.

## Excessive Leverage: Another Culprit?

Many have pointed to very high leverage levels, particularly in financial institutions, as an underlying cause of the recent malaise. There is no doubt that higher leverage increases the probability of default for a given borrower; but again, default itself has no influence on total real wealth in the economy as a whole. It is simply a wealth transfer.

The triggering event underlying the distress of a financial institution is undoubtedly a value reduction somewhere in a real asset, perhaps subsequently propagated through intervening debt contracts. But leverage itself is not the culprit; it is simply the device that makes a wealth transfer more likely. Again, there is no loss collectively.

## Credit Derivatives?

Collateralized debt obligations, mortgage-backed securities, and similar derivative contracts are often mentioned as underlying causes of the crisis. Like all other debt contracts and derivatives, they are assets to some and liabilities to others and, again, their total cumulative market value is zero; they are not part of *total* real wealth.

## Can Wealth Transfers Alone Cause Reductions in Aggregate Real Wealth?

At first glance, this question seems preposterous; imagine that some entities simply hand over part of their wealth to other entities. Why would that cause a reduction in total wealth?

One possibility is that wealth transfers are secured by those with more inclination to either consume or invest. For example, rich people have lower consumption rates but perhaps higher investment rates. If wealth transfers during the crisis changed the *average* consumption or investment rate, then there might have been some marginal influence on real economic activity. The trouble with this possibility is that it represents a second-order effect at best. The 2008 worldwide decline in real asset values, perhaps as much as 50 percent, seems unlikely to have been precipitated by such a marginal influence.

It is frequently alleged, however, that wealth transfers in the credit markets can have a large *psychological* impact, inducing reassessments of future real cash flows. This view represents a behavioral theory of the crisis, a theory of irrational markets. According to this diagnosis, the patient is psychosomatically ill. A similar psychological diagnosis is advocated by those who blame the crisis on lax mortgage underwriting standards, which lenders accepted because of an irrational belief that housing prices would rise forever.

A psychosomatic illness cannot be ruled out, but two difficulties arise with such a diagnosis. First, it is easy to advocate but devilishly difficult to prove one way or the other. Second, if the diagnosis happens to be incorrect and the illness is actually physical rather than mental, truly effective remedies might not even be attempted. For example, if a patient with a brain tumor is prescribed Valium because the physician concludes that the observed dizziness and headache are psychosomatic, a positive resolution for the patient is unlikely.

In the current case, a *non-psychosomatic* explanation is available and plausible—namely, that reductions in real asset values induced wealth transfers among participants in debt and derivative contracts.

## Principle 3: Financial Markets Are Forward Looking

Under the rubric of “financial market,” I wish to include any market that establishes a “value” on the basis of the capitalization of future cash inflows. Equity markets capitalize future dividends. Real estate markets capitalize future implicit rents. Human capital markets capitalize future labor incomes.

A fundamental and pervasive principle is that current values depend on anticipations about the future. Anything in the past is “sunk costs” and has no influence on current value. What are the implications of this principle?

Real estate values began to decline in late 2007 to early 2008. Some people (e.g., Alan Greenspan) attribute the real estate crash to the collapse of a bubble, the bubble having been induced by low mortgage interest rates and an “excessive” increase in debt over the previous decade. But in reality, an increase in aggregate total debt over the previous decade could *not* have occurred because every borrower had a corresponding lender. Moreover, as we have already seen, interest rates dropped even further during the 2008 crash, which is inconsistent with the very explanation of a bursting debt bubble.

Of course, one can never completely rule out the possibility of an irrational bubble in hindsight. A simple explanation for the 2007–08 debacle is that global real estate values were simply too high and that a crash was inevitable. Why there was a bubble in the first place and why it burst when it did might forever remain unanswerable questions, which is the problem with any bubble story; it can always be concocted to “explain” everything.

Consider an alternative rational explanation: a 2007 reduction in the value of human capital, the overwhelmingly dominant component of collective total real wealth. Human capital is also the most important determinant of real estate values. People will pay what they can afford for housing. There are plausible reasons to conjecture that a negative human capital valuation shock actually occurred in 2007, although hard evidence is lacking because human capital prices are not directly observable.

Machinery, equipment, and intangible values can be observed daily, at least in part, through equity market values. Real estate values are partially observable, although less frequently—at best monthly. Human capital value is not observable until long afterward, when labor income is ultimately reported.

Given the impossibility of observing human capital values directly, the diagnostician must resort to supposition. The following is a plausible chronology of recent events, based on rationality and well-functioning markets.

First, human capital values declined precipitously from mid-2007 through 2008 because anticipated growth rates in labor income declined. This value reduction was not observed (and could not have been). If the anticipated growth rate in labor income is relatively close to the discount rate, even a small decrease in anticipated growth can have a large impact on the present value of human capital.

Second, real estate values declined either concurrently or with a short lag.

Third, as soon as these poorly observable assets became clearly less valuable, equities fell because anticipated consumption and future corporate earnings declined.

## Validity?

If the preceding chronology has any validity, we may have misdiagnosed the debt markets as the underlying cause of the crisis rather than simply the sneeze caused by the virus. But if the chronology is valid, why *did* human capital fall in value and thereby precipitate the cascade of declines in other real assets? There are two possibilities that are not mutually exclusive:

1. The valuation of human capital is irrational, as the stock market is sometimes alleged to be; there is no underlying real cause but simply a psychosomatic malady.
2. Human capital values fell because the *anticipated* growth rate in labor income declined (and it should have declined).

There is little proof, but there are plenty of reasons to suspect that the second possibility is true. If it is correct, the markets actually got it right from the very beginning!<sup>1</sup>

Markets are forward looking, and in 2007, global market participants began to notice a major sea change washing ashore in many countries. Reversing the trend of at least the previous decade, the private sector's fraction of GDP began to perceptibly decline relative to the public sector's fraction. This phenomenon was observable in Europe, Latin America, and North America—especially in the United States, where the public expenditure bailouts that began in the Bush administration and continued into 2009 brought the largest deficits in U.S. history. Other public sector plans, such as health care reform, promised to divert even more spending from the private sector to the public sector in the United States and elsewhere.

The uptrend in the growth of government and the corresponding decline in the private sector were widespread but not ubiquitous. Possible exceptions include China and India, but those countries' economies might have been damaged by the global trend. Subsequently, China and India have rebounded with the greatest vigor.

One issue that might be considered in this story is whether the relative sizes of the public and private sectors were trending in the same direction prior to 2007. At least in some countries, this possibility seems likely, but it was not universal; notable exceptions include not just the United States in the early part of the Bush administration but also such countries as Ireland, Denmark, Chile, and Brazil. But in 2007, perhaps a global "tipping point" was reached that made market participants nervous about the growth of state spending to an *irreversible* level, on average, across the globe.

## Principle 4: Prosperity Depends on Economic Liberalization

It works both ways. There are numerous recent examples of countries whose real wealth increased by a factor of four after economic liberalization (e.g., Chile, China, and India, as well as Ireland until it reversed the trend this past year).

There are numerous examples of countries whose real wealth declined by a factor of four (or even more) after economic deliberalization (e.g., Argentina, Cuba, and Zimbabwe).

The underlying reasons for this strong empirical pattern are somewhat elusive, but they probably include reduced efficiency in the public versus private sector and higher tax rates reducing incentives. According to some economists, a dollar of public spending results in substantially less than a dollar of GDP.<sup>2</sup> Whatever the cause, the phenomenon is both pervasive and dramatic in its extent. There are few exceptions to the rule that a larger public sector is associated with a lower level of prosperity, except at the extremely low levels of prosperity exemplified by non-developing nations.

In the United States, the equity markets declined by "only" 50 percent in 2008. Real estate and human capital values also declined, but the extent is hard to measure. Given the shift toward the public sector at the end of 2008, there was plenty of room for further decline, possibly by another 50 percent. The market upswing in 2009 suggests an anticipated reduction of the trend: At least in the United States, voters are having second thoughts about a dramatic increase in the

relative size of the public sector. This trend has no doubt led to a rebound in the growth rate of labor income and a concomitant increase in the value of human capital.

### What Happened in 2009 and 2010?

In some countries, such as India and China, 2009 was a good year. Their public sectors were not growing relative to their private sectors. They were hurt by other countries in 2008, but they recovered well. In the United States, the stock market recovered (partially) in 2009, which is entirely consistent with a potential reversal of public sector spending as evidenced by its growing unpopularity and its rather dramatic repudiation by the U.S. electorate in the midterm election of November 2010. This reversal of trend seems to have induced a recovery in the expected growth rate of labor income, which has led to rebounds in the prices of at least some real assets.

Unfortunately, 2010 is likely to end with a stubbornly high rate of unemployment and lethargic consumer spending. The economy is still languishing. Shouldn't we at least consider the possibility of a misdiagnosis? What if the treatment still advocated in many countries is exacerbating the symptoms and delaying recovery? What if anticipation of the current treatment led to a more severe illness in 2008?

### The Proper Treatment under the Alternative Diagnosis

If the diagnosis here is valid, a much better treatment protocol is available. The first step is to stop the current medicine because it is making the problem worse. Increased government spending and a decreased role for the private sector are simply going to prolong the malady; indeed, so long as that improper treatment continues, the patient will not improve. The global economy and the U.S. economy are destined for a long period of stagnation, akin to that experienced by the United Kingdom after World War II, until another physician like Margaret Thatcher comes along to try an alternative cure.

In principle, the patient could recover much sooner and even very quickly, but only if the political seas have truly reversed themselves and we are now embarked on a divergent tack. There is a well-proven healthy regimen: a relatively smaller public sector and a larger private sector, lower public spending, and lower taxes. It has been shown time and again to bring a dramatic improvement in economic prosperity, an improvement that can happen quickly. Perhaps it is being excessively optimistic to hope that we have learned our collective lesson and that governments can be persuaded to shrink and, by doing so, create a more prosperous era.

*This article qualifies for 0.5 CE credit.*

### Notes

1. Recent evidence suggests that the actual wage growth rate *did* decline after 2007; see Matthew Saltmarsh, "Wage Growth Slows in Western Nations," *New York Times* (16 December 2010):B8. That article cites a United Nations report that states average worldwide wage growth was 2.8 percent in 2007 but only 1.5 percent in 2008 and 1.6 percent in 2009. The anticipation of a decline in 2007 is hardly surprising because it turned out to be correct.
2. See Robert J. Barro, "Government Spending Is No Free Lunch," *Wall Street Journal* (22 January 2009):A17.