

more pressure on pharmaceutical companies to deliver affordable medicines.

The legacy of a corporate leader will in part be determined by whether she is perceived as being with or against 'us', the public — whether she shops at the Co-op or at Gucci. Choose the former for longer-term viability. ■

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End the obsession with interest

Regulating leverage, not interest rates, is the answer to a troubled economy, says **John Geanakoplos**.

In standard economic theory, the interest rate has long been regarded as the most important variable. Whenever the economy slows, and asset prices fall, economists clamour for lower interest rates to encourage more spending, and the US Federal Reserve usually obliges. It has recently obliged again, lowering the bank rate to nearly zero. But sometimes, especially in times of crisis, it's the collateral a borrower needs to post (or what economists call leverage) that is far more important.

Shakespeare got this right 400 years ago. In *The Merchant of Venice*, when Shylock grants a loan to Antonio they negotiate not just the interest rate but a pound of flesh as collateral too. It is clear which Shakespeare thought was more important: nobody who sees the play ever remembers the interest rate, which was zero.

It is apparent from everyday life that the laws of supply and demand can determine both the interest rate and leverage of a loan: the more impatient borrowers are, the higher the interest rate; the more nervous the lenders become, the higher the collateral they demand. But standard economic theory fails to properly capture these effects, struggling to see how a single

supply-equals-demand equation for a loan could determine two variables: the interest rate and the leverage. The theory typically ignores the possibility of default (and thus the need for collateral), or else fixes the leverage as a constant, allowing the equation to predict the interest rate.

Yet variation in leverage has a huge impact on the price of assets, contributing to economic bubbles and busts. This is because for many assets there is a class of buyer for whom the asset is more valuable than it is for the rest of the public (standard economic theory, in contrast, assumes that asset prices reflect some fundamental value). These buyers are willing to pay more, perhaps because they are more sophisticated and know better how to hedge their exposure to the assets, or they are more risk-tolerant, or they simply like the assets more. If they can get their hands on more money through more highly leveraged borrowing (that is, getting a loan with less collateral), they will spend it on the assets and drive those prices up.

In the absence of intervention, leverage becomes too high in boom times, and too low in bad times. As a result, in boom times asset prices are too high, and in crisis times they are too low. This is the leverage cycle.

Leverage dramatically increased in the United States from 1999 to 2006. A bank that in 2006 wanted to buy a AAA-rated mortgage security could borrow 98.4% of the purchase price, using the security as collateral, and pay only 1.6% in cash. The average leverage in 2006 across all of the US\$2.5 trillion of 'toxic' mortgage securities was about 16 to 1, meaning that the buyers paid down only \$150 billion and borrowed the other \$2.35 trillion. Home-buyers could get a mortgage leveraged 20 to 1: a 5% deposit. Security and house prices soared.

Today leverage has been drastically curtailed by nervous lenders wanting more collateral for every dollar loaned. Those toxic mortgage securities are now leveraged on average only about 2 to 1. Home buyers can now leverage themselves at only 5 to 1 if they can get a government loan, and less if they need a private loan. De-leveraging is the main reason the prices of both securities and homes are still falling.

The leverage cycle is a recurring phenomenon. The financial derivatives crisis in 1994 that bankrupted Orange County in California was the tail end of a leverage cycle. So was the 1998 emerging markets/mortgage crisis.

I have spent the past ten years mapping out the leverage cycle, and although some aspects of it are now well understood, others are not. What signs reveal when the crisis is about to begin, and how best should the government



intervene? I am now working on these and other questions, in part under the auspices of the Santa Fe Institute in New Mexico with physicist Doyne Farmer.

It is clear that the leverage cycle cannot be stopped by blaming or shaming greedy Wall Street investors or by exhortations not to panic. The cycle emerges even if — in fact precisely because — every agent is acting rationally. But this individual rationality leads to collective disaster. The government must intervene.

What the Federal Reserve should do is manage leverage, curtailing it in ebullient times and propping it up in anxious times — especially in a crisis like now. Instead, it remains obsessed with managing the economy by lending money to banks at lower and lower interest rates, hoping, for no good reason, that the banks will turn around and lower the collateral requirements they impose on borrowers.

The upshot of *The Merchant of Venice* is that the regulatory authority (the court) intervenes, not by changing the interest rate, but by imposing a collateral level different from what Shylock and Antonio freely negotiated: a pound of flesh,

but not a drop of blood. The Federal Reserve should follow Shakespeare's lead. ■

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