Regime Shift in the US Housing Market

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Abstract

The US housing market crashed in 2007, triggering the Subprime Crisis and thereafter the Global Financial Crisis. The world economy has yet to recover fully from this downturn, and already another housing market crash may be looming just over the horizon. This time round, the regional housing bubble straddling China, Hong Kong, Korea, Singapore, Taiwan, India, Malaysia, Indonesia, and the Philippines dwarfs the scale of the US housing bubble before it collapsed, stoking fears that the world economy will be in for a long and deep economic recession. Asian governments are racing against time to deflate their housing bubbles, but it is not clear that the measures they employed will be effective. Clearly a better understanding of housing bubbles and housing market crashes is necessary, and what better example to study than the most recent US housing market crash? We tested the time series of several US housing market variables across a large number of US cities for early warning signals preceding regime shifts, and found evidence for not one, but two critical transitions [1]. The first occurred in Oct 2003, and is associated with an abrupt increase in the proportion of subprime loans. The second occurred in Oct 2008, and is associated with stock market crashes triggered by the bankruptcy of Lehman Brothers. Averaging the normalized homes sold variable over our cross section of US cities, we fit the smoothed trajectory to a Landau-like free energy landscape model. Assuming relaxation dynamics for the homes sold variable, we found that a driving phase is necessary to destabilize the normal US housing market regime. Driving stopped only after crossing the saddle-node bifurcation point, and thereafter the US housing market relaxed towards the collapsed regime in the transient phase. Checking the timeline of Federal Reserve interest rate adjustments, we found that driving started when the federal funds rate went below 1.75%, and stopped when the federal funds rate went above 3%. Noting this close association between driving and interest rate adjustments, we tested the free energy landscape model to find that it is always possible to obtain a soft landing for the US housing bubble, provided that driving is stopped before the bifurcation point. This suggests that the Subprime Crisis would not be so bad, if the Federal Reserve had implemented a timelier tightening of their monetary policy following the brief economic recession triggered by the 2000 Technology Bubble Crisis.

References

[1] P. L. J. Tan and S. A. Cheong, "Critical slowing down associated with regime shifts in the US housing market", European Physical Journal B **87**, 38 (2014).